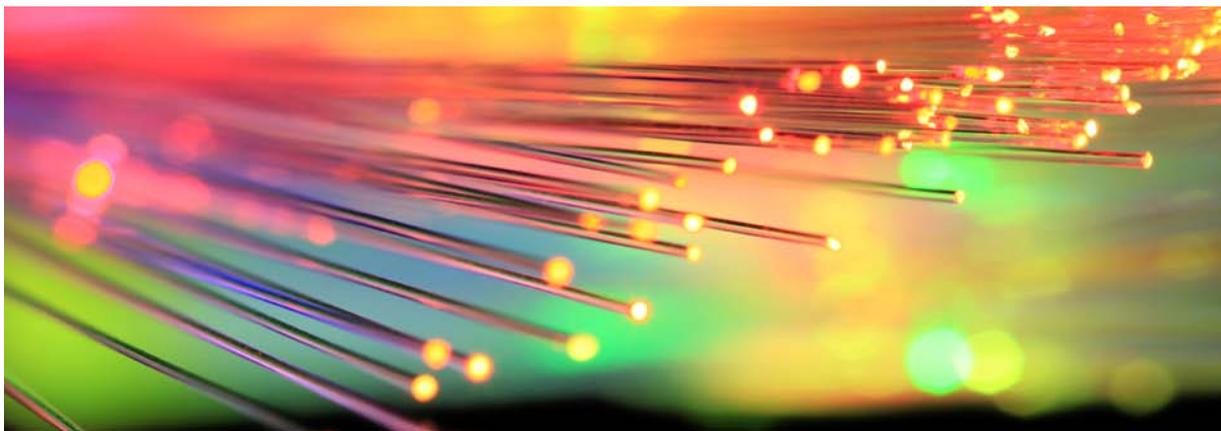


Developing Broadband in Maine: Baseline Update 2013

Volume I

Prepared by James W. Sewall Company for the ConnectME Authority
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Developing Broadband in Maine: Baseline Update 2013 Volume I

The ConnectME Authority Broadband Planning Project

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1.0 Executive Summary

1.1 TASK

This report updates the findings of the ConnectME Authority's *Broadband Needs Assessment* (2011), a comprehensive analysis of broadband availability and use in Maine and of the barriers to broadband adoption throughout the state.¹ It summarizes the results of new surveys of Maine broadband providers and consumers and compares these results with the 2011 findings, identifying areas of recent broadband growth. This information will be used to strengthen and enhance the Authority's strategies for increasing broadband awareness and uptake as outlined in the Authority's *Broadband Strategic Plan* (2012), and to provide an updated baseline against which such implemented strategies can be evaluated.²

1.2 METHOD

The data upon which this update is based was acquired in several ways. Using the same process as the 2011 assessment, a statewide statistical survey was mailed to over 10,000 residences and 3,500 businesses, yielding a high response rate of 23 percent and 10 percent respectively. Federally defined community anchor institutions, health organizations and Native Indian Tribes were surveyed separately using new, expanded online questionnaires. Survey data on Maine's primary educational institutions were drawn from a recent third-party study. Non-proprietary broadband service provider data were drawn from the Authority's Broadband Inventory and Mapping Project that is proceeding in parallel with this study. Additional raw and comparative data were secured from a number of governmental and other sources as described herein. Assessment analyses were based on rigorous economic modeling as well as expert content analysis by team and Authority members.

¹ *Developing Broadband in Maine: Needs Assessment*, v. 1-2, prepared by James W. Sewall Company for the ConnectME Authority, 10 June 2011, as part of the Authority's Broadband Planning Project.

² *Developing Broadband in Maine: Strategic Plan*, prepared by James W. Sewall Company for the ConnectME Authority, 24 April 2012, as part of the Authority's Broadband Planning Project.

1.3 SUMMARY RESULTS

A summary of key results from the 2013 survey and comparative analysis follows. Details and supporting data are in the body of the report.

Broadband Availability and Use

Maine Locations:

- 93.1 percent of Maine street locations currently have access to some form of broadband connection from at least one service provider, an increase of 2 percentage points since 2011.
- Maine municipalities are served by an average of 4.7 providers, an increase of 0.4 providers since 2011.
- 43 percent of geographic area coverage of the state has access to fourth-generation mobile broadband, an advanced high-speed technology not available in 2011.

Maine Households

- 89.8 percent of surveyed Maine households currently have some form of internet connection from at least one provider, which represents little change since 2011.
- 75.3 percent of surveyed Maine households currently subscribe to broadband, a statistically significant increase over 72.7 percent in 2011.
- 47.6 percent of surveyed Maine households use mobile devices, almost doubling the percentage of usage in 2011.

Maine Businesses

- 93.7 percent of surveyed Maine businesses currently have some form of internet connection, an increase of 2 percentage points since 2011.
- 93.1 percent of surveyed Maine businesses subscribe to broadband, an increase of 7 percentage points since 2011.
- 46.3 percent of surveyed Maine businesses use mobile devices, an increase of 14.0 percentage points since 2011.

Consumer-Identified Barriers to Broadband Use

- The greatest barriers to broadband adoption for surveyed households continue to be lack of perceived need or value in owning a computer (54.1%), which increased 9.4 percentage points since 2011, and cost (18.3%), which decreased 3 percentage points since 2011.
- The greatest barriers to broadband adoption for surveyed businesses continue to be lack of perceived need or value in having an internet connection (54.6%), which increased 15.5 percentage points since 2011, and cost (18.2%), which decreased 10.1 percentage points since 2011.

Demographic Factors Driving Broadband Use

- Demographic factors that affect broadband use together with Maine’s national ranking in these categories show that Maine continues to rank high in those areas that retard broadband uptake and low in those areas that accelerate it.
 - Factors associated with increased broadband use in Maine are households with one or more children under the age of 18, households with more than three people, and small businesses in the finance and insurance industry (Table 1-1). As in 2011, Maine’s ranking relative to all US states is 48th out of 50 in the percentage of households with one or more children under 18, the percentage of households with more than three people, and the percentage of small businesses in the finance and insurance sector.
 - Factors associated with decreased use in Maine are households with annual incomes of less than \$15,000, households comprised of people over the age of 64, and small businesses with fewer than five workers. As in 2011, Maine’s ranking relative to all US states is 18th out of 50 in the percentage of households with annual incomes of less than \$15,000, 5th out of 50 in the percentage of households with one or more people over the age of 64, and 9th out of 50 in the percentage of establishments with one to four employees.

Table 1-1: Drivers of Computer Use and Broadband Internet Subscribership by Maine Households and Small Businesses

Factors that increase use/subscribership:	Maine’s ranking relative to all US states:
Households with one or more children under the age of 18	48 th out of 50 in % of households with one or more children under 18
Households with more than 3 people	48 th out of 50 in % of households with more than 3 people
Small businesses in the finance and insurance industry	48 th out of 50 in % of small businesses in the finance and insurance sector
Factors that decrease use/subscribership:	Maine’s ranking relative to all US states:
Households with annual incomes of less than \$15,000	18 th out of 50 in % of households with annual incomes of less than \$15,000
Households comprised of people over the age of 64	5 th out of 50 in % of households with one or more people over the age of 64
Small businesses with fewer than 5 workers	9 th out of 50 in terms of % of establishments with 1 to 4 employees

1.4 COMMON THEMES

In analyzing the data and information collected in 2013, five major themes emerge, the first four of which were identified in the 2011 needs assessment.

1. *The general need and demand for higher levels of broadband service driven by social, economic, and technological factors are increasing.*

Although more household and business respondents report increased satisfaction with the delivery of basic internet services for communications, email and social media, particularly for the cost they pay, a growing number of consumers in business, government, health and educational sectors identify the growing need for higher-speed broadband with greater bandwidth to conduct more business functions online and to deliver new and enhanced services to Maine citizens and communities. With faster internet, Maine businesses indicate they would do more web site development and business in general; CAIs would do more online training and recordkeeping; schools would engage in innovative digital testing and learning; libraries would advance digital literacy efforts; and healthcare organizations would provide more telemedicine services. Among state agencies, the demand for wireless broadband access, online data sharing, and advanced public safety communications is driving the need for greater bandwidth.

2. *Although Maine's coverage for basic broadband services has increased, current service levels in many locations are still too low to support the growing network demands of higher level applications.*

Most of Maine (93.1% of street locations) is now served with lower-speed broadband (at least Tier 1), and the availability of broadband internet technologies, specifically DSL, fixed wireless, cable and fiber, has increased across the state. Although access to higher-tiered services (Tier 3 and Tier 5) has increased significantly since 2011, lower-speed broadband and the use of traditional copper wire networks still prevail. As noted above, consumers and businesses are satisfied with the basic level of internet service for communications and social media, the primary activity for which they subscribe. At the same time, more stakeholders recognize the need for speeds as high as Tier 5 and greater network capacity to support such beneficial applications as telecommuting and videoconferencing, remote education and digital learning, telemedicine and real-time medical image consultation. Although Maine's national rankings in deployment of broadband and in broadband download capacity have increased, the state continues to lag behind most other states, and a large population of Maine citizens remains underserved.

3. *Lack of perceived value in computer use and internet adoption has solidified as the most significant factor for nonsubscribers of broadband services.*

The primary barrier to broadband subscribership among Maine households and businesses is lack of interest or perceived value in owning a computer or in having an internet connection, respectively. Although household and business subscribership has increased since 2011, reducing the number of non-adopters in both stakeholder groups, the percentage of non-adopters that cite these barriers as primary has risen, as opposed to the percentage that cite cost, which has decreased.³ In addition, among residential consumers, the gap between the desire to purchase a computer and the actual plan to do so has widened. A major influencing factor is Maine's demographics, particularly an aging population and households of only senior citizens. It should be noted that respondents to the 2013 household survey sample comprised an older survey sample than the 2011 sample.

4. *Maine's demographics continue to present a challenge to broadband advancement.*

Relative to other states, Maine's demographics continue to rank high in areas that retard broadband uptake—households with people over the age of 64 and incomes less than \$15,000, and small businesses with fewer than five workers—and to rank low in areas that accelerate it—households with more than three people and one or more children under the age of 18, and small businesses in the finance and insurance industry. Key drivers of broadband advancement that offset the challenge of Maine's demographics are shown to be educational attainment among households and the type of internet technology used among households and businesses, including mobile devices. Accessible, easy to learn, and multipurpose, mobile devices can remove barriers to computer and internet use, particularly among older citizens, and generate demand for broadband services.

5. *Mobile wireless service is more widely available and used by consumer and business communities to complement other internet technologies.*

Significant growth in the use of mobile devices has occurred across all stakeholder groups since 2011. As with most other internet technologies, the migration to mobile wireless is at a basic level—for email, social media and other forms of communications—and at current speeds and network capacities, mobile cannot support many business, healthcare, educational,

³ PCs for Maine, a program of the Information Technology Exchange, a nonprofit organization dedicated to increasing technology access and literacy, is successfully addressing barriers to computer ownership, including cost, access, and education. Ongoing since 2002, the program provides low-cost, refurbished computer systems and online tutorials to individuals, families, schools, libraries, and nonprofit organizations throughout Maine. <http://www.pcsformaine.org/>; <http://www.itec3.org/>

and public safety applications. Also most stakeholders use mobile in conjunction with other internet technologies. Only 2.8 percent of residential respondents, for example, use mobile devices as their sole means of connecting to the internet. With the advent of 4G mobile technology and spread of mobile provider coverage, however, this percentage can be expected to grow. Given its popularity and ease of use, mobile wireless can be a powerful digital learning tool, increasing access to, demand for, and adoption of broadband in Maine.

1.5 RECOMMENDATIONS

The summary above and the detailed analysis that follows provide the basis for the recommendations below, which can be used to strengthen and enhance the Authority's strategies for increasing broadband awareness and uptake and to implement the State broadband policy provisions of the Advanced Technology Infrastructure Act.⁴

- *Consider redefining minimum broadband service at a speed level 3 to 6 Mbps, formalizing the definition of underserved, as provisioned in the Advanced Technology Infrastructure Act.*⁵

Enlarging the area of unserved and identifying areas of underserved in the state will:

- Help focus funding on higher-capacity broadband services to meet critical business, educational, healthcare, and public safety needs, promoting "availability to all individuals, businesses, and institutions,... including those that require ultra-high-speed internet access"⁶
 - Bring support to the underserved, targeting broadband development in areas with the highest level of broad-based benefit
- *Encourage public-private partnerships to fund a complete buildout of existing infrastructure, leveraging initiatives of healthcare, schools and libraries, business, and the public safety broadband network.*

Completing the buildout will:

- Maximize Maine's existing physical infrastructure to support, strengthen and integrate Maine's logical infrastructure, including business, healthcare, education, and public safety initiatives

⁴ MRSA 35-A §9202-A. <http://www.mainelegislature.org/legis/statutes/35-A/title35-Asec9202-A.html>

⁵ MRSA 35-A §9204. <http://www.mainelegislature.org/legis/statutes/35-A/title35-Asec9204.html>

⁶ MRSA 35-A §9202-A. <http://www.mainelegislature.org/legis/statutes/35-A/title35-Asec9202-A.html>

- Grow business and retain IT expertise in the state, attract business from out of state, and improve Maine’s national ranking in the deployment of broadband telecommunications
 - Promote service provider competition, invigorating the drive to innovate, to invest in higher-capacity technologies, and to provide service that creates more consumer value for the dollar
- *Provide educational outreach on broadband’s value proposition (the benefits for the cost), targeted to specific audiences within each stakeholder group, including older citizens and small businesses.*⁷
A key driver of broadband internet subscribership, education on broadband’s benefits and opportunities will:
 - Encourage non-adopters to obtain a computer and to connect to the internet, closing the computer/internet gap and increasing the number of subscribers in the state
 - Encourage adopters to seek the advantages of higher-speed broadband, including distance-learning opportunities, telemedicine, and business out of state, advancing the knowledge, health and welfare of Maine’s citizens
 - Increase broadband uptake in the state, improving Maine’s ranking nationally
 - *Embrace mobile technology as broadband and leverage its power as a demand generator*⁸ to drive broadband adoption.
Recognizing 4G mobile technology as broadband will:
 - Support the use of mobile devices as an introductory learning tool for computer and internet non- and late-adopters, helping to offset the challenge of Maine’s demographics
 - Increase availability of high-speed broadband service, particularly in remote areas with challenging terrain, helping to solve the problem of last-mile access
 - Increase broadband uptake in the state, improving Maine’s ranking nationally
 - Increase broadband funding through additional monthly surcharges on mobile services
 - Encourage mobile providers to innovate, including advancing transmission speeds and capacity

⁷ Section 2E, MRSA 35-A §9202-A. <http://www.mainelegislature.org/legis/statutes/35-A/title35-Asec9202-A.html>

⁸ A *demand generator* is an entity, activity or event that drives customers into a marketplace and produces demand.

2.0 Broadband in Maine—Update

To update the 2011 baseline assessment, the Sewall Team surveyed Maine broadband suppliers and consumers on broadband availability, use, drivers of adoption and barriers to adoption in the state. The team also collected relevant information from existing industry, federal and state sources, including map data from the ConnectME Authority Broadband Mapping and Inventory Project. These results were used in economic modeling of broadband availability and demand for services to determine demographic factors influencing both provider deployment and consumer adoption.

A summary of new findings and key changes in Maine broadband are provided in this section together with a review of Maine’s current status and differentiation in the national broadband industry.

2.1 DEFINING BROADBAND

As in the 2011 baseline assessment, we define broadband according to two criteria: (1) transmission speed and (2) type of technology. In our analysis of broadband availability, *transmission speed* is the defining factor. In our analysis of broadband adoption, *type of technology* is the defining factor.

Broadband Transmission Speed

Broadband levels of service are generally understood to provide higher speeds of data transmission, allowing more content to be carried through the telecommunications line, or transmission “pipeline.” Connection speed is determined by bandwidth—the amount of data that can be transmitted at any given period of time—and by latency—the amount of time it takes to transmit the data. In brief: the broader the bandwidth, the faster the connection. The FCC defines broadband in a tiered approach with distinct levels based on upload and download speeds.

For purposes of this update, broadband understood as transmission speed is defined as transmission speeds at and above Tier 1. In May 2011, the ConnectME Authority approved adopting the FCC’s seven speed tiers definition of broadband with a preference for funding projects that provide service at Tier 3 or better.

Table 2-1: FCC's Seven Tier Broadband Classification

FCC Speed Tier	Upload/Download Speeds	Broadband (Y/N)
• 1 st Generation Data	200 kbps to < 768 kbps	No
• Tier 1	768 kbps to < 1.5 Mbps	Yes
• Tier 2	1.5 Mbps to < 3 Mbps	Yes
• Tier 3	3 Mbps to < 6 Mbps	Yes
• Tier 4	6 Mbps to < 10 Mbps	Yes
• Tier 5	10 Mbps to < 25 Mbps	Yes
• Tier 6	25 Mbps to 100 Mbps	Yes
• Tier 7	> 100 Mbps	Yes

At the time this report goes to press, the FCC is finalizing the transition of its reporting process for broadband availability by all categories of internet service providers. The reporting standard adopted in June 2013 for implementation in 2014 updates the requirements for reporting by all internet service providers that transmit data via fixed landline, including telephone, cable, fiber optic, electric or any service systems and all spectrums and technologies, licensed or unlicensed. Reporting will include among other information technology types, maximum advertised download transfer rates and maximum upload transfer rates. For purposes of both current and future readers of this text, we provide Table 2-2, which correlates the current definitions for broadband service within Maine and the standards adopted by the FCC beginning in 2014.

Table 2-2: Correlation of Broadband Tier and FCC Reporting Ranges for Download Transfer Rates

Correlation of Broadband Tier and FCC Reporting Ranges for Download Transfer Rates ⁹	
Maine Broadband Tier	FCC Reporting Ranges for Download Transfer Rates
• Tier 1	Code 3: Greater than or equal to 768 kbps and less than 1.5 Mbps
• Tier 2	Code 4: Greater than or equal to 1.5 Mbps and less than 3 Mbps
• Tier 3	Code 5: Greater than or equal to 3 Mbps to and less than 6 Mbps
• Tier 4	Code 6: Greater than or equal to 6 Mbps and less than 10 Mbps
• Tier 5	Code 7: Greater than or equal to 10 Mbps and less than 25 Mbps
• Tier 6	Code 8: Greater than or equal to 25 Mbps and less than 100 Mbps
• Tier 7	Code 9: Greater than or equal to 100 Mbps

⁹ Instructions for Local Telephone Competition and Broadband Reporting (FCC Form 477), p. 18. <http://transition.fcc.gov/Forms/Form477/477inst.pdf>

Broadband Technologies

Broadband can also be defined by specific technologies that achieve higher speeds of data transmission. With the exception of dial-up, the technologies shown in Table 2.3 can achieve Tier 1 speeds of 768 kbps or more. Of these technologies, five are defined in this study as broadband, including DSL, cable, fixed wireless, T-1, and fiber optic.

Table 2-3: Internet Technologies¹⁰

Technology	Broadband (Y/N)*	Download Speeds	Upload Speeds
• Dial-up	No	Up to 56 kbps	Up to 33.6 kbps
• Electric power line	No	500 kbps – 3 Mbps	500 kbps – 3 Mbps
• Satellite	No	768 kbps – 3 Mbps	256 kbps – 1 Mbps
• Mobile	No	768 kbps – 100 Mbps	256 kbps – 25 Mbps
• Fixed wireless	Yes	768 kbps – 3 Mbps	256 kbps – 1 Mbps
• T-1	Yes	1.5 Mbps	1.5 Mbps
• DSL	Yes	768 kbps – 25 Mbps	256 kbps – 5 Mbps
• Cable	Yes	768 kbps – 100 Mbps	256 kbps – 25 Mbps
• Fiber optic	Yes	768 kbps – > 100 Mbps	256 kbps – ≥ 100 Mbps

* Broadband as defined in this study.

Satellite technology, because it is subject to latency or delays in transmission, is not considered a type of broadband, and only recently does mobile wireless service, through the development of fourth-generation (4G) technology such as long-term evolution (LTE), meet the speed criteria. As a result, we studied satellite and mobile services more generally as internet technologies rather than specifically as broadband. Electric power line services, which are not available in Maine, were not under consideration.

Although our study does not include mobile wireless as a type of broadband technology, 4G LTE now offers speeds that achieve broadband levels. According to the NTIA, as of June 2013, 80.6 percent of Americans have access to advanced mobile broadband.¹¹ In Maine, the availability and use of mobile wireless—whether at broadband speeds or not—have increased dramatically in the last two years. Accessible, easy-to-learn, this rapidly evolving technology promises to have a significant impact on Maine broadband in the future.

¹⁰ Sources used for Tables 2-3 and 2-4 include: Broadband in Washington Annual Reports, 2010, 2012, State of Washington Broadband Office; <http://www.commerce.wa.gov/Programs/Infrastructure/Broadband/Pages/AnnualReport.aspx> and About.com Guide, 1 October 2011; <http://broadband.about.com/b/2011/10/01/broadbandspeedtable.htm>; http://compnetworking.about.com/od/networkcables/f/t1_t3_lines.htm

¹¹ NTIA, “Exploring the Digital Nation: America’s Emerging Online Experience,” June 2013.

Table 2-4: Download and Upload Speeds for Types of Applications

Application	Download Speeds	Upload Speeds
<ul style="list-style-type: none"> • Basic email • Voice over IP (VOIP) • Browsing • YouTube video 	768 kbps – 1.5 Mbps	256 kbps – 896 kbps
<ul style="list-style-type: none"> • Remote surveillance • Telecommuting • Streaming music • Standard definition video 	1.5 Mbps – 3 Mbps	356 Kbps – 1 Mbps
<ul style="list-style-type: none"> • Internet protocol television (IPTV) • File sharing (small/medium files) 	3 Mbps – 6 Mbps	356 kbps – 1 Mbps
<ul style="list-style-type: none"> • Video on demand • Remote diagnosis (basic) • Online gaming 	6 Mbps – 10 Mbps	768 kbps – 2 Mbps
<ul style="list-style-type: none"> • IPTV high definition (HD) • Telemedicine • Remote education 	10 Mbps – 25 Mbps	2 Mbps – 5 Mbps
<ul style="list-style-type: none"> • HD video surveillance • Smart/intelligent building control • Educational services 	25 Mbps – 50 Mbps	5 Mbps – 10 Mbps
<ul style="list-style-type: none"> • Video conferencing • Multiple educational services • Research applications • Remote supercomputing 	50 Mbps – 100 Mbps	10 Mbps – 25 Mbps
<ul style="list-style-type: none"> • Real-time data collection • Real-time medical image consultation 	> 100 Mbps	≥ 100 Mbps

2.2 SUMMARY STATUS

Summary information on Maine’s current and changing status in the broadband industry is provided below, with a focus on broadband availability, speed, adoption, and infrastructure in the state.

2.2.1 Broadband Availability

According to 2013 survey results, 93.1 percent of Maine locations¹² have access to one or more broadband technologies that achieve the FCC’s Tier 1 speed definition of 768 kbps to 1.5 Mbps downstream and upstream. This percentage has increased 2 percentage points from 91.1 percent as measured in the 2011 needs assessment.

¹² Location information is based on E911 address data. A location is defined as a range of addresses along a street or road that may or may not have occupied houses (households) or businesses.

Fixed wireless shows the most robust expansion in deployment, increasing from 15.7 to 19.8 percent of Maine addresses.

When speeds increase to Tier 3, broadband availability in Maine drops to 84.9 percent and to 20.8 percent for Tier 5 internet service. Since 2011, however, Tier 3 broadband availability has risen by 71.6 percent and Tier 5 by 14.5 percent (Figures 2-1-2-8).

As noted earlier, the availability and use of mobile wireless to connect to the internet have increased dramatically. In the last two years, 3G mobile area coverage of the state grew from 59 percent to 66 percent; 4G coverage, from 0 percent to 43 percent (Figure 2-9).

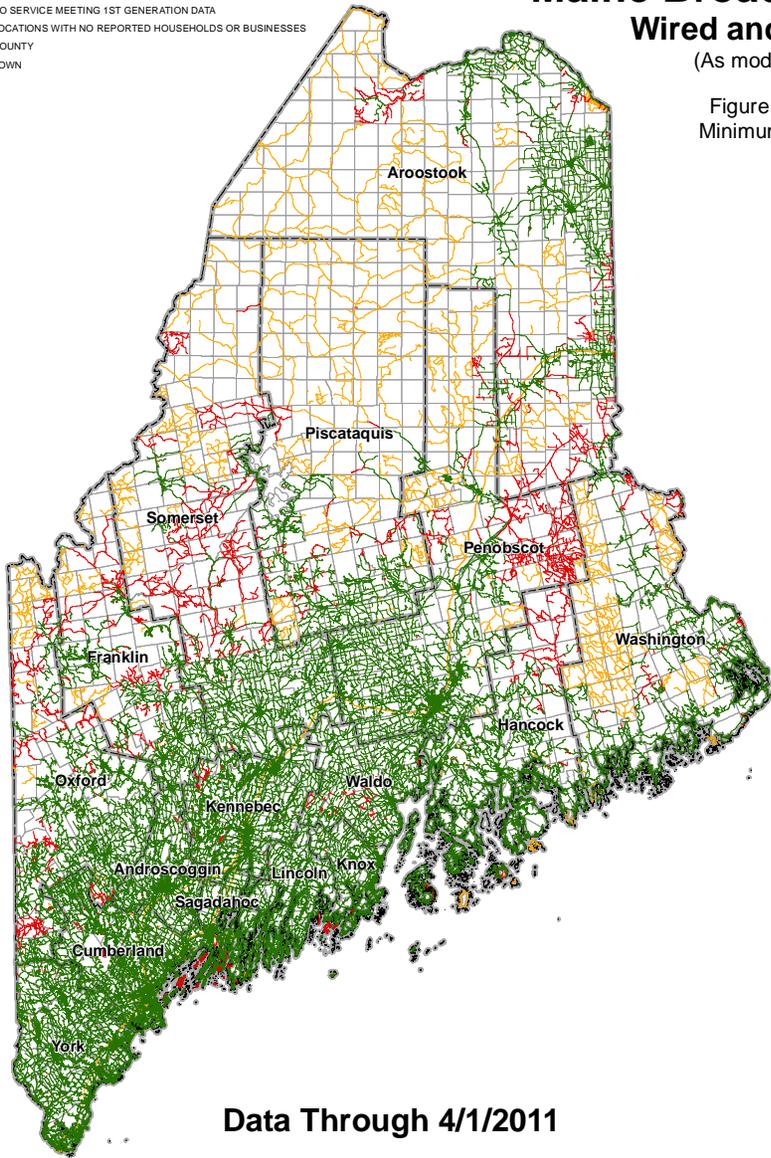
- Legend**
- SERVICE MEETING 1ST GENERATION DATA
 - NO SERVICE MEETING 1ST GENERATION DATA
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

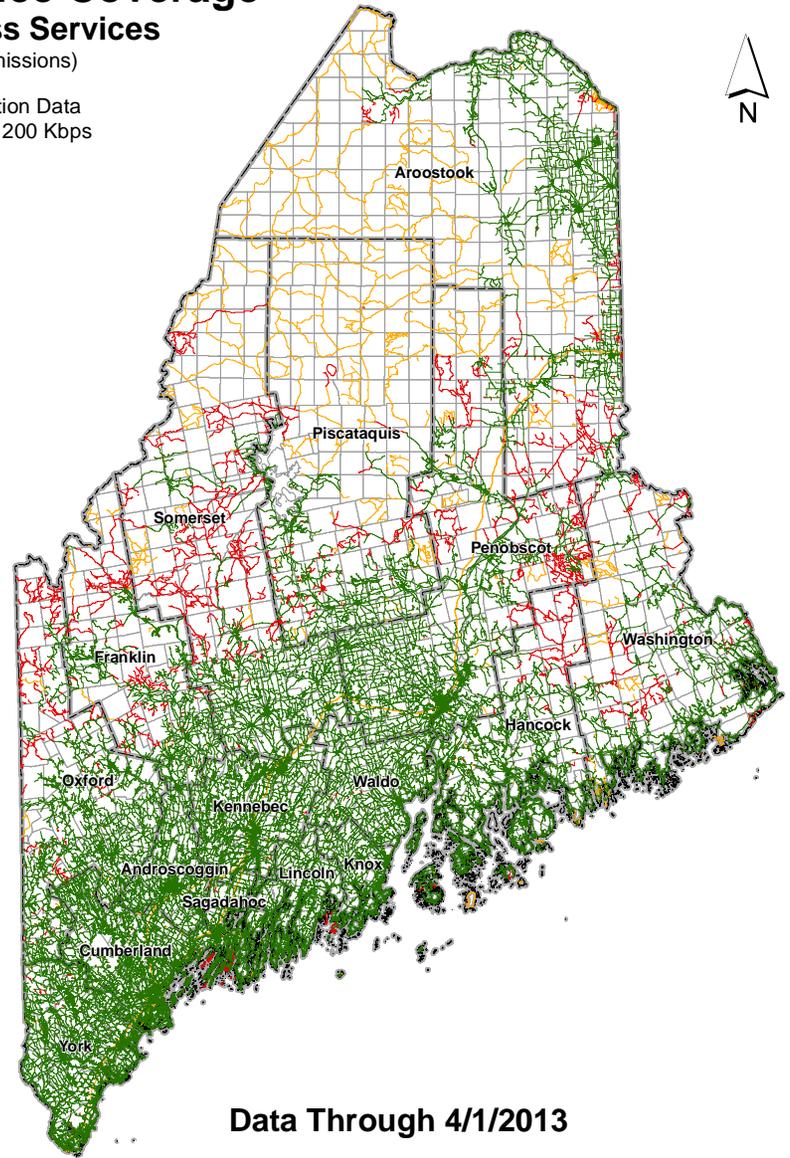
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-1: FCC First Generation Data
Minimum Advertised Speeds of 200 Kbps



Data Through 4/1/2011



Data Through 4/1/2013

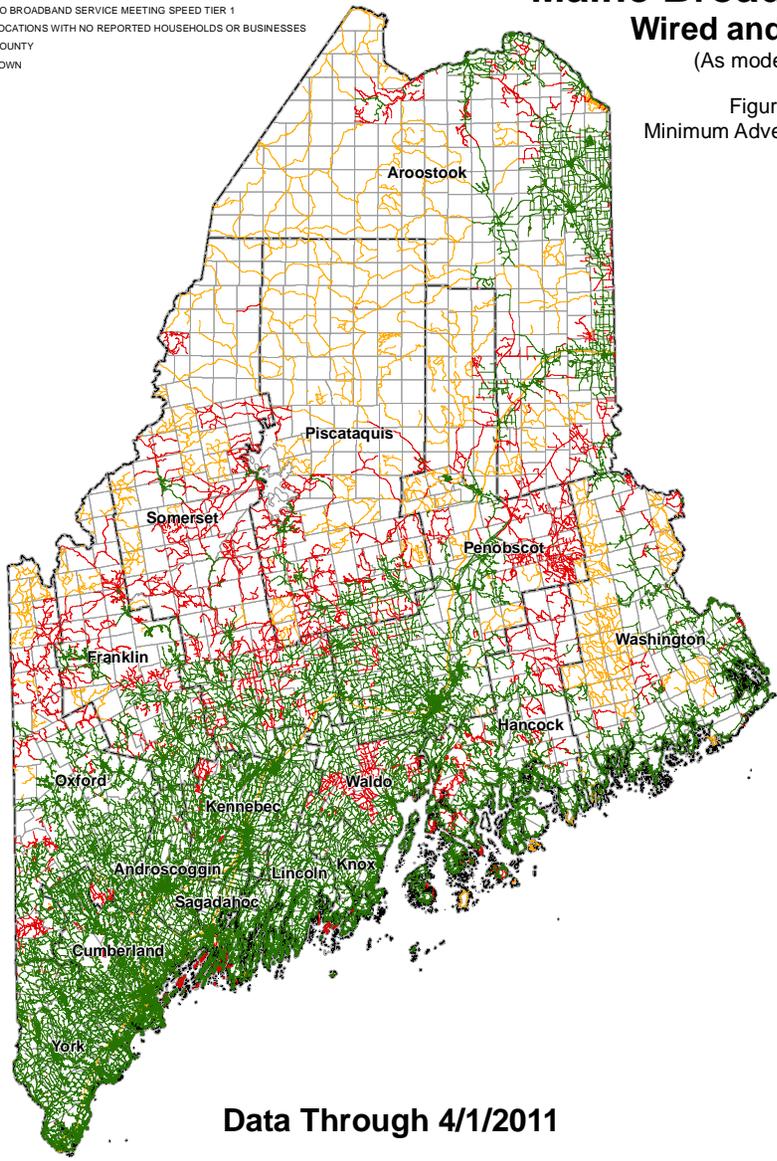
- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 1
 - NO BROADBAND SERVICE MEETING SPEED TIER 1
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

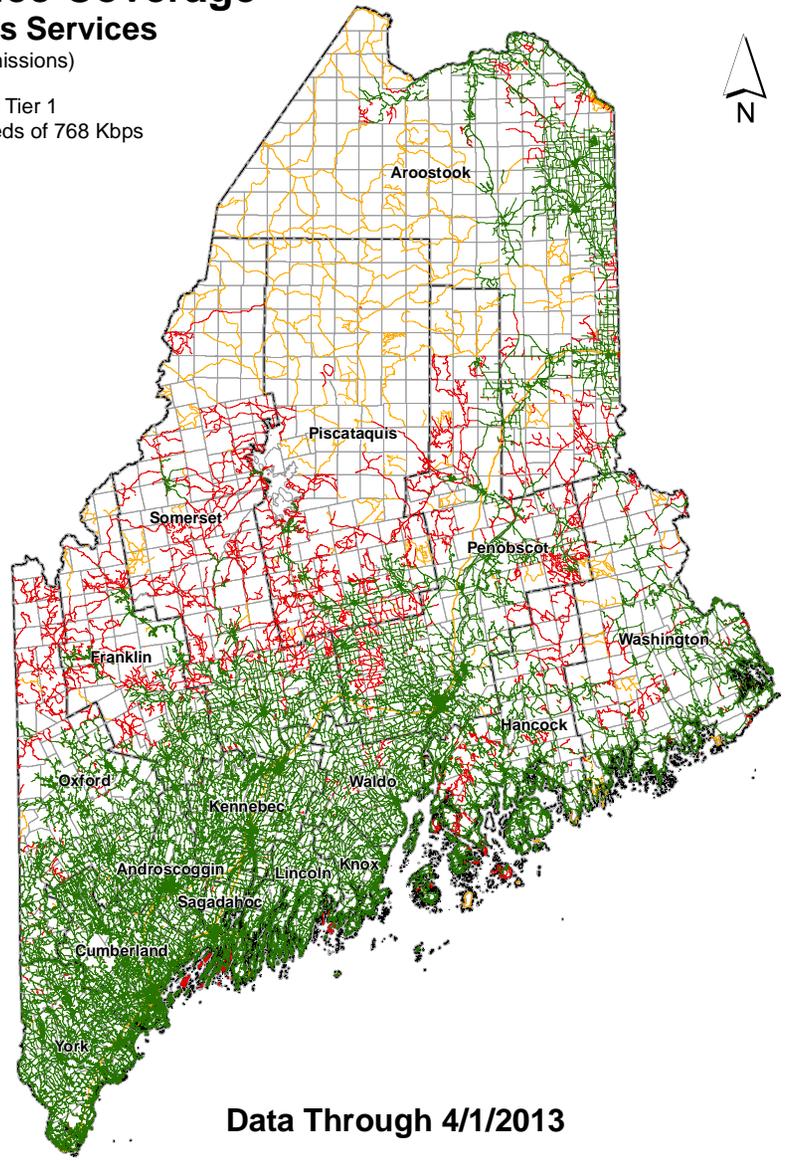
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-2: FCC Broadband Tier 1
Minimum Advertised Broadband Speeds of 768 Kbps



Data Through 4/1/2011



Data Through 4/1/2013

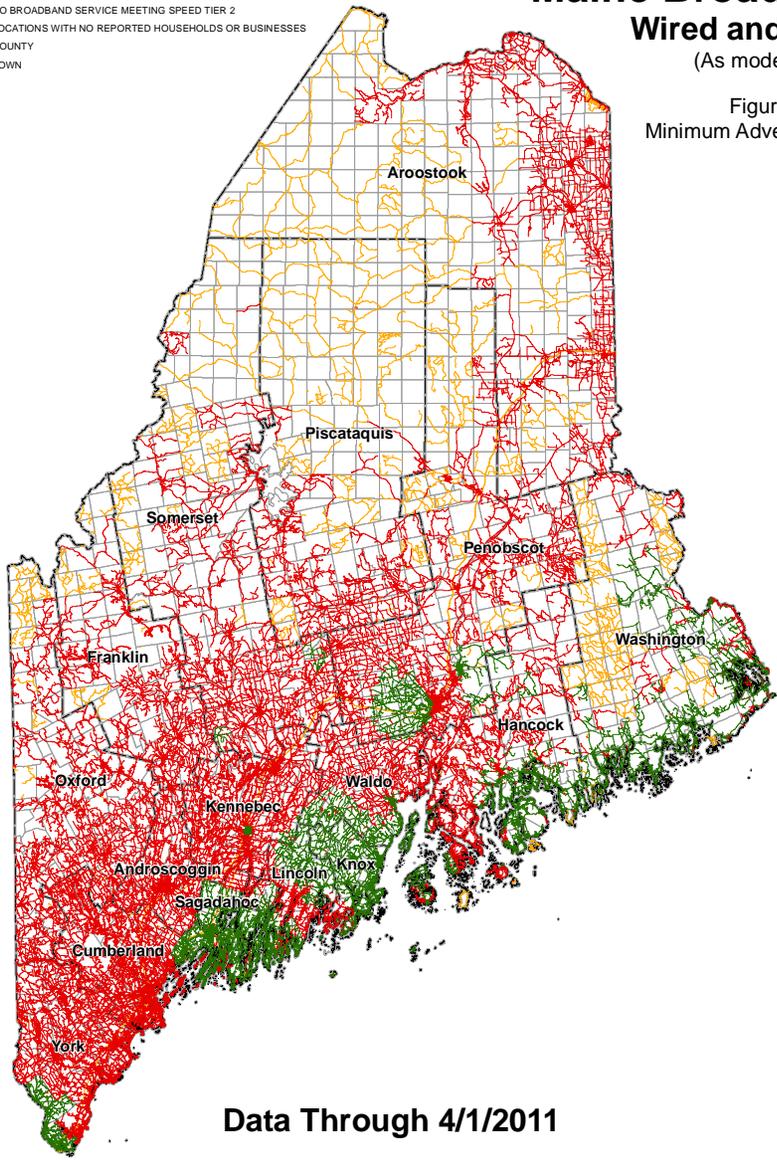
- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 2
 - NO BROADBAND SERVICE MEETING SPEED TIER 2
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

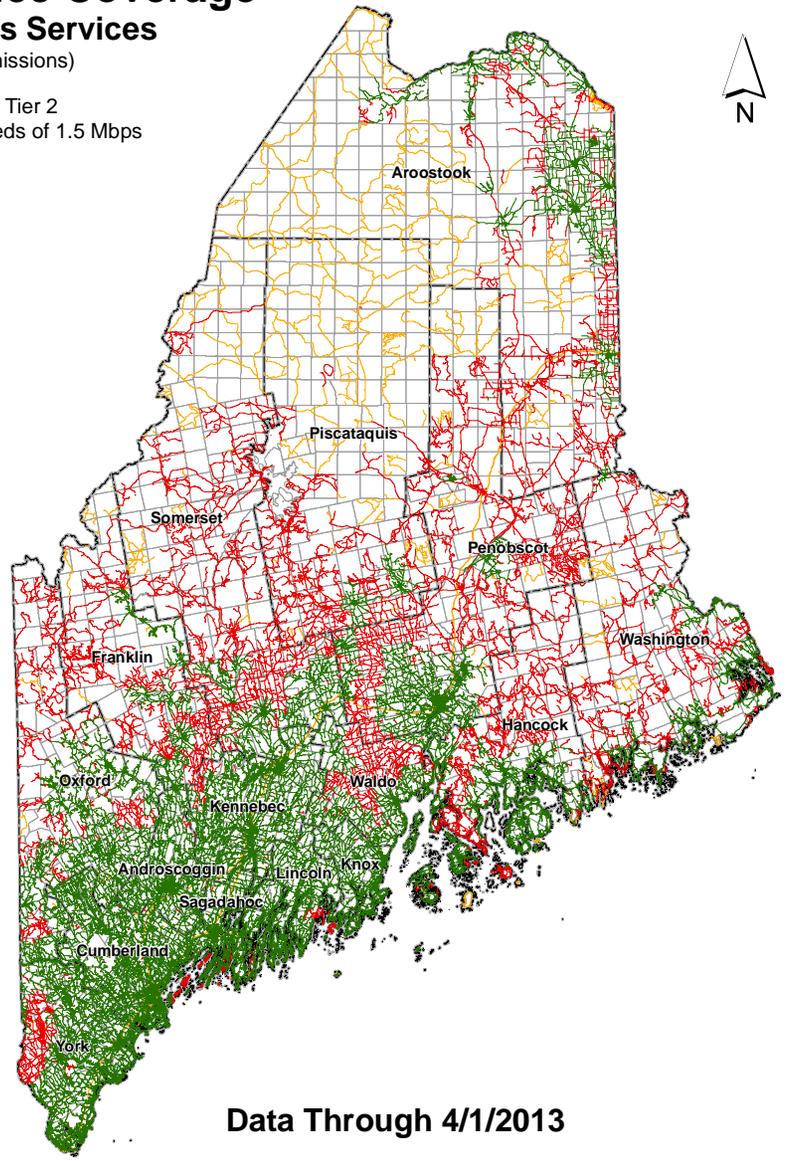
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-3: FCC Broadband Tier 2
Minimum Advertised Broadband Speeds of 1.5 Mbps



Data Through 4/1/2011



Data Through 4/1/2013

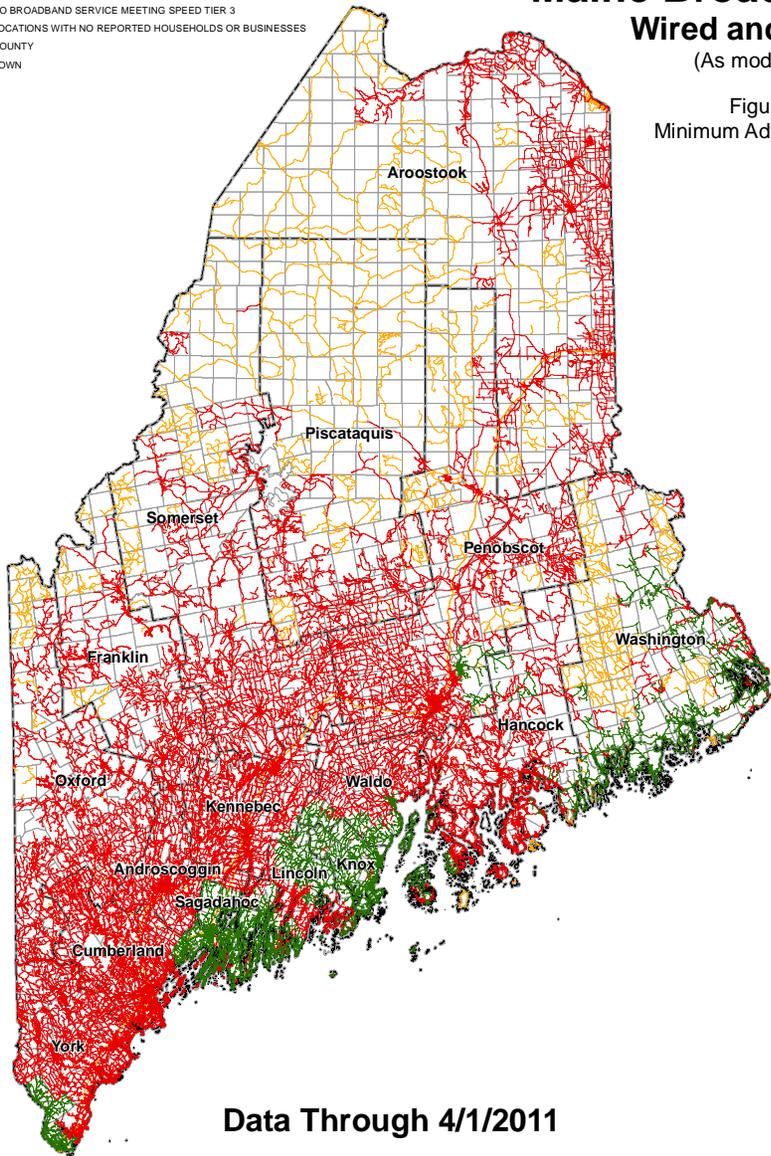
- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 3
 - NO BROADBAND SERVICE MEETING SPEED TIER 3
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

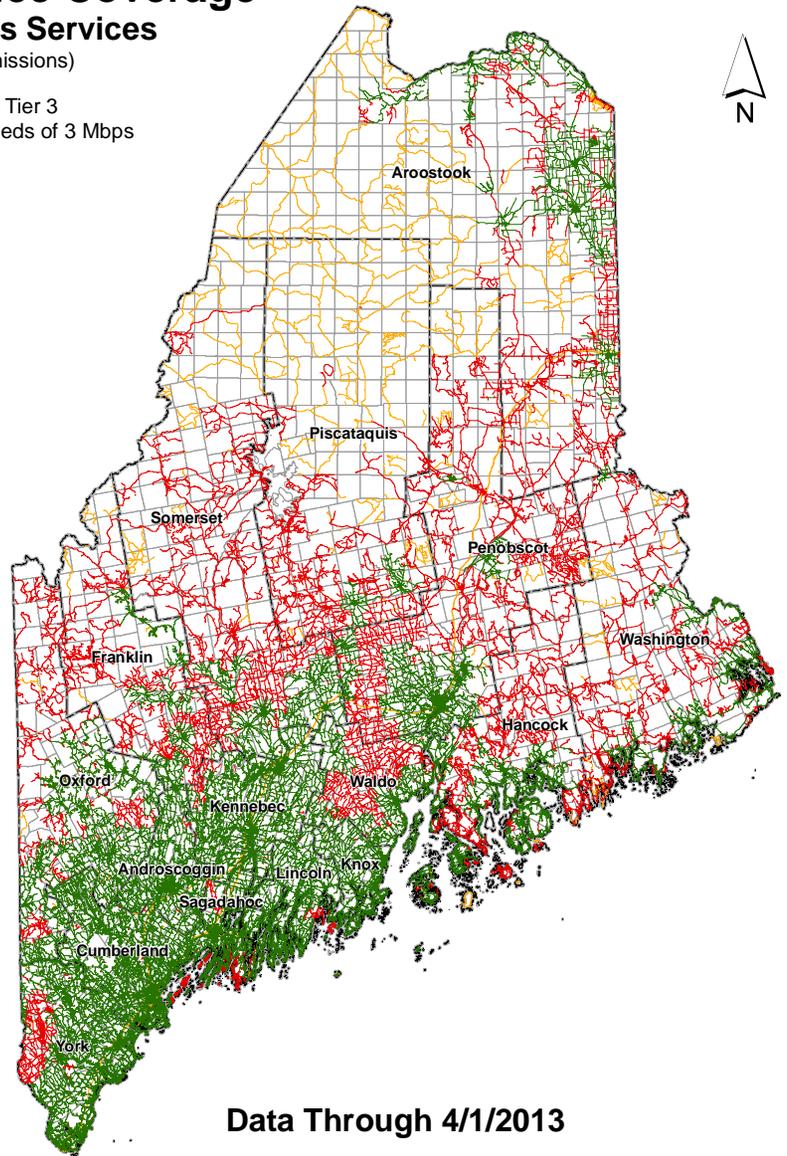
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-4: FCC Broadband Tier 3
Minimum Advertised Broadband Speeds of 3 Mbps



Data Through 4/1/2011



Data Through 4/1/2013

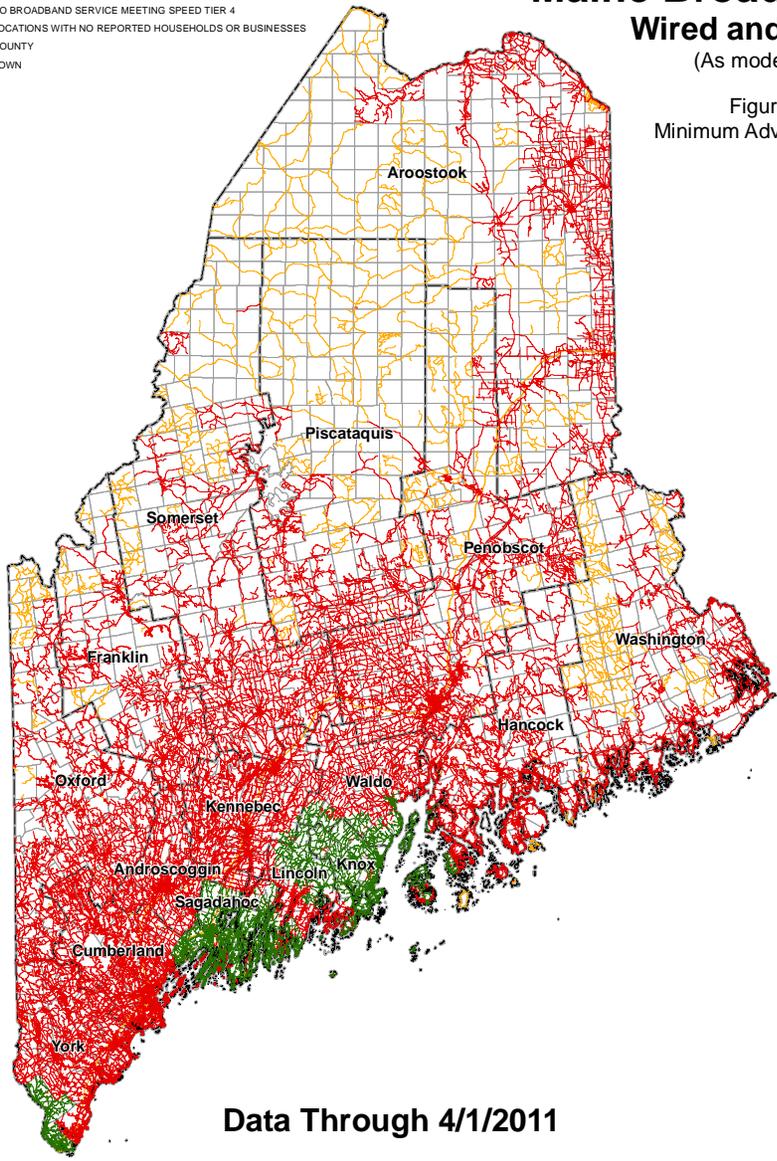
- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 4
 - NO BROADBAND SERVICE MEETING SPEED TIER 4
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

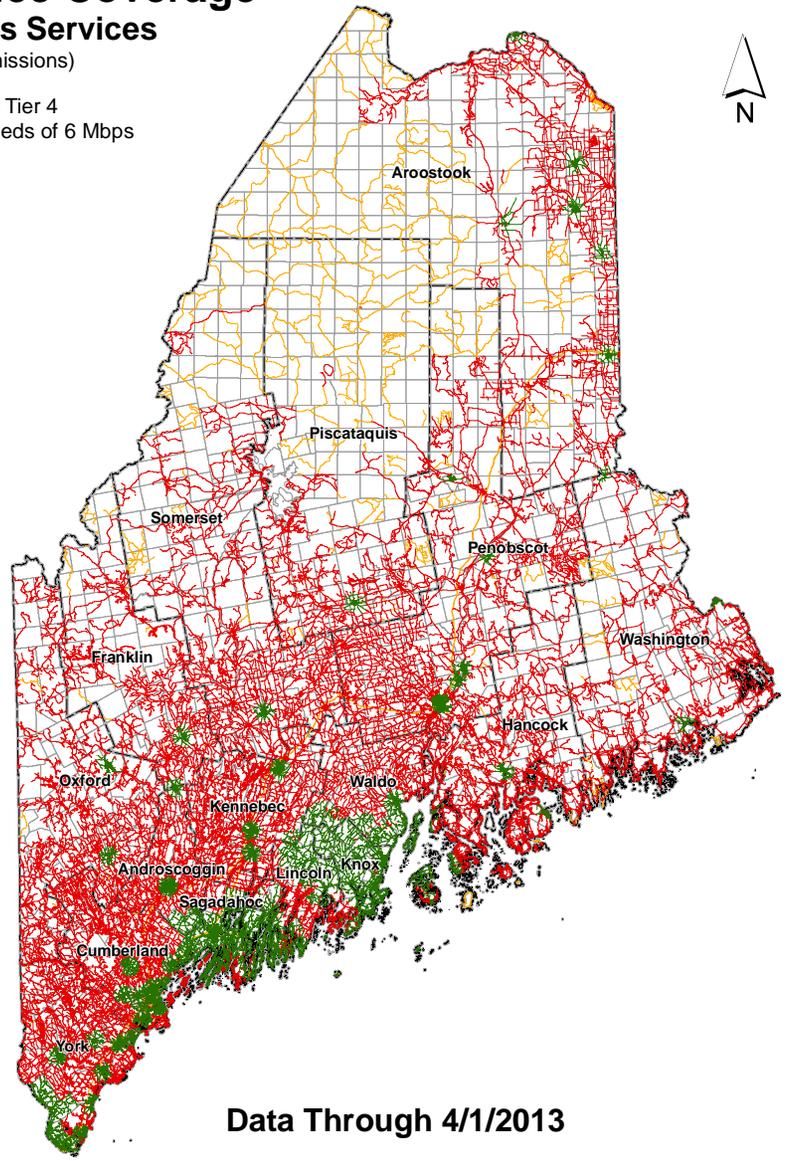
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-5: FCC Broadband Tier 4
Minimum Advertised Broadband Speeds of 6 Mbps



Data Through 4/1/2011



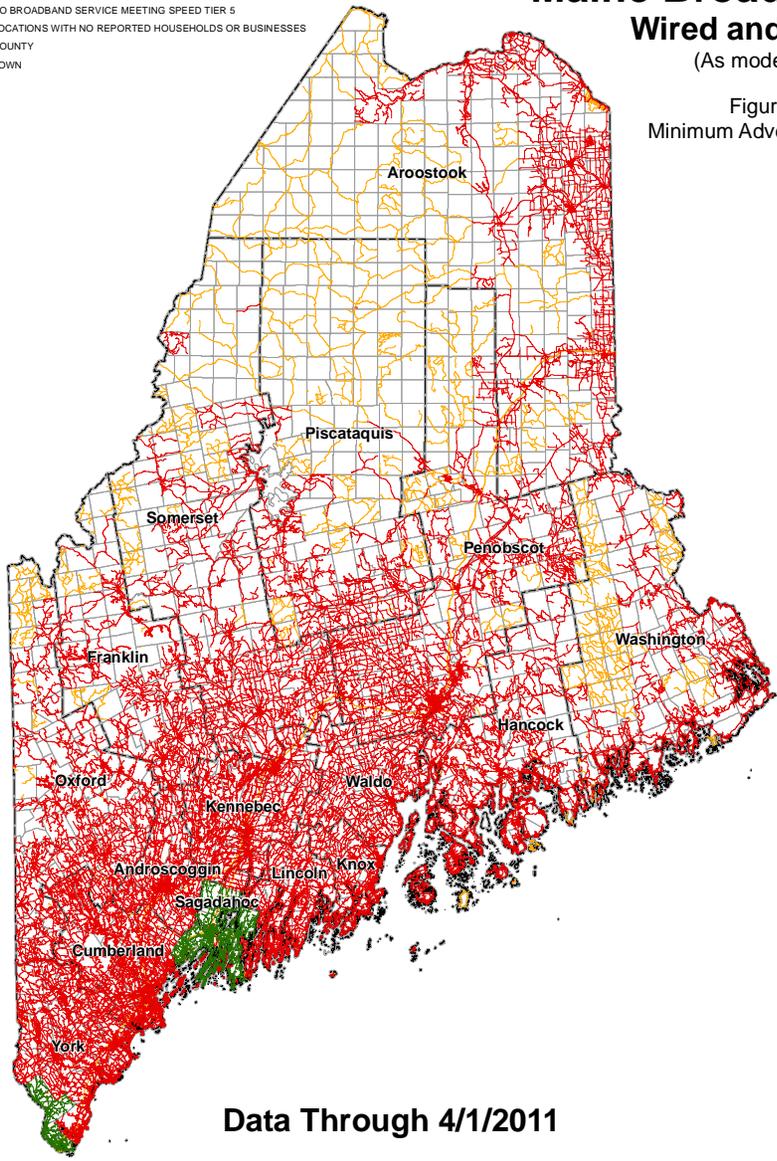
Data Through 4/1/2013

- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 5
 - NO BROADBAND SERVICE MEETING SPEED TIER 5
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

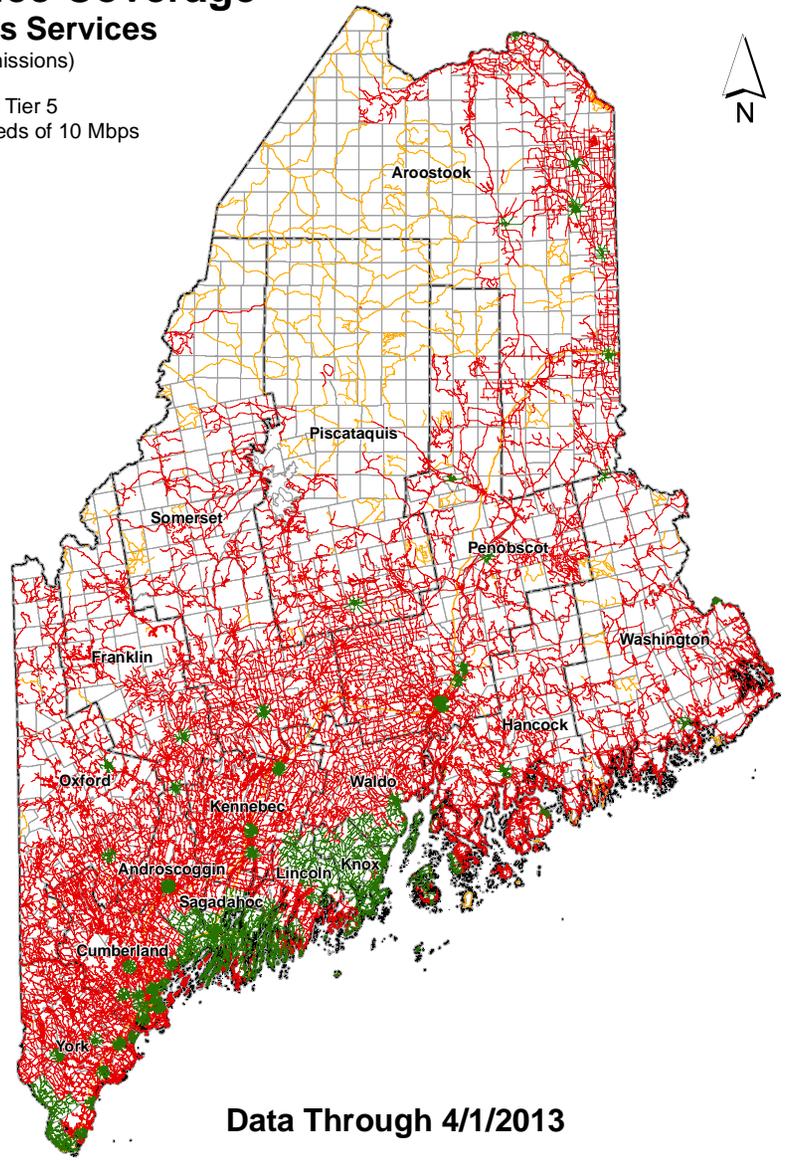
Maine Broadband Service Coverage Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-6: FCC Broadband Tier 5
Minimum Advertised Broadband Speeds of 10 Mbps



Data Through 4/1/2011



Data Through 4/1/2013

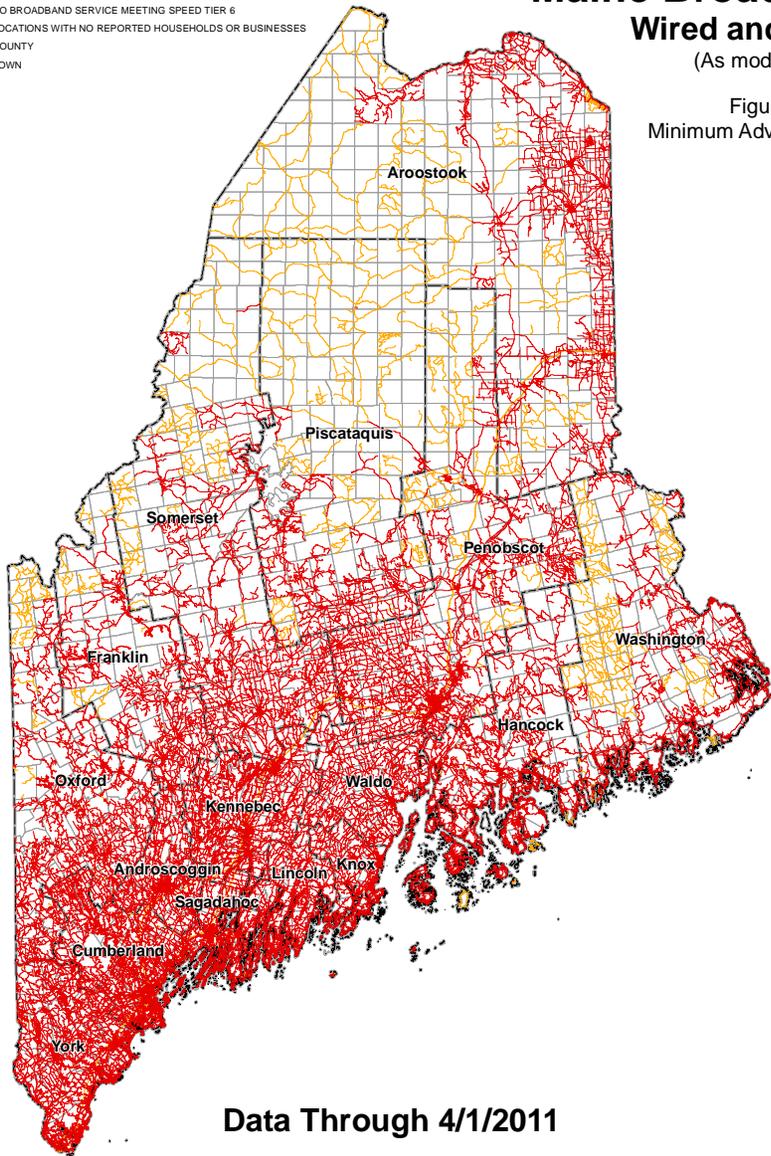
- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 6
 - NO BROADBAND SERVICE MEETING SPEED TIER 6
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

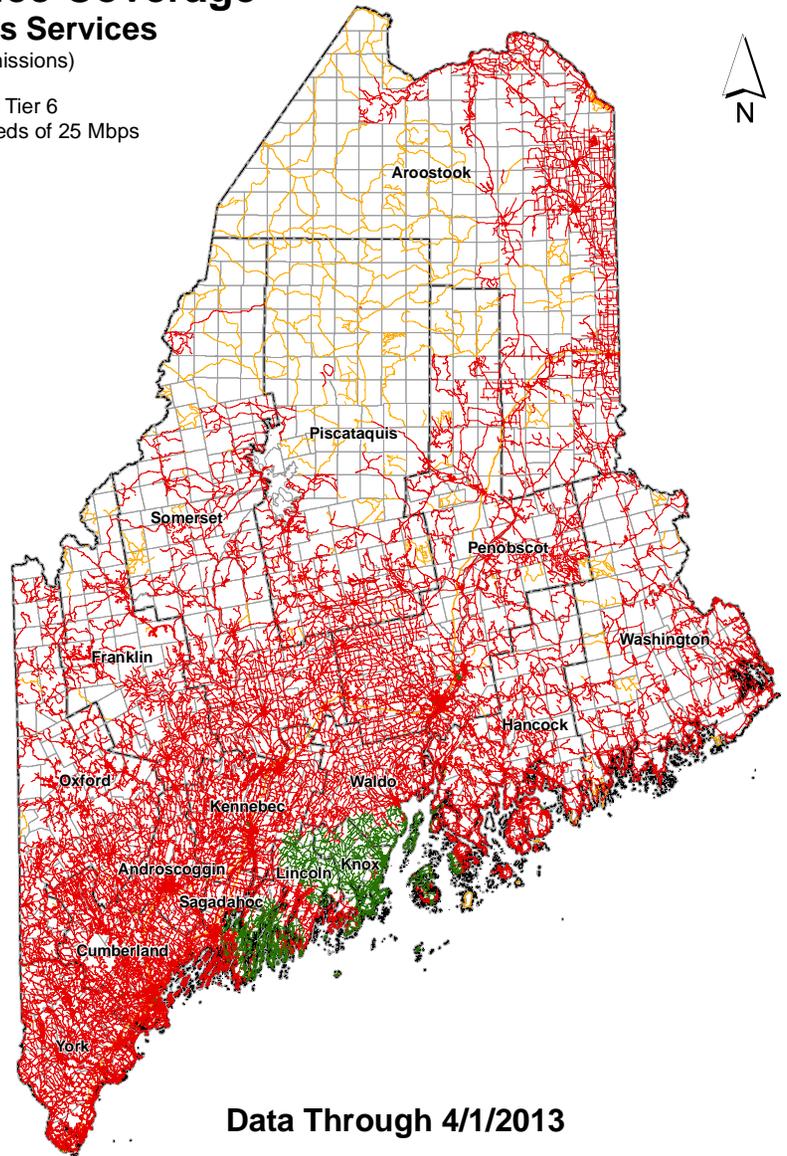
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-7: FCC Broadband Tier 6
Minimum Advertised Broadband Speeds of 25 Mbps



Data Through 4/1/2011



Data Through 4/1/2013

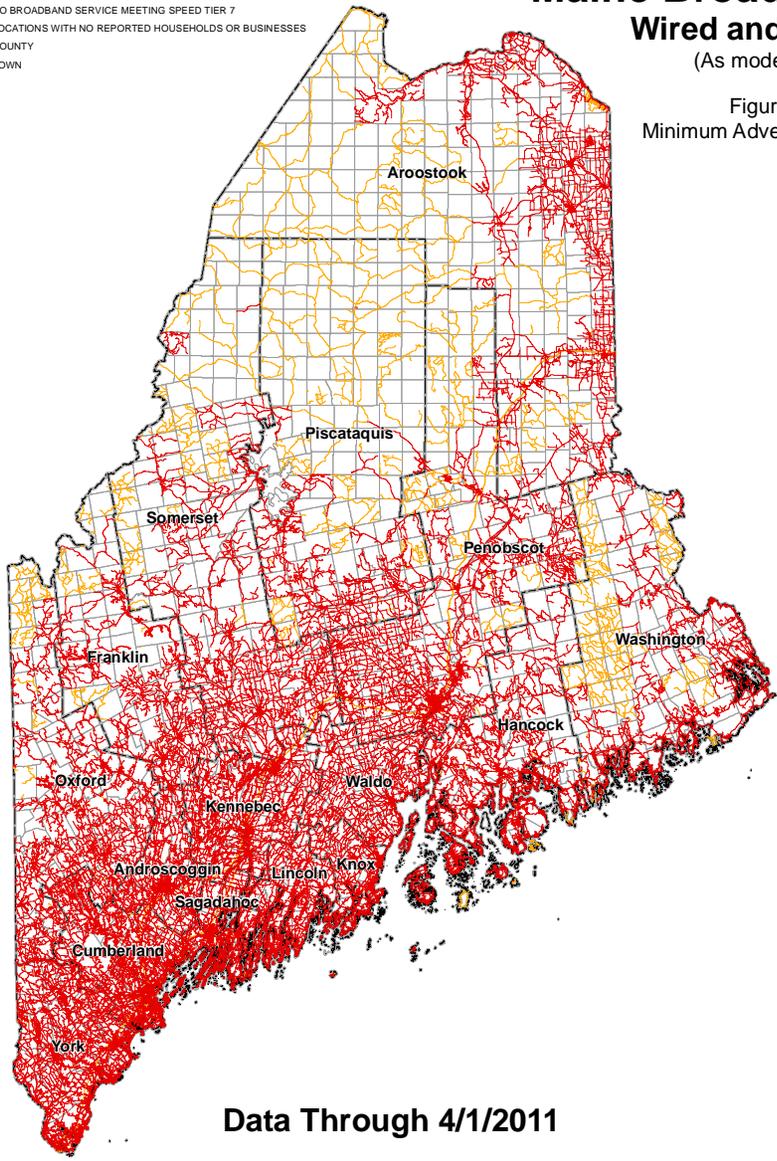
- Legend**
- BROADBAND SERVICE MEETING SPEED TIER 7
 - NO BROADBAND SERVICE MEETING SPEED TIER 7
 - LOCATIONS WITH NO REPORTED HOUSEHOLDS OR BUSINESSES
 - COUNTY
 - TOWN

Maine Broadband Service Coverage

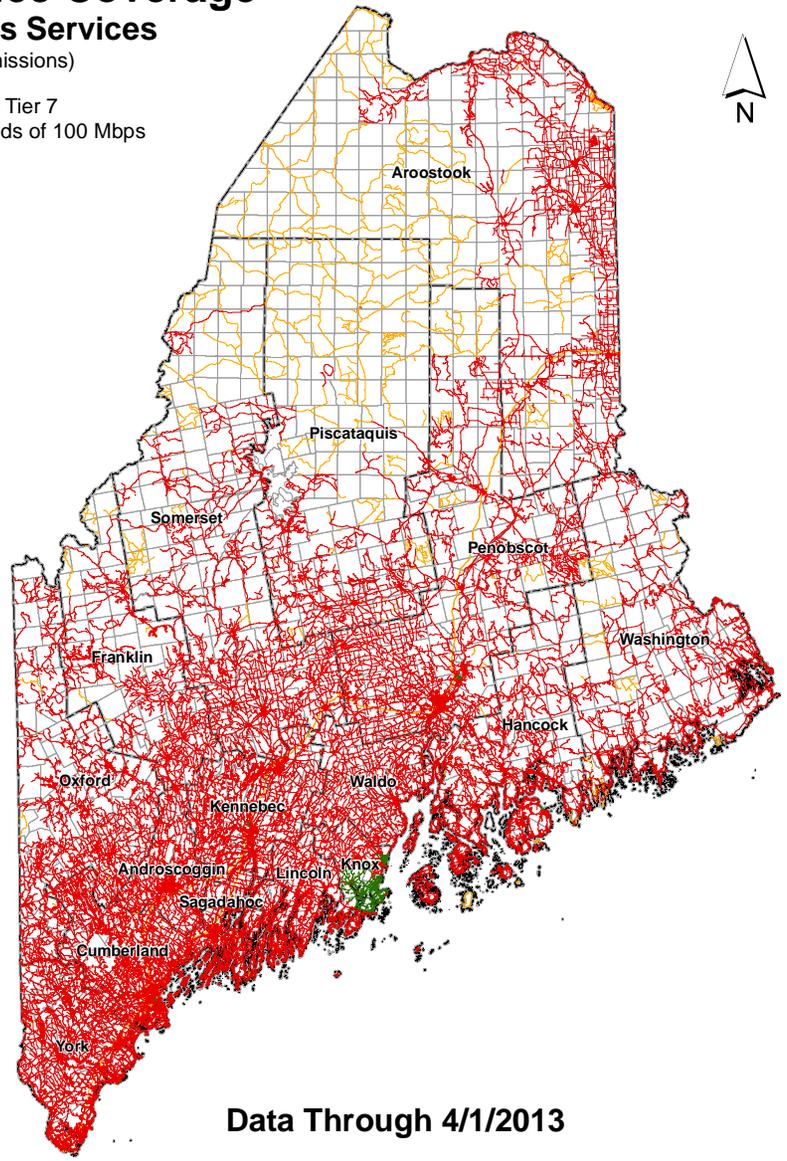
Wired and Fixed Wireless Services

(As modeled from provider submissions)

Figure 2-8: FCC Broadband Tier 7
Minimum Advertised Broadband Speeds of 100 Mbps



Data Through 4/1/2011



Data Through 4/1/2013

Legend

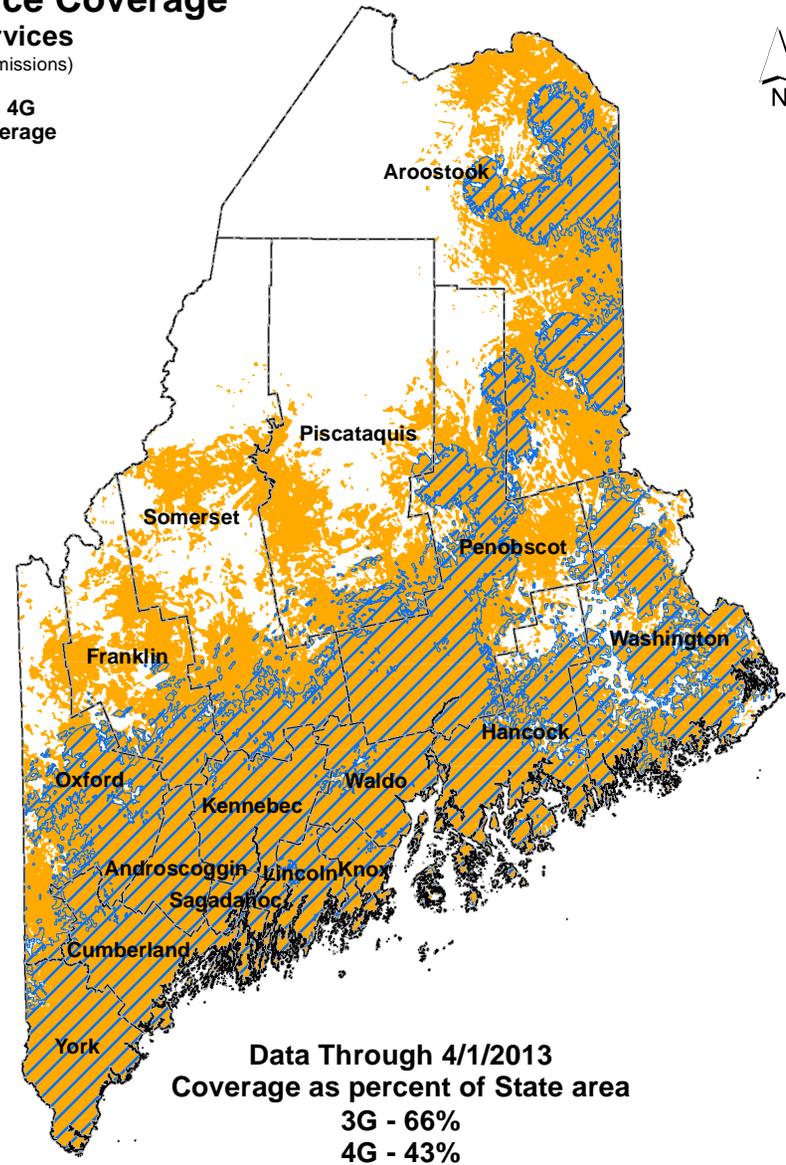
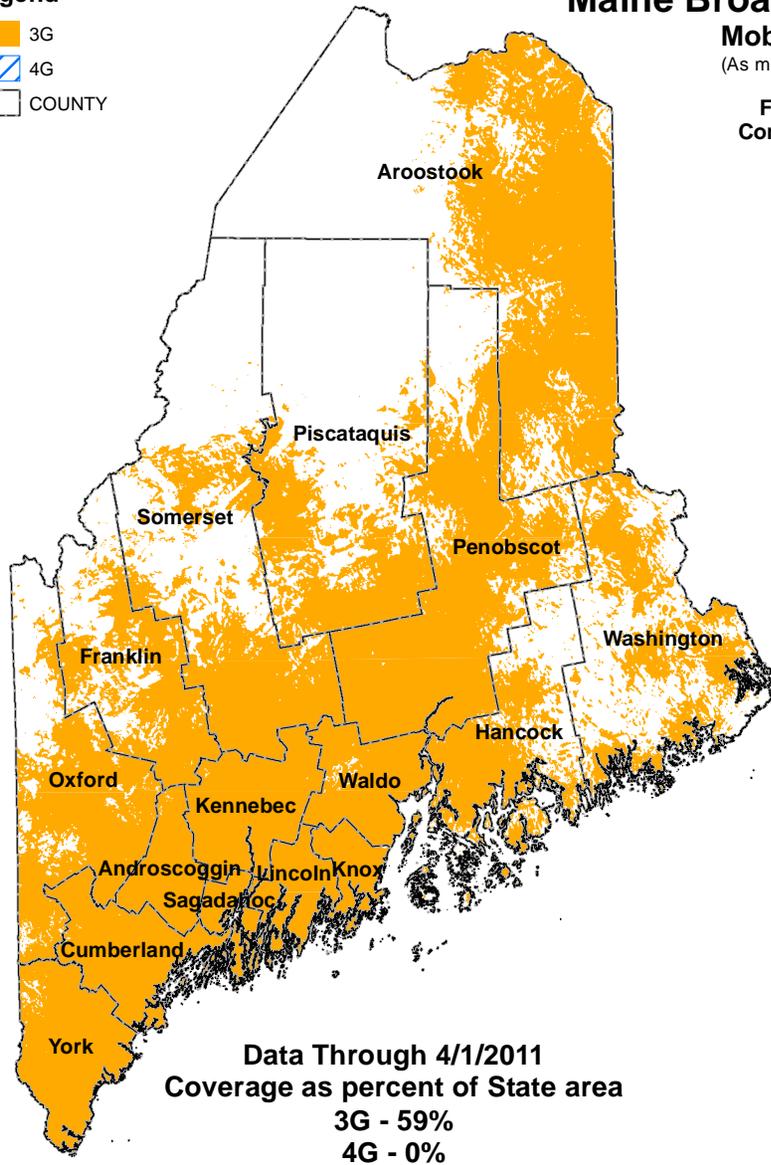
- 3G
- 4G
- COUNTY

Maine Broadband Service Coverage

Mobile Wireless Services

(As modeled from provider submissions)

**Figure 2-9: 3G versus 4G
Combined Provider Coverage**



2.2.2 Broadband Speed

As of July 2013, median broadband download capacity in Maine is at 4.8 Mbps.¹³ Although download capacity has significantly increased from an average of 768 kbps since 2011, Maine still lags behind the national norm of 6.4 Mbps. Maine’s percentages of connections by download speed continue to be comparable to, and in some cases higher than, those for New Hampshire and Vermont except for the higher-range speeds (Figure 2-10).¹⁴

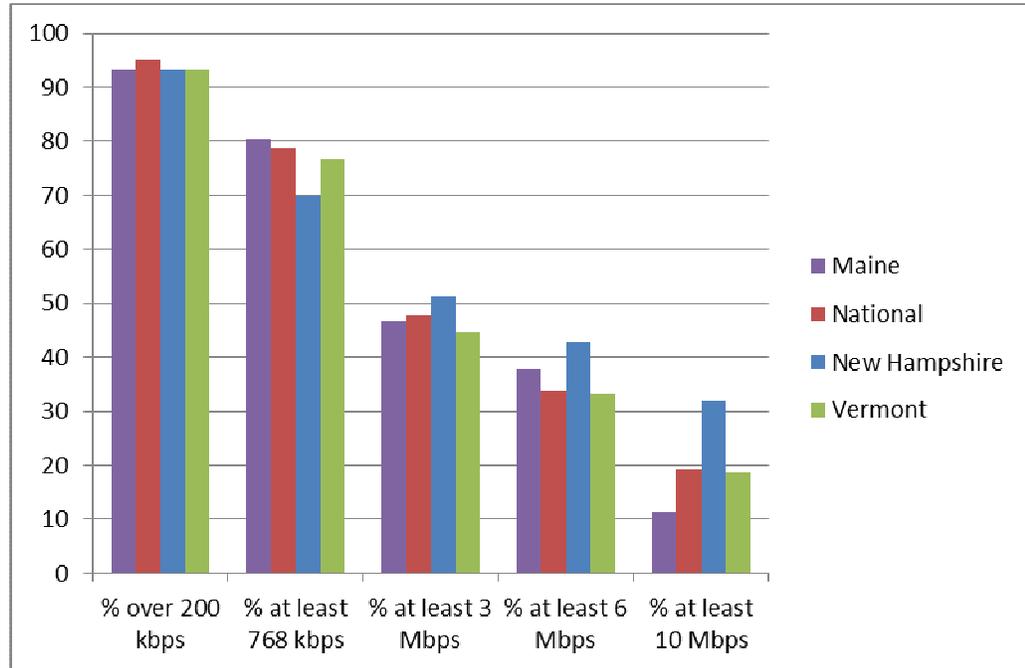


Figure 2-10: Percentage of Connections by Download Speed (FCC Report)

Over the two-year period, Maine’s percentage of connections at the 10 Mbps or greater download speeds has increased from 6.3 percent to 11.5 percent, ranking Maine 49th in the nation (Figure 2-11).¹⁵

¹³ National Broadband Map data. <http://www.broadbandmap.gov/>

¹⁴ These percentages are derived from the *FCC Internet Access Service Report, Status as of June 30, 2012*, Wireline Competition Bureau, May 2013.

¹⁵ Maine’s ranking is relative, however, to the source of data and criteria of measurement used. Using National Broadband Map data, Maine housing units, and **download** speeds of at least 10 Mbps as measurement criteria, for example, the percentage of Maine housing units having access to these speeds is 81.1 percent, ranking Maine slightly higher at 46th. Using National Broadband Map data, Maine housing units, and equivalent **download and upload** speeds of at least 10 Mbps as measurement criteria, the percentage of Maine housing units having access to these speeds is 37.3 percent, which ranks Maine even higher at 29th.

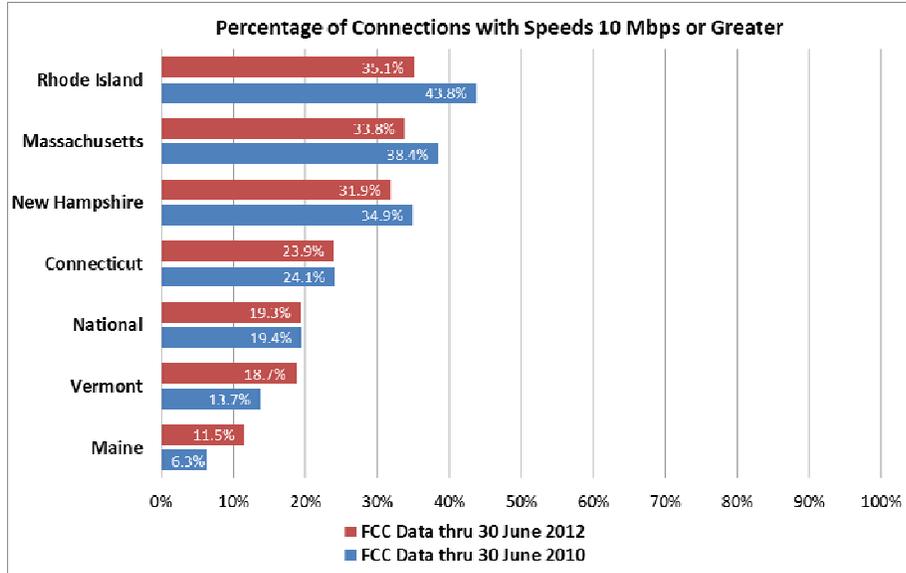


Figure 2-11: Percentage of Connections with Download Speeds 10 Mbps or Greater

Maine’s percentages of connections by upload and download speeds, particularly in the higher speed ranges, are still too low to meet all but basic service needs. A recent White House report¹⁶ cites that 94 percent of America’s households have access to service that is 10 Mbps down and 3 Mbps up. Conducting a similar analysis of Maine’s data shows that approximately 85 percent (616,000) of the 721,830 housing units represented in the 2010 census have this level of available service offered them (Table 2-5). If used as a standard of excellence for today’s systems, it could be argued that Maine needs to increase availability of that service level to an additional 62,500 housing units just to be on par with the 2012 national average.

Table 2-5: Percentage of Maine Households with Access to Speeds 10 Mbps or Greater

Maximum Advertised Downstream Speed	Maximum Advertised Upstream Speed	Maine Census Blocks with Service	Potential No. of Housing Units with Service	% Housing Units	Potential No. of Occupied Housing Units with Service	% Occupied Housing Units
At least 10 Mbps	At least 200 kbps	36,579	626,543	86.80%	504,383	90.52%
At least 10 Mbps	At least 768 kbps	36,579	626,543	86.80%	504,383	90.52%
At least 10 Mbps	At least 1.5 Mbps	35,934	617,461	85.54%	498,257	89.42%
At least 10 Mbps	At least 3 Mbps	35,814	616,014	85.34%	497,466	89.28%
At least 10 Mbps	At least 6 Mbps	13,935	302,256	41.87%	256,799	46.09%
At least 10 Mbps	At least 10 Mbps	13,935	302,256	41.87%	256,799	46.09%

¹⁶ *Four Years of Broadband Growth*, Office of Science and Technology Policy and the National Economic Council, The White House, June 2013.

2.2.3 **Broadband Adoption**

Based on the technologies used, 75.3 percent of Maine households have adopted broadband at Tier 1 or greater level, a statistically significant increase from 72.7 percent in 2011. When internet speeds increase from Tier 1 to Tier 3, broadband availability drops from 93.1 percent to 84.9 percent of street addresses; and when speeds increase from Tier 3 to Tier 5, availability falls to just 20.8 percent. Since 2011, however, Tier 3 broadband availability has risen by 71.6 percentage points and Tier 5 by 14.5 percentage points.

2.2.4 **Broadband Infrastructure**

According to the 2012 State New Economy Index, Maine ranks 37th in deployment of broadband telecommunications. This placement shows significant improvement from the 45th ranking assessed in 2007. The state's rankings in number of IT professionals in non-IT industries and in high-tech jobs as a percentage of all jobs have dropped, however, from 41st to 43rd and from 35th to 38th, respectively.¹⁷ These figures support the assertion that Maine, identified as the oldest state in the nation, educates young people in IT professions, but does not employ them in either IT or non-IT industries.¹⁸ This particular index is based on the number of filled jobs and does not indicate the number of available, unfilled jobs in the state.¹⁹ It is useful to note that 2013 business survey results indicate that the percentage of business respondents using telecommuting to generate revenue out of state dropped over the two-year period (Section 4.2.1).

Maine currently has 33 wired and fixed wireless end user internet service providers serving the state, not including 2 that offer middle-mile service only and 2 that are strictly resellers. An additional 5 providers offer mobile services. Municipalities are served by an average of 4.6 providers. With the exception of the mobile providers, none of these is a nationally scaled provider. Since 2011, 4 more providers, for a total of 5 dispersed throughout the state, are deploying next generation access (NGA) networks across their service territories to both residential and business consumers.²⁰

¹⁷ 2012 State New Economy Index

¹⁸ Efforts are under way to address this situation. Project<Login, for example, a statewide outreach program under the auspices of the business-led Educate Maine, is fostering collaboration between Maine businesses and educational institutions to educate, engage, and employ more young people in the fields of computers and technology. See <http://www.projectlogin.com/vision-purpose>.

¹⁹ Interview with Luke Stewart, Economic Analyst, Information Technology and Innovation Foundation, publisher of the State New Economy Index.

²⁰ An NGA is a wired access network that consists wholly or in part of optical elements and that are capable of delivering broadband access services with enhanced characteristics such as higher throughput as compared to those provided over already existing copper networks.

2.3 PROFILE OF MAINE BROADBAND

The profile of Maine broadband that emerges from the 2013 survey results is similar to the 2011 profile with some statistically significant differences. Key findings on and changes in broadband availability, use, drivers and barriers to adoption are summarized below by stakeholder group, including service providers, households and businesses, community anchor institutions (CAIs), the healthcare community, Native Indian Tribes, and State agencies. A more detailed discussion of the results is provided in Section 4.0.

2.3.1 The Stakeholders—Providers and Consumers

Broadband Service Providers

Availability. According to 2013 survey findings, providers in Maine serve 93.1 percent of street addresses in the state with at least Tier 1 coverage (download and upload speeds of at least 768 kbps). This percentage is up 2 percentage points from the 91.1 percent of locations measured in 2011. Fixed wireless exhibits the most robust expansion in deployment, which grew from 15.7 percent to 19.8 percent of Maine addresses (Section 4.1.1).

Broadband access varies widely across Maine, ranging from almost universal coverage in Androscoggin, Cumberland, Kennebec, Knox, Lincoln and York counties to a broadband availability rate of less than one-half of the street addresses in Piscataquis County. Somerset and Waldo counties have exhibited the most robust growth in broadband availability since 2011. Looking at individual technologies, we estimate that 85.3 percent, 37.0 percent and 19.8 percent of Maine locations have access to broadband via cable, DSL and fixed wireless services, respectively. Less than 1 percent of Maine addresses have access to broadband via fiber optics.

When internet speeds increase from Tier 1 to Tier 3, broadband availability drops from 93.1 percent to 84.9 percent of Maine street addresses, and availability falls to just 20.8 percent of Maine addresses for Tier 5 internet service. Since 2011, however, Tier 3 broadband availability has risen in the state by 71.6 percentage points, and Tier 5 availability by 14.5 percentage points.

Of the 16 service providers who responded to the 2013 survey, 75 percent have plans to expand broadband service in Maine in the next 12 months, a 10 percent increase since 2011; 86 percent have plans to upgrade their current service offerings (Section 4.1.2).

Drivers. Findings from the 2013 economic analysis generally show that population density, median age and household income, the county of location, the presence of CAIs, and the shares of local employment in certain industrial sectors are key determinants of broadband availability. As population density, household income, and the presence of CAIs increase, availability appears to increase. As median age

and the percentage of population who reside outside urbanized areas increase, availability decreases. Shares of local employment in manufacturing, information, finance and insurance, healthcare and social assistance, and certain types of personal services tend to have a positive effect on broadband availability. In particular, shares of finance and insurance stand out as having a positive effect over time.

Barriers. In 2013, service providers cited the high cost of infrastructure as the primary barrier to service expansion. Lack of funding and low return on investment, cited as primary in the 2011 survey, were secondary. In terms of service adoption, the majority of providers in 2013 emphasized consumer lack of awareness as the primary barrier over cost, which was identified as primary in 2011. Provider recommendations also emphasized consumer education over pricing and funding support, both of which were identified as primary in 2011.

Residential Consumers

Availability. As in the 2011 analysis, modeling of data from the Maine Broadband Inventory and Mapping Project in 2013 shows that broadband services are more widely available in municipalities with a greater percentage of population residing in urbanized areas and in places with younger residents and higher median household incomes. The level of educational attainment, which had a positive effect on the availability of any type of broadband technology in 2011, shows in 2013 to have a positive effect on fixed wireless broadband availability only. These findings suggest that telecommunications companies have made greater investments in Maine municipalities with younger residents—who might have a greater interest in broadband—and in areas with higher levels of income—which is presumably a sign of greater ability to pay for it (Section 4.2.1).

Use. Results of the 2013 analysis show that 75.3 percent of Maine households currently subscribe to a broadband internet service, which represents a statistically significant increase from 72.7 percent in 2011. The use of DSL, cable and fixed wireless technologies among residential consumers has all increased; however, the most dramatic increase in internet technology use has been in mobile wireless—whether at broadband speeds or not. Household use of mobile devices has almost doubled, from 24.2 percent to 47.6 percent. Only 2.8 percent of respondents use these devices as their sole means of connecting to the internet.

Household use of mobile devices has almost doubled from 24.2 percent to 47.6 percent. But only 2.8 percent of household respondents use these devices as their sole means of connecting to the internet.

The percentages of households that have a computer in the home (85.9%) and an internet connection of any kind (89.8%) are essentially the same as in 2011. The gap between the desire to own a computer and the plan to obtain one has widened over time, however, as has the gap between the desire to connect to the internet and the plan to connect.

Households use the internet primarily for communications and social networking (83.0%), with checking news, weather and sports second (74.0%), and online shopping and banking third (72.0%). These percentages have all increased slightly in two years, showing a greater focus of users on basic functionality. Use of the internet for job-related and educational purposes has decreased, attributable in part to a survey sample of older respondents in 2013. A significant correlation exists between age and internet use for these purposes—as age increases, usage decreases. If respondents had access to higher-speed internet, the largest percentage indicated that they would do nothing more as their current service is fast enough, although the second highest percentage cited they would do more online games and entertainment with higher-speed internet.

Drivers. The factors that seem to increase household computer use and broadband subscribership continue to be the presence of children under the age of 18 and the presence of more than three people in the household. Household income and educational attainment also influence the extent to which computers are used by Maine families. In general, the higher the income category, the greater the percentage of respondents who indicate they have a computer and broadband internet in the home. In 2013, educational attainment appears to have a stronger positive effect on computer and internet use than in 2011. Households having at least one person with a four-year or graduate degree are more likely than other households to have a computer in the home, to subscribe to broadband and to use a greater number and variety of internet applications.

As in 2011, results identify a significant relationship between frequency of homeboundness and hours of internet access by respondent alone and by household as a whole.

The household county of residence has an impact on computer use and broadband internet usage. Households located in Cumberland, Sagadahoc, and York counties, for example, are more likely to subscribe to broadband service. Over time, Sagadahoc and Waldo counties show the largest increase in broadband adoption (12%).

Of reasons to connect, residential consumers identify basic e-mail and communications and social networking as the primary driver, with online games and entertainment as a potential driver for future internet use. In general, 2013

respondents are more focused on basic functionality and fewer, less varied uses of the internet than in 2011.

Barriers. Of the households that do not have a computer in the home, 54.1 percent indicated the main reason to be lack of interest or need and 18.3 percent indicated cost. The percentage citing lack of interest, a primary reason in the 2011 survey, has increased in 2013; the percentage citing cost, a secondary reason in 2011, has decreased in 2013. Not owning a computer continues to be the primary barrier to connecting to the internet, with cost second. As in 2011, cost continues to be a barrier to consumers subscribing to faster internet service.

As in 2011, the economic modeling shows that low incomes and households of only senior citizens are factors that tend to decrease computer use and broadband subscribership. It is noteworthy that household respondents in the 2013 residential survey comprise a significantly older demographic than that in the 2011 survey.

Business Consumers

Availability. Similar to the 2011 modeling analysis, results of the 2013 modeling indicates that availability of Tier 1 broadband to business and other consumers is positively impacted by the county of location and its proximity to other places where broadband is present. The presence of CAIs, as well as the shares of local employment in manufacturing, information, finance and insurance, healthcare and social assistance, and certain types of personal services also have a positive effect on broadband availability. In terms of Tier 1 broadband, the local share of employment in the finance and insurance sector stands out across all types of internet technologies, except for fixed wireless. The presence of “large” employers (i.e., 100 or more employees) does not have the statistically significant effect on broadband in 2013 as it did in 2011 (Section 4.2.1).

Use. The percentage of business respondents that have some form of internet connection and some form of broadband internet connection have increased slightly in 2013 (from 90.1% to 93.7% and from 85.7% to 93.1%, respectively). With businesses that are not connected, a gap exists between the desire to connect and the actual plan to connect, although in 2013 this gap appears to be closing.

The percentage of businesses using DSL, cable and satellite technologies has increased; the percentage using fixed wireless is basically the same; and the percentage using fiber optic and T-1

The major reasons Maine businesses use the computer are for email and other online communications (87.6%), conducting business (80.3%), recordkeeping (71.5%), and financial management and billing (63.1%). All of these uses have increased since 2011.

has decreased. As with residential consumers, the most significant increase in the use of internet technology among businesses is in the use of mobile internet—whether it achieves broadband speeds or not (from 32.3% in 2011 to 46.3% in 2013). Respondents did not cite the use of mobile devices as a reason *not* to connect to the internet, however, indicating that such use in the workplace is supplementing rather than replacing the use of other internet technologies.

The major reasons Maine businesses use the computer are for email or other online communications (87.6%), conducting business (80.3%), recordkeeping (71.5%), and financial management and billing (63.1%). All of these uses have increased since 2011. If provided with access to higher-speed internet, a larger percentage of respondents than in 2011 indicated that their current service is sufficient for business. However, in 2013 a significant portion of businesses (41.9%) maintained that their current internet access would be better if it were faster. With faster internet, businesses would do more website development (11.2%) and conduct more business (10.3%). Less emphasis was placed on more email or other communications, suggesting that the current internet speeds are meeting this primary need.

Drivers. In general, the 2013 analysis of business characteristics that drive internet use and broadband subscribership—employment size, industrial category, and county of location—do not reveal significant differences since 2011, despite the increase in the share of businesses that subscribe to broadband services. In general, businesses with larger operations (more than 10 employees) are more likely to subscribe to broadband, to use computers extensively, to use a broader range of applications, and to employ an IT specialist, particularly businesses in service-related sectors such as finance and insurance, information, and professional services. The county of location also has some bearing on computer use and broadband subscribership. Businesses in Hancock County, for example, are more likely to exhibit heavy computer use and to employ an IT specialist.

Of reasons to connect, business consumers identify email or other online communications, conducting business, recordkeeping, and financial management and billing as primary, with the need for more website development as a potential driver for future internet use. It is noteworthy that using the internet to generate revenues from out of state—a potential benefit of and driver for subscribership—has decreased since 2011.

Barriers. In the 2013 results, 54.6 percent of business respondents reported the “business does not need the internet” as the primary reason for not connecting to it. Cost of internet services was the secondary reason cited at 18.2 percent. Although business respondents identified the same reasons in the 2011 results, the percentage citing lack of need has increased significantly (from 39.1% in 2011) and

the percentage citing cost has decreased (from 28.3% in 2011). Similarly, cost and lack of interest are cited in both 2011 and 2013 surveys as barriers to upgrading to faster internet service. Both objections to purchasing faster internet have increased over time, which suggests that more businesses consider their access fast enough for the price they are paying. Further, business respondents to the 2013 survey indicate that the monthly price they are willing to pay for faster internet services has in general decreased, with the responses in the higher payment ranges shifting into the lower payment ranges. It is noteworthy that, in terms of cost range, there has been a general shift toward internet being less expensive.

Community Anchor Institutions (CAIs)

Availability. 2013 survey findings, based on an expanded, more targeted survey than 2011, indicate that 92 percent of CAI respondents have access to broadband. In terms of specific technologies, the majority have access to DSL (68%) and cable (65%), as well as mobile wireless service (52%)—whether at broadband speeds or not (Section 4.2.3).

Use. In general, CAIs exhibit heavy computer use (75%), with computers available primarily for employees only, although 25 percent make WiFi services available to the public. The percentage of CAIs with some form of internet connection is high (95.9%), with 88 percent connecting to broadband. Those CAIs that have internet access connect primarily to cable (49%) and secondarily to DSL (35%). The third highest percentage connects to mobile wireless (21%). The use of mobile devices for connecting to the internet, whether at broadband speeds or not, is notable among this stakeholder group as well as among the other groups surveyed.

As is characteristic of other consumer groups, a gap exists between the percentage of CAIs that have no connection to the internet and would like to connect (50%) and the percentage that plan to connect in the next 12 months (28.6%), signaling an opportunity for educational outreach.

Similar to businesses and other organizations, CAIs connect to the internet primarily for basic email and communications functions (91%), conducting business (87%), recordkeeping (83%), word processing (67%), and financial management (63%). With access to faster internet services, they would do more online training (19%), recordkeeping (16%), and business in general (13%). It is noteworthy that a high percentage of CAIs (62%) cite that their service is fast enough.

Drivers. In addition to basic office functions, CAIs use the internet to connect to state-maintained web sites and state-mandated reporting, and to provide online access to government information and services, including ambulance and emergency response, live streaming of meetings, and video-based training. To

maintain this level of functionality, a relatively high percentage of CAIs (46.2%) have an employee dedicated to IT duties.

Barriers. The main reasons CAIs do not connect to the internet are cost (28.6%) and lack of perceived need (21.4%). Although CAI respondents to the 2011 telephone survey also cited cost, the primary reason was availability. Availability continues to be an issue in 2013, but for a smaller percentage (7.1%) of respondents.

The primary reason CAIs cited for not subscribing to faster internet is lack of interest (32.2%). Most of these same respondents also indicated that their internet service was sufficiently fast (95.7%). Second, CAIs indicated that faster internet service was not available (22%) and, third, that faster internet was too expensive (19%), suggesting that CAIs, like small businesses, consider their access fast enough for the price they are paying. 41.1 percent of CAIs indicated that they would not be willing to pay for faster internet.

Schools and Libraries

The 2013 survey results on Maine’s K-12 schools and libraries, evaluated as separate entities from other CAIs, combine new findings on computer and internet use with existing information from Networkmaine’s database of Maine School and Library Network (MSLN) participants, who receive high-speed broadband at no cost (Section 4.2.4).

Availability. According to Networkmaine’s 2013 annual survey of MSLN participants, 100 percent of Maine schools and libraries have broadband service; 48 percent are served by fiber optic connections, up from 44 percent in 2011, allowing for near limitless scalability in broadband capacity (i.e., capability to perform under increasing network demands). The remaining 52 percent are still served using traditional copper-based lines, which raises concerns about near-term scalability of internet speeds.

Recognizing the lack of private-sector infrastructure investment and the increased demand for funding through the E-Rate program, the White House launched ConnectED, a nationwide initiative to connect 99 percent of America’s students at speeds no less than 100 Mbps, with a target of 1 Gbps within the next five years.

Recognizing the lack of private-sector infrastructure investment and the significantly increased demand for funding through the E-Rate program, the White House on June 3, 2013, called for a review of the E-Rate program and launched

ConnectED,²¹ a nationwide initiative to connect 99 percent of America’s students at speeds no less than 100 Mbps, with a target of 1 Gbps within the next five years.

On July 23, 2013, the FCC released a Notice of Public Rule Making (NPRM)²² to initiate a thorough review of the E-Rate program in response to President Obama’s call to action. The NPRM is the first step in the process to reform and modernize the E-Rate program to ensure schools and libraries have affordable access to 21st-century broadband that supports digital learning.

Use and Drivers. In 2012, 121 MSLN participants required upgrades to faster connections based on their previous bandwidth utilization and projected needs. In 2013, an additional 55 participants required bandwidth increases. Much of this demand for increased bandwidth has been driven by the new, innovative ways in which Maine schools and libraries are leveraging internet connectivity to bring benefits to students and their communities.

Barriers. Primary barriers to adoption are price and availability of fiber optic infrastructure in the last mile. Although the Maine Telecommunications Education Access Fund (MTEAF) and federal school and library Universal Service Fund (E-Rate) programs have removed the financial barriers for individual K-12 schools and libraries, pricing is still a major barrier at the MSLN project level. Although schools and libraries receive broadband internet access at no cost, the service is not free. The size of the MTEAF assessment²³ continues to shrink as telecommunications companies’ intrastate revenue falls. The size of the MTEAF ultimately limits the amount of broadband internet access for schools and libraries. Bandwidth is therefore rationed to schools and libraries based on what can be afforded rather than on what is needed.

Many schools and libraries cannot leverage their connectivity to full potential without the bandwidths required. The State Educational Technology Directors Association (SETDA), a national member association that serves, supports and represents the interests of US state and territorial educational technology leadership, recommends connecting district schools together in district-area networks that would promote more efficient sharing and consolidation of IT resources while allowing each district to deliver better services and opportunity to its teachers and students.²⁴ If implemented in all school districts, this model would

²¹ http://www.whitehouse.gov/sites/default/files/docs/connected_fact_sheet.pdf

²² http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-13-100A1.pdf

²³ Approximately \$3.8 million based on a recently increased assessment level of 0.7 percent. Maine PUC Docket # 2013-00116 Procedural Order, 8 March 2013. <https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/ViewDoc.aspx?DocRefId={28DFAFDC-980F-42B3-A4FA-C4B5BEF58EE8}&DocExt=pdf>

²⁴ http://www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1515.pdf

require a level of connectivity beyond what is deployed within many school districts today. Funding available through the MTEAF and E-Rate programs is not sufficient to purchase the level of bandwidth at currently available pricing levels. Further, in 2013, requests for E-Rate support totaled \$4.9 billion, more than twice the program’s annual cap of \$2.25 billion.

Another barrier to adoption is the lack of middle- and last-mile fiber infrastructure. Although Maine Fiber Company’s 3 Ring Binder Project is beginning to close the middle-mile gap, it does not reach large regions of the state, including much of western Maine and the island communities. Maine’s broadband service providers have also made investments in expanding their fiber optic infrastructures; however, most of these investments have been focused on more urban parts of the state. These investment decisions are influenced by both market drivers (e.g., adoption rate, population density) and current regulatory restrictions (e.g., rural exemption).

With 58 percent of the K-12 schools and libraries still serviced by copper-based local loops, service providers will not be able to scale their offerings to the bandwidth levels needed by these institutions in a timely fashion. It takes months, sometimes years, and an estimated \$20,000 to \$40,000 per mile to build out fiber-optic-based infrastructure. It may take at least another 3 Ring Binder-sized investment to bring fiber-based services to all schools and libraries in Maine.

Healthcare Organizations

Availability. The 2013 survey results, which are based on a new expanded survey, show that 98 percent of surveyed healthcare facilities have access to the internet, an increase of 8 percentage points since 2011. 95 percent of surveyed organizations have access to broadband, an increase of 7 percentage points since 2011. In terms of specific broadband technologies, 61 percent have access to cable, 53 percent to DSL, 34 percent to fiber optic, and 32 percent to T-1. The availability of mobile wireless—whether at broadband speeds or not—is also relatively high at 30 percent (Section 4.2.5).

Survey results show that 79 percent of respondent healthcare organizations exhibit heavy computer use (68% almost all of the time; 11% most of the day, almost every day).

Use. 79 percent of respondent health organizations exhibit heavy computer use (68% almost all of the time; 11% most of the day, almost every day). Only 1 percent indicated they had not used the computer at all in the previous week, and 2 percent indicated that they had no computer at the practice location.

The percentage of respondents that use some form of broadband is relatively high at 95 percent. In terms of specific broadband technologies, 43 percent connect to

cable, 29 percent to DSL, and 22 percent to T-1. Only 4 percent use fiber optic or fixed wireless technologies. 12 percent use mobile devices to connect. As is characteristic with other consumer groups, including households, businesses, and CAIs, a gap exists between the percentage of healthcare organizations that have no internet connection and would like to connect (46%) and the percentage of those that plan to connect in the next 12 months (33%). The gap within this stakeholder group appears to be smaller, however, by at least 10 percentage points.

Similar to businesses and CAIs, healthcare organizations connect to the internet first and foremost to conduct basic communications (98%) and office functions, such as recordkeeping (74%) and managing finances and billing (67%). Other major reasons to connect are to provide or access training online (77%) and to conduct the healthcare practice (63%). Significantly lower are the percentages of respondents who use the internet to participate in the HealthInfoNet health information exchange (HIE) (22%), to provide telemedicine services (13%), and transmit medical imagery (13%).

With faster internet, the largest percentage of respondents indicated that they would do more telemedicine/telehealth (32%), recordkeeping (24%), and online training (23%), although over half indicated that their internet service is sufficiently fast (55%). When questioned separately on internet speed specifically, however, a sizable percentage (40%) indicated that, although the practice can do what it needs with current speeds, faster internet would be better.

With faster internet, the largest percentage of respondent healthcare organizations indicated they would do more telemedicine (32%), recordkeeping (24%), and online training (23%).

Drivers. The availability of new online healthcare technologies, such as the HIE, electronic health records (EHRs), e-prescribing, and telemedicine systems, are major drivers of high-capacity broadband connectivity among Maine’s healthcare organizations.

One-third of the 2013 survey respondents are connected to the HIE, although most have read-only (82%) rather than interactive access for data exchange. 64 percent of respondents have installed and use an EHR system, and of that 64 percent, over 80 percent use the system heavily. Of those respondents that use an EHR system less than 50 percent of the time, almost half (47%) indicated that they are still in the process of implementing such a system. In comparison with EHR systems, respondents’ use of e-prescribing (27%) and telemedicine systems (7%), additional drivers of broadband adoption, is relatively low. It is important to note that the largest percentage of respondents (32%) indicated they would do more telemedicine if they had faster internet.

Barriers. Although the Maine healthcare community has made meaningful gains since 2011 in using broadband to deliver services, barriers still exist in the adoption of internet and specific health information technologies that improve patient care and drive broadband adoption. As with other consumer groups, lack of awareness of broadband's benefits (including federal payment incentives), access to adequate service, and perceived value for the cost continue to be the biggest barriers. Lack of IT support in small practices also continues to be a barrier, although a significant percentage (66%) of 2013 respondents indicated that they have an employee dedicated to IT duties.

Native Indian Tribes

Availability. Populated Tribal lands in Maine have 100 percent access to broadband-level internet service, a higher level of availability than in 2011 and higher than in many other regions of the state (Section 4.2.6). In addition, Tribal households have multiple options for service at or exceeding Tier 3 speeds.

Use. General patterns of Tribal household use align closely with the findings of the larger 2013 residential survey. A large percentage (90%) of Tribal respondents reported owning a computer device used to access the internet; 89 percent subscribe to the internet at broadband-level speeds, a higher percentage than the larger residential group (75.3%). Not surprisingly, Tribal respondents use the internet for the same types of tasks and with the same frequency as the other households in the study, with social networking, news, and online banking at the top of the list. The use of mobile technology in Tribal households that responded (40%) is comparable to that of the larger population.

Drivers and Barriers. As with the larger residential population, income appears to be a determinant of computer use and broadband internet subscribership, with a correlation between income level and the amount respondents are willing to pay for broadband service. Although in 2011, cost was indicated as the number one barrier to computer use and broadband subscribership, the major barrier cited in 2013 is lack of interest due to a perceived lack of value in owning a computer. Again these findings support the findings from the residential survey sample.

State Agencies

Availability. With the exception of a few remote parks and campgrounds, Maine's State offices and facilities have broadband-level internet access. The cost of this access has been lowered by new carrier Ethernet cloud offerings (Section 4.2.7).

Use. The State continues to expand its online internal and public service offerings. In addition to upgrading telecommunications services to its facilities, providing more bandwidth, greater flexibility, and an increase in voice over IP (VoIP), the

State has developed online tools and services to meet the evolving access needs of mobile device users.

Drivers. Many of the State’s network access and capacity requirements are driven by the expanded need for mobility and huge increases in wireless usage. Among state employees and private citizens, the rapid rise of mobile devices has changed the way users interact and expect to interact with governmental entities. A second major driver is the increasing need for online data sharing with federal government as well as other states. A third and related major driver is the national plan to implement the first nationwide interoperable public safety broadband network, under the auspices of FirstNet, an agency created within the NTIA that recently awarded the Maine Emergency Management Agency (MEMA) a million-dollar grant for implementation planning in Maine.

Barriers. Having the funding necessary to support broader access and the ever growing demand for network capacity will continue to challenge the State.

3.0 Factors & Influences

The profile of Maine broadband that emerges from the 2013 findings is not dramatically different than the profile of two years ago. Nevertheless, changes in technology, funding support, consumer demographics, and consumer demand have impacted broadband availability and use, signaling the emergence of broadband trends in the state.

An at-a-glance view of potential factors influencing changes in Maine broadband is presented in Table 3-1. Referencing the baseline measurement criteria, the table compares key statistics on broadband availability and adoption from the 2011 assessment with those of the 2013 update, and identifies associated factors where significant change has occurred.

The increase in availability of Tier 1 broadband from 91.1 percent to 93.1 percent, for example, can be attributed to ConnectME Authority grant awards, which have spurred broadband growth in Somerset and Waldo counties specifically, to the presence of a new fixed wireless provider in Waldo County, and to additional provider buildout in general. Another example is the dramatic increase in household use of mobile devices from 24.2 percent to 47.6 percent, which can be correlated to the increase in mobile coverage and marketing in the state and to advancements in mobile technology in general.

Shaded cells in the table indicate new analysis conducted for the update, including analysis on data originally collected in 2011.²⁵

²⁵ Tier 3 and Tier 5 broadband availability data from both 2011 and 2013 surveys, for example, were evaluated for the first time for this update.

Table 3-1: Factors Influencing Changes in Maine Broadband Development--2011-2013

MEASUREMENT CRITERIA	BASELINE 2011	UPDATE 2013	FACTORS/INFLUENCES	SOURCE
General Statewide Broadband Availability and Use				
Maine Locations				
<ul style="list-style-type: none"> Percent of street locations having access to broadband at Tier 1 speeds or above from at least 1 SP* <ul style="list-style-type: none"> Increase in fixed wireless <p><i>*Greatest growth in Somerset and Waldo counties</i></p>	<p>91.1% 15.7%</p>	<p>93.1% 19.8%</p>	<ul style="list-style-type: none"> ConnectME Authority grant awards influencing growth in Somerset and Waldo counties. In the Somerset County communities of Long Pond, Rockwood, and Appleton, completed projects in 2011-2012 serve an additional estimated 1001 households. In the Waldo County communities of Lincolnville and Lincolnville Beach, completed projects in 2011 serve an additional estimated 105 households. Additional buildout by many providers in general. Fixed wireless a lower-cost technology to implement as opposed to wired networks, although more susceptible to reliability issues due to interference factors. The presence of a new fixed wireless provider in the Belfast area of Waldo County (Bluestreak). New map coverage of Hussey Communications in Somerset County is increasing percentage of availability. (Hussey was in existence in 2011, but did not participate in survey.) 3 Ring Binder infrastructure not operational long enough to realize full potential impact to market/industry in Maine. 	ConnectME Inventory and Mapping 6-month updates
<ul style="list-style-type: none"> Percent of street locations having access to broadband at Tier 3 speeds or above from at least 1 SP <ul style="list-style-type: none"> Increase in cable 	<p>13.3% ^[1] 6.3%</p>	<p>84.9% ^[1] 74.5% ^[2] 82.8% ^[1]</p>	<ul style="list-style-type: none"> Majority of increase due to technology upgrades on part of cable service providers, rather than that of local incumbent telephone companies. Cable companies realize far less investment costs to offer higher-capacity cable services. 	<p>¹ConnectME Inventory and Mapping 6-month updates ²Wired phone connections from the automatic location identification (ALI) database for E911 response. Each telephone number and the physical location to which it corresponds are stored in an ALI database.</p>
<ul style="list-style-type: none"> Percent of street locations having access to broadband at Tier 5 speeds or above from at least 1 SP <ul style="list-style-type: none"> Increase in DSL Increase in fixed wireless 	<p>6.3% 0.0% 0.0%</p>	<p>20.8% ^[1] 24.2% ^[2] 11.5% ^[1] 5.0% ^[1]</p>	<ul style="list-style-type: none"> A number of providers maximizing throughput of physical plant in which they have invested. This represents incremental improvements over full replacement. Increase in Tier 5 DSL coverage attributable to GWI. According to GWI's technical contact: <ul style="list-style-type: none"> GWI supports the newer G.SHDSL standard for symmetric DSL, which will do 5x5 on a single loop and 40x40 bonded over 8 loops. Most G.SHDSL customers are using 2 loops at a minimum. 	<p>¹ConnectME Inventory and Mapping 6-month updates ²ALI database</p>
<ul style="list-style-type: none"> Percent of geographic area coverage having access to mobile broadband at 4G speeds 	<p>0.0%</p>	<p>43.0% ^[1]</p>	<ul style="list-style-type: none"> New technology and increase in mobile provider marketing in Maine Large telco companies (Verizon) investing in cellular service/wireless not wired networks. Cost of investment per customer served significantly lower; profit margins high.² Advance of smartphones and tablets is creating a robust entry point for adoption by non-owners of traditional computing devices. 	<p>¹ConnectME Inventory and Mapping 6-month updates ²http://stopthecap.com/2013/07/18/verizon-diverting-landline-fios-investment-to-pay-for-more-profitable-wireless-upgrades/; http://muninetworks.org/content/verizon-plans-abandon-copper-wires-islands-damaged-sandy;</p>
<ul style="list-style-type: none"> Average number of broadband SPs per Maine community 	<p>4.3</p>	<p>4.7</p>	<ul style="list-style-type: none"> Inclusion of resellers increase SP options. 	ConnectME Inventory and Mapping 6-month updates
Maine Households				
<ul style="list-style-type: none"> Percent of surveyed Maine households having some form of internet connection 	<p>89.6%</p>	<p>89.8%</p>		ConnectME Planning surveys (2011; 2013)
<ul style="list-style-type: none"> Percent of surveyed Maine households using mobile devices 	<p>24.2%</p>	<p>47.6%</p>	<ul style="list-style-type: none"> Growth in mobile technology and mobile provider coverage. 4G broadband interoperability presents options and added value. 	ConnectME Planning surveys (2011; 2013)
<ul style="list-style-type: none"> Percent of surveyed Maine households subscribing at broadband levels* <p><i>*Largest increase in Sagadahoc and Waldo counties</i></p>	<p>72.7%</p>	<p>75.3%</p>	<ul style="list-style-type: none"> Households upgrading service from dialup to DSL, cable and fixed wireless. Waldo a growth county in new fixed wireless specifically 	ConnectME Planning surveys (2011; 2013)
Maine Businesses				
<ul style="list-style-type: none"> Percent of surveyed Maine businesses having some form of internet connection 	<p>90.1%</p>	<p>93.7%</p>	<ul style="list-style-type: none"> Response to business survey Question #3 (2011); response to business survey Question #9 (2013) 	ConnectME Planning surveys (2011; 2013)
<ul style="list-style-type: none"> Percent of surveyed Maine businesses using mobile devices 	<p>32.3%</p>	<p>46.3%</p>	<ul style="list-style-type: none"> Growth in mobile technology and mobile provider coverage. 4G broadband interoperability presents options and added value. 	ConnectME Planning surveys (2011; 2013)
<ul style="list-style-type: none"> Percent of surveyed Maine businesses subscribing at broadband levels 	<p>85.7%</p>	<p>93.1%</p>	<ul style="list-style-type: none"> Shift toward internet being less expensive (2013 business survey). 	ConnectME Planning surveys (2011; 2013)
Consumer Identified Barriers to Broadband Use				
<ul style="list-style-type: none"> Barriers for surveyed households <ul style="list-style-type: none"> Lack of perceived value in owning a computer (major reason households do not connect) Cost 	<p>44.7% 21.3%</p>	<p>54.1% 18.3%</p>	<ul style="list-style-type: none"> 2013 survey sample an older demographic—a segment with less interest in computers. <i>It is important to note that the number of non-adopters has decreased since 2011 as adoption has increased, with the result that the percentage of respondents citing lack of perceived value in owning a computer is based on a smaller number. As members of this group adopt technology, the number of non-adopters will grow smaller and the percentage of those citing lack of perceived value will continue to rise.</i> Mobile devices, not necessarily recognized as computers, are potential driver for broadband use. 	ConnectME Planning surveys (2011; 2013)
<ul style="list-style-type: none"> Barriers for surveyed businesses <ul style="list-style-type: none"> Lack of perceived value in having an internet connection: Cost 	<p>39.1% 28.3%</p>	<p>54.6% 18.2%</p>	<ul style="list-style-type: none"> Maine businesses conducting less business out of state in 2013 than in 2011. Maine businesses generating less income in 2013 than 2011. Price businesses will pay for faster internet service decreased. 	ConnectME Planning surveys (2011; 2013)

Table 3-1: Factors Influencing Changes in Maine Broadband Development--2011-2013 (continued)

MEASUREMENT CRITERIA	BASELINE 2011	UPDATE 2013	FACTORS/INFLUENCES	SOURCE
General Statewide Broadband Availability and Use				
Maine's Broadband Infrastructure				
<ul style="list-style-type: none"> Average broadband download capacity* <ul style="list-style-type: none"> Maine National <p><i>* The measurement criteria for broadband 2011 and 2013 download capacity data, which are from different sources, may vary.</i></p>	<p>768 Kbps ^[1] 3.9 Mbps ^[1]</p>	<p>4.8 Mbps ^[2] 6.4 Mbps ^[2]</p>	<ul style="list-style-type: none"> Advances from plant improvements. Cable upgrades. 2013 data more inclusive than 2011 data (only those SPs required file report Form 477). 	<p>¹ FCC Internet Access Service reports updated as available ² National Broadband Map data (2013) for median download speed</p>
<ul style="list-style-type: none"> Internet speeds in Maine <ul style="list-style-type: none"> Percent of households having at least 3 Mbps (download) Percent of housing units having at least 3 Mbps (download) Percent of households having at least 10 Mbps (download) Percent of housing units having at least 10 Mbps (upload/download) Percent of housing units having at least 10 Mbps (download) <ul style="list-style-type: none"> Percent served at least 10 Mbps by cable (download) Maine's ranking in speeds >10Mbps 	<p>55% ^[1] -- 6% ^[1]</p>	<p>-- 96.6% ^[2] 11.1% ^[1]</p> <p>37.3% ^[2] 81.1% ^[2] 80.7% ^[2] 49th ^[1] 46th ^[2]</p>	<ul style="list-style-type: none"> Changes in technology: cable, fixed wireless, fiber optic. Advancement in physical plants by providers. Time Warner Cable increased offerings (prominent provider in Maine); other cable companies upgrading technology. Number of companies reporting increased. Maine playing eternal game of catchup with national average. Maine has to take jump in technology to change the landscape. 	<p>¹ FCC Internet Access Service report updated as available ² National Broadband Map data (2013)</p>
<ul style="list-style-type: none"> Maine's ranking in deployment of broadband telecommunications 	45th	37^t		State New Economy Indexes updated as available
<ul style="list-style-type: none"> Maine's ranking in number of IT professionals in non-IT industries 	41st	43rd	<ul style="list-style-type: none"> Young people leaving Maine and those left behind aging. Maine not a business-friendly state. More businesses see less value in adopting IT technology. Businesses in Maine are not offering IT jobs. State government is the largest employer followed by healthcare (nonprofits). 	State New Economy Indexes updated as available
<ul style="list-style-type: none"> Maine's ranking in high tech jobs as a percentage of all jobs 	35th	38th	<ul style="list-style-type: none"> IT jobs not offered in Maine--we educate but not employ. Also cannot fill IT positions (southern Maine)—not a pool in the state. Businesses have not adopted telecommuting to meet needs for “meaningful life” and amenities. Business use of internet is email/database/billing primarily. 	State New Economy Indexes updated as available
<ul style="list-style-type: none"> Number of Maine end user SPs deploying NGA 	1	5	<ul style="list-style-type: none"> Part of trend of SPs (new companies using new technologies; older companies making incremental changes.) 	ConnectME Inventory and Mapping 6-month updates
Focused Stakeholder Groups				
The Healthcare Community				
<ul style="list-style-type: none"> Broadband Availability and Use by Medical/Dental Providers & Hospitals <ul style="list-style-type: none"> Percent of surveyed facilities with access to broadband Percent of surveyed facilities with some form of internet connection Percent of surveyed facilities subscribing at broadband levels Percent that use healthcare services & reporting <ul style="list-style-type: none"> Telemedicine* E-prescription Health InfoNet Health Information Exchange (HIE) Electronic Health Records (EHR) Percent unsure about internet access Percent with access at less than broadband speeds Percent without internet access Percent using mobile devices <p><i>* The reduction in the use of telemedicine services from 2011 and 2013 is largely due to differences in measurement criteria between the Muskie study and this update.</i></p>	<p>88% ^[1] 90% -- -- 18% -- -- -- -- 9% 2% 1%</p>	<p>95% ^[2] 98% 95% 64% 7% 26.9% 33% 64.0% 0.1% <1% <1% 12%</p>	<ul style="list-style-type: none"> Federal incentives for implementing and adopting meaningful use of certified EHRs. Growing confidence in HealthInfoNet expanding use in system. 	<p>¹ Muskie School Health Information Technology (HIT) Survey update (2011) ² ConnectME Planning survey (2013)</p>
<ul style="list-style-type: none"> Barriers to Broadband Adoption for Surveyed Healthcare Facilities & Providers <ul style="list-style-type: none"> Lack of perceived need or value Cost Lack of adequate service 	<p>42% ^[1] 12% --</p>	<p>40% ^[2] 20% 30%</p>		<p>¹ Muskie School Health Information Technology (HIT) Survey update (2011) ² ConnectME Planning survey (2013)</p>

Table 3-1: Factors Influencing Changes in Maine Broadband Development--2011-2013 (continued)

MEASUREMENT CRITERIA	BASELINE 2011	UPDATE 2013	FACTORS/INFLUENCES	SOURCE
General Statewide Broadband Availability and Use				
The Education Community (K-12)				
<ul style="list-style-type: none"> Availability and Use by Maine Schools and Libraries <ul style="list-style-type: none"> ➤ Percent with broadband service ➤ Percent with fiber optic connections ➤ Percent using mobile devices 	<p>100%</p> <p>44%</p> <p>18.2%</p>	<p>100%</p> <p>48%</p> <p>72.7%</p>	<ul style="list-style-type: none"> Small growth in fiber a factor of available funding. Network has been improved, but schools still served primarily by copper-based. Infrastructure change required: fiber plant may be in community but not to building. Schools not taking advantage of speeds available to them; 52% not adopting fiber. Mobile used only as communications device rather than classroom tool. 	Networkmaine's annual survey
<ul style="list-style-type: none"> Barriers to Adoption <ul style="list-style-type: none"> ➤ Price, at Maine School Library Network level ➤ Sufficient bandwidth ➤ Lack of middle and last mile infrastructure ➤ Lack of access to middle and last mile infrastructure 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>--</p>	<p>Yes</p> <p>Yes</p> <p>No</p> <p>Yes</p>	<ul style="list-style-type: none"> Middle mile fiber now exists, but still not accessible. 	Networkmaine's annual survey
Community Anchor Institutions				
<ul style="list-style-type: none"> Availability <ul style="list-style-type: none"> ➤ Percent of Maine CAIs with access to broadband (includes schools, libraries and healthcare organizations) ➤ Percent of CAIs nationwide with access to broadband 	<p>94.4% ^[1]</p> <p>--</p>	<p>95.4% ^[1] 92% ^[2]</p> <p>94% ^[3]</p>	<ul style="list-style-type: none"> Change in 2011 percentage due to improvement of ConnectME Inventory & Mapping Project dataset (i.e., deletion of duplicate and invalid records in database) According to the National Broadband Map data, there are a total of 299,893 CAIs nationwide and where broadband status is known, 94% of the CAIs have broadband. 	^[1] ConnectME Inventory and Mapping 6-month updates ^[2] ConnectME Planning survey (2013) ^[3] National Broadband Map data
<ul style="list-style-type: none"> Use <ul style="list-style-type: none"> ➤ Percent of surveyed CAIs with some form of internet connection (does not include schools, libraries and healthcare organizations) ➤ Percent of surveyed CAIs subscribing at broadband levels ➤ Percent using mobile devices 	<p>--</p> <p>--</p> <p>--</p>	<p>95.9%</p> <p>88%</p> <p>43.7%</p>		
<ul style="list-style-type: none"> Barriers to Adoption <ul style="list-style-type: none"> ➤ Cost ➤ Perceived value (cost and quality service) ➤ Outdated equipment ➤ Lack of technical support 	<p>--</p> <p>8%</p> <p>4%</p> <p>3%</p>	<p>28.6%</p> <p>21.4%</p> <p>7.1%</p> <p>0.0%</p>	<ul style="list-style-type: none"> Increase in respondents in 2013 provided more accurate numbers than limited survey sample in 2011. 	ConnectME Planning surveys (2011; 2013)
State Agencies				
<ul style="list-style-type: none"> Availability (estimated) 	98%	99%		Office of Information Technology (OIT)
<ul style="list-style-type: none"> Use <ul style="list-style-type: none"> ➤ Percent using privately owned mobile devices to connect to state wireless access points 	33.3%	66.6%		Office of Information Technology (OIT)
<ul style="list-style-type: none"> Barriers to Adoption (anecdotal) <ul style="list-style-type: none"> ➤ Limited or no carrier access to remote areas (geography) ➤ Funding 	<p>Yes</p> <p>Yes</p>	<p>Yes</p> <p>Yes</p>		Office of Information Technology (OIT)
Native Indian Tribes				
<ul style="list-style-type: none"> Aroostook Band of Micmac - Availability 	98%	100%	<ul style="list-style-type: none"> General trend between Maine Tribal and general populations will continue to mirror each other. Infrastructure for Tribes fairly well integrated with rest of Maine. Smaller populations compared to western Tribes. 	ConnectME Inventory and Mapping 6-month updates
<ul style="list-style-type: none"> Houlton Band of Maliseet Indians - Availability 	65%	100%	<ul style="list-style-type: none"> Increase in SPs reporting, increase in physical plant available. 	ConnectME Inventory and Mapping 6-month updates
<ul style="list-style-type: none"> Penobscot Nation – Availability <ul style="list-style-type: none"> ➤ Indian Island ➤ Remaining lands 	<p>100%</p> <p>21%</p>	<p>100%</p> <p>100%</p>	<ul style="list-style-type: none"> Increase in physical plant. 	ConnectME Inventory and Mapping 6-month updates
<ul style="list-style-type: none"> Passamaquoddy Tribe – Availability <ul style="list-style-type: none"> ➤ Pleasant Point ➤ Indian Township ➤ Remaining lands 	<p>100%</p> <p>100%</p> <p>12%</p>	<p>100%</p> <p>100%</p> <p>56.1%</p>	<ul style="list-style-type: none"> Increase in physical plant. 	ConnectME Inventory and Mapping 6-month updates
<ul style="list-style-type: none"> All Tribes – Barriers to adoption <ul style="list-style-type: none"> ➤ Cost of computer ownership and internet services 	Yes	--		ConnectME Planning surveys (2011; 2013)

4.0 Survey Results & Analysis

Detailed results from the 2013 surveys on Maine broadband availability and adoption are presented in this section with an analysis of changes since the 2011 baseline assessment. The focus of this update, as with the baseline assessment, is on end user service providers and consumers, including households and businesses, CAIs, the healthcare community, Native Indian Tribes, and State agencies.

4.1 BROADBAND SERVICE PROVIDERS

Availability and use of broadband depend on the investment decisions of service providers and the demand for services by local households, businesses and community organizations. When deciding to deploy broadband infrastructure, providers consider the cost of reaching potential customers as well as the likelihood that they will subscribe to available services. A municipality's geographic location and population settlement patterns—which affect the cost of delivery—and characteristics of local households, business and community organizations—which affect the need for, and interest in, services—are likely to influence deployment decisions.

This update on broadband availability and the socioeconomic factors that influence broadband development is based on economic modeling analysis using 2013 broadband survey data from the ConnectME Authority Broadband Mapping and Inventory Project, and municipality-level population data from the 2010 US Census and the American Community Survey of the Census Bureau. The Census Bureau's *Zip Code Business Patterns* provided information on the number of local establishments that employ 100 or more workers. Additional findings were obtained from a 2013 survey of service providers on their expansion plans (Section 4.1.2).²⁶

4.1.1 Broadband Availability

This study analyzed the availability of broadband services in Maine, defined as FCC Tier 1 minimum download and upload speed of 768 kbps or greater (Section 2.1). It was also informative to identify the growth in availability of broadband services at

²⁶ A comprehensive economic analysis on the 2013 results on broadband availability is provided in Appendix B.

speeds higher than Tier 1, namely at Tier 3 and Tier 5. A range of technologies were considered, with an emphasis on broadband connections via cable, DSL and fixed wireless services.²⁷

Table 4-1 shows the increase in Tier 1, Tier 3, and Tier 5 broadband availability over time by specific technology.

Table 4-1: Summary of Availability of Broadband Services

Year	Any Type	Cable	DSL	Fixed Wireless	Optical Carrier/Fiber	Average Number of Suppliers
Percentage of Addresses with Access to Tier 1 Broadband						
2011	91.1%	84.7%	36.4%	15.7%	0.0%	4.3
2013	93.1%	85.3%	37.0%	19.8%	0.4%	4.7
Percentage of Addresses with Access to Tier 3 Broadband						
2011	13.3%	6.3%	0.0%	7.8%	0.0%	0.3
2013	84.9%	82.8%	16.9%	5.5%	0.3%	1.9
Percentage of Addresses with Access to Tier 5 Broadband						
2011	6.3%	6.3%	0.0%	0.0%	0.0%	0.1
2013	20.8%	6.2%	11.5%	5.0%	0.2%	0.9

Using information on a sample of 494 Maine municipalities, 2013 findings indicate that 93.1 percent of Maine locations have access to one or more broadband technologies at a minimum of Tier 1 speed, an increase of 2 percentage points from 91.1 percent in 2011. Looking at individual technologies, 85.3 percent, 37.0 percent, 19.8 percent, and 0.4 percent of Maine locations have access to broadband via cable, DSL, fixed wireless and fiber optic services, respectively. Fixed wireless exhibits the most robust expansion in deployment, which grew from 15.7 percent to 19.8 percent of Maine addresses.

Access to broadband varies across Maine. The highest shares of locations with access to Tier 1 broadband are found in Androscoggin, Lincoln, Cumberland, Kennebec, York and Knox counties (Table 4-2). Regions of the state with the lowest shares with access include Piscataquis, Franklin, Somerset, and Hancock counties. The counties with the most expansion in availability between 2011 and the current update are Somerset and Waldo counties. Somerset County grew from 61.2 percent

²⁷ Information on the percentage of addresses with access to broadband delivered through fiber optics is presented for the state and individual counties. Less than 1 percent of Maine addresses have access to broadband via fiber optics however. For this reason, the factors affecting the deployment of this type of broadband technology are not analyzed in this report.

to 79.8 percent of addresses, and Waldo County grew from 75.6 percent to 86.7 percent of addresses.

Table 4-2: Availability of Tier 1 Broadband Services in Maine

Percentage of Addresses with Access to Tier 1 Broadband						
Region	Any Type	Cable	DSL	Fixed Wireless	Optical Carrier / Fiber	Average Number of Suppliers
Statewide (n=494)	93.1%	85.3%	37.0%	19.8%	0.4%	4.7
County						
Androscoggin (n=14)	99.6%	99.0%	50.3%	0.3%	0.0%	5.4
Aroostook (n=67)	87.2%	67.8%	27.4%	60.0%	0.0%	4.6
Cumberland (n=26)	97.8%	97.2%	35.8%	0.2%	0.2%	4.5
Franklin (n=23)	70.7%	36.8%	29.3%	28.3%	0.0%	3.9
Hancock (n=36)	80.7%	68.7%	20.3%	37.6%	3.2%	4.1
Kennebec (n=30)	99.1%	98.6%	34.0%	23.2%	0.2%	5.3
Knox (n=18)	98.0%	87.6%	47.1%	86.7%	0.0%	5.3
Lincoln (n=20)	99.4%	95.4%	46.6%	51.1%	0.5%	4.5
Oxford (n=37)	94.5%	89.1%	45.3%	0.2%	0.0%	3.8
Penobscot (n=61)	88.7%	75.8%	41.4%	26.1%	1.6%	4.9
Piscataquis (n=19)	46.1%	37.9%	18.2%	0.0%	0.0%	3.7
Sagadahoc (n=10)	91.9%	82.9%	36.6%	30.2%	0.0%	4.2
Somerset (n=33)	79.8%	55.2%	22.7%	38.6%	0.0%	4.0
Waldo (n=26)	86.7%	49.8%	45.7%	45.5%	0.0%	4.4
Washington (n=45)	88.5%	58.2%	19.7%	70.8%	0.3%	3.8
York (n=29)	98.8%	98.5%	39.3%	0.0%	0.0%	4.9

Notes: Information on the number of broadband suppliers and the percentage of street addresses with access to broadband is from the Maine Broadband Inventory and Mapping Project, conducted by Sewall for the ConnectME Authority. These figures are weighted by municipality population size as of the 2010 US Census.

When internet speeds increase from Tier 1 to Tier 3, broadband availability drops from 93.1 percent to 84.9 percent of Maine street addresses, and availability falls to just 20.8 percent of Maine addresses for Tier 5 internet service. Since 2011, however, Tier 3 broadband availability has risen in the state by 71.6 percentage points, and Tier 5 availability by 14.5 percentage points (Table 4-1).

Tables 4-3 and 4-4 show considerable variation across Maine in the availability of faster internet speeds. For example, the percentage of addresses with access to Tier 5 broadband ranges from over 65 percent in Knox and Sagadahoc counties to less than 5 percent in Piscataquis, Oxford, Somerset, Hancock, Washington and Franklin counties. Less than one-half of the locations in Piscataquis and Franklin counties have access to Tier 3 broadband services.

Table 4-3: Availability of Tier 3 Broadband Services in Maine

Percentage of Addresses with Access to Tier 3 Broadband						
Region	Any Type	Cable	DSL	Fixed Wireless	Optical Carrier / Fiber	Average Number of Suppliers
Statewide (n=494)	84.9%	82.8%	16.9%	5.5%	0.3%	1.9
County						
Androscoggin (n=14)	99.2%	99.0%	27.5%	0.0%	0.0%	2.1
Aroostook (n=67)	68.0%	64.3%	13.3%	0.0%	0.0%	1.5
Cumberland (n=26)	97.4%	97.2%	24.0%	0.2%	0.2%	2.2
Franklin (n=23)	44.4%	36.8%	9.4%	0.0%	0.0%	1.2
Hancock (n=36)	68.8%	68.7%	3.2%	1.6%	0.1%	1.5
Kennebec (n=30)	98.6%	98.6%	17.5%	0.7%	0.2%	1.8
Knox (n=18)	96.5%	87.6%	19.1%	82.9%	0.0%	2.0
Lincoln (n=20)	97.5%	95.4%	0.0%	51.0%	0.5%	2.1
Oxford (n=37)	89.1%	89.1%	5.2%	0.0%	0.0%	1.4
Penobscot (n=61)	76.2%	74.6%	17.3%	0.0%	1.6%	1.8
Piscataquis (n=19)	38.1%	37.9%	5.1%	0.0%	0.0%	1.1
Sagadahoc (n=10)	83.5%	74.9%	22.6%	30.2%	0.0%	2.1
Somerset (n=33)	58.5%	55.2%	5.7%	0.0%	0.0%	1.4
Waldo (n=26)	62.8%	49.8%	6.0%	23.0%	0.0%	1.3
Washington (n=45)	58.5%	58.2%	4.7%	0.0%	0.0%	1.2
York (n=29)	87.8%	85.0%	18.9%	0.0%	0.0%	2.2

Notes: Information on the number of suppliers providing Tier 3 broadband and the percentage of street addresses with access to Tier 3 broadband is from the Maine Broadband Inventory and Mapping Project, conducted by Sewall for the ConnectME Authority. These figures are weighted by municipality population size as of the 2010 US Census.

Table 4-4: Availability of Tier 5 Broadband Services in Maine

Percentage of Addresses with Access to Tier 5 Broadband						
Region	Any Type	Cable	DSL	Fixed Wireless	Optical Carrier / Fiber	Average Number of Suppliers
Statewide (n=494)	20.8%	6.2%	11.5%	5.0%	0.2%	0.9
County						
Androscoggin (n=14)	19.5%	2.7%	17.0%	0.0%	0.0%	1.1
Aroostook (n=67)	10.2%	0.0%	10.2%	0.0%	0.0%	0.5
Cumberland (n=26)	25.6%	10.9%	15.9%	0.2%	0.2%	1.3
Franklin (n=23)	4.7%	0.0%	4.7%	0.0%	0.0%	0.4
Hancock (n=36)	3.7%	0.0%	2.2%	1.5%	0.1%	0.4
Kennebec (n=30)	13.0%	0.0%	12.2%	0.6%	0.2%	0.7
Knox (n=18)	78.9%	0.0%	14.5%	78.8%	0.0%	1.0
Lincoln (n=20)	43.5%	0.0%	0.0%	43.5%	0.0%	1.0
Oxford (n=37)	3.3%	0.0%	3.3%	0.0%	0.0%	0.4
Penobscot (n=61)	14.4%	0.0%	12.9%	0.0%	1.6%	0.9
Piscataquis (n=19)	3.8%	0.0%	3.8%	0.0%	0.0%	0.3
Sagadahoc (n=10)	68.1%	60.6%	16.0%	29.8%	0.0%	1.6
Somerset (n=33)	3.0%	0.0%	3.0%	0.0%	0.0%	0.3
Waldo (n=26)	19.9%	0.0%	4.1%	18.6%	0.0%	0.4
Washington (n=45)	3.9%	0.0%	3.9%	0.0%	0.0%	0.3
York (n=29)	25.2%	13.9%	13.1%	0.0%	0.0%	0.9

Notes: Information on the number of suppliers providing Tier 5 broadband and the percentage of street addresses with access to Tier 5 broadband is from the Maine Broadband Inventory and Mapping Project, conducted by Sewall for the ConnectME Authority. These figures are weighted by municipality population size as of the 2010 US Census.

Determinants of Broadband Availability

The 2013 analysis shows that the most important factors explaining the differences in Tier 1 broadband availability across Maine municipalities are population density (locations with higher densities have greater availability), the percentage of the population in a municipality that resides outside urbanized areas (rural population²⁸), the median age of the population, and median household income. The analysis also indicates that aspects of a municipality’s geographic situation—the county of location and its proximity to other places where broadband is present—are key determinants of broadband availability. Finally the results suggest that the presence of CAIs, as well as the shares of local employment in manufacturing,

²⁸ This report uses the US Census Bureau’s classification of “rural” as a population density of less than 500 people per square mile; and of “urban” as a population density of at least 1,000 people per square mile, and at least 500 people per square mile in blocks surrounding an urbanized area.

information, finance, and insurance, healthcare and social assistance, and certain types of personal services, has a positive effect on broadband availability.

The percentage of population residing outside of urbanized areas continues to be negatively associated with the availability of broadband, suggesting that settlement patterns of the population, which affects the cost of infrastructure deployment, also affects broadband availability. As noted earlier, results show that a municipality’s geographic situation—the county of location and access to broadband in surrounding areas—are key determinants of the availability of DSL and fixed wireless broadband technologies.

Table 4-5: Factors Affecting Tier 1 Broadband Availability in Maine Municipalities

Factor	Providers	Any Type	Cable	DSL	Fixed Wireless
Population Density	No Effect	No Effect	Positive (1 of 3)	Positive (1 of 3)	Negative (1 of 3)
Rural Population	Negative (2 of 2)	No Effect	Negative (3 of 3)	No Effect	No Effect
Median Age	Negative (2 of 2)	Negative (3 of 3)	Negative (3 of 3)	Negative (3 of 3)	Negative (2 of 3)
Educational Attainment	No Effect	No Effect	Negative (1 of 3)	No Effect	Positive (3 of 3)
Median Income (\$1,000s)	Positive (2 of 2)	Positive (3 of 3)	Positive (3 of 3)	Positive (2 of 3)	Negative (1 of 3)
Housing Value (\$1,000s)	No Effect	No Effect	Positive (1 of 3)	No Effect	Negative (1 of 3)

Notes: A positive/negative effect means that an increase in the magnitude of the factor is associated with an increase/decrease in the measure of availability. The information shown in parentheses is the number of regression models in which the factor has a statistically significant effect (at a 10% significance level). "No effect" means that the factor does not have a statistically significant effect on the measure of availability.

As indicated in the 2011 survey, we find that the median age of the population has a negative effect on broadband availability and that median household income has a positive effect on availability (Table 4-5). The level of educational attainment, which had a positive effect on the availability of any type of broadband technology in 2011, shows in 2013 to have a positive effect on fixed wireless broadband availability only. These findings suggest, other things being equal, that telecommunications companies have made greater investments in Maine municipalities with younger residents—who may have a greater interest in broadband and understanding of its value—and in areas with higher levels of household income—which is presumably a sign of greater ability to pay for it.

We also found that the presence of “large” employers (i.e., 100 or more employees) does not have a statistically significant effect on broadband in 2013 as in 2011 (Table 4-6). The presence of CAIs, however, which appeared to have no effect in 2011, shows a positive effect on the availability of cable and fixed wireless technologies in 2013.

Table 4-6: Effects of Large Businesses and CAIs on Tier 1 Broadband Availability

Variable	Any Type	Cable	DSL	Fixed Wireless
Large Businesses	No Effect	No Effect	No Effect	No Effect
Community Anchor Institutions	No Effect	Positive (2 of 2)	No Effect	Positive (1 of 2)

Notes: A positive/negative effect means that an increase in the percentage of industry employment is associated with an increase/decrease in the measure of availability. The information shown in parentheses is the number of regression models in which the percentage of industry employment has a statistically significant effect (at a 10% significance level). “No effect” means that the percentage of industry employment does not have a statistically significant effect on the measure of availability.

The 2013 results indicate that the shares of local employment in manufacturing, information, finance and insurance, healthcare and social assistance, and certain types of personal services (i.e., other services) tend to have a positive effect on broadband availability (Table 4-7).

Table 4-7: Effects of Local Industry Specialization on Tier 1 Broadband Availability

Industry Category	Any Type	Cable	DSL	Fixed Wireless
Agriculture, Forestry, Fishing and Hunting	Negative (2 of 2)	Negative (2 of 2)	Negative (2 of 2)	Negative (1 of 2)
Construction	Negative (2 of 2)	Negative (2 of 2)	No Effect	No Effect
Manufacturing	Positive (2 of 2)	No Effect	No Effect	Positive (1 of 2)
Wholesale Trade	No Effect	No Effect	No Effect	No Effect
Retail Trade	No Effect	No Effect	No Effect	No Effect
Transportation and Warehousing	No Effect	Negative (2 of 2)	No Effect	No Effect
Utilities	No Effect	No Effect	No Effect	No Effect
Information	Positive (2 of 2)	No Effect	No Effect	No Effect

Industry Category	Any Type	Cable	DSL	Fixed Wireless
Finance and Insurance	Positive (1 of 2)	Positive (1 of 2)	Positive (2 of 2)	Negative (1 of 2)
Real Estate	Negative (1 of 2)	No Effect	No Effect	No Effect
Professional, Scientific and Technical Services	No Effect	Positive (2 of 2)	No Effect	No Effect
Management of Companies and Enterprises	No Effect	No Effect	No Effect	No Effect
Administrative, Support and Waste Management Services	No Effect	No Effect	No Effect	No Effect
Educational Services	No Effect	No Effect	No Effect	No Effect
Healthcare and Social Assistance	Positive (2 of 2)	Positive (2 of 2)	Positive (2 of 2)	No Effect
Arts, Entertainment and Recreation	Negative (1 of 2)	Positive (1 of 2)	No Effect	Negative (2 of 2)
Accommodation and Food Service	No Effect	Positive (2 of 2)	No Effect	No Effect
Other Services	Positive (2 of 2)	No Effect	No Effect	Positive (2 of 2)
Public Administration	Negative (1 of 2)	No Effect	Negative (1 of 2)	Positive (1 of 2)

Notes: A positive/negative effect means that an increase in the percentage of industry employment is associated with an increase/decrease in the measure of availability. The information shown in parentheses is the number of regression models in which the percentage of industry employment has a statistically significant effect (at a 10% significance level). "No effect" means that the percentage of industry employment does not have a statistically significant effect on the measure of broadband access.

In terms of having a positive effect on the availability of Tier 1 broadband, the local share of employment in the finance and insurance sector stands out across all types of internet technologies, except for fixed wireless. In addition, this sector is the only one consistently found to have a positive effect over time.²⁹

In aggregate, the results from both 2011 and 2013 surveys suggest that, along with characteristics of the local population, the presence of businesses in a municipality—in particular those related to finance and insurance—may influence the decisions of telecommunications companies.

²⁹ The 2011 baseline assessment found shares in finance and insurance to have a positive effect across all internet technologies.

4.1.2 Service Provider Survey Results

Respondent profile. Of the 26 end-user service providers contacted, 16 (62 percent) participated in the survey, providing the Sewall Team with information on their plans to expand service coverage, their barriers to expansion, and their barriers to adoption where service is available. They also provided recommendations for increasing service expansion and adoption.³⁰ At 62 percent, service provider response in 2013 was slightly less than the 68 percent who responded to the 2011 survey (19 respondents out of 28 service providers contacted).³¹

Expansion plans. Of the service providers who responded to the 2013 survey, 75 percent have plans to expand broadband service in Maine in the next 12 months, a 10 percent increase since 2011; 86 percent have plans to upgrade their current service offerings.

Barriers to service expansion. As in the 2011 survey, service providers indicated barriers to service expansion in four major categories: cost, technical issues, policy and regulations, and location.

In 2013, service providers emphasized the high cost of infrastructure over the correlating lack of funding or low return on investment. Infrastructure build time was also cited as a barrier to expansion. On the technical side, providers placed more emphasis in 2013 on the lack of available spectrum for wireless than the lack of utilities, access to pole attachments, or greater backhaul capacity. A greater percentage of providers referenced as barriers Maine's geography and climate as well as the lack of customer density (Table 4-8).

Barriers to service adoption. Service providers surveyed in both 2011 and 2013 identified three broad categories of barriers to service adoption where broadband service is available: cost, education/awareness, and tools. In 2013, providers indicated less concern about cost as a barrier to adoption than in 2011 (Table 4-9). The majority, however, continued to view consumer lack of awareness of broadband benefits as a major barrier. Two service providers indicated no barriers to adoption.³²

³⁰ For the service provider questionnaire, see Appendix A.

³¹ Service provider consolidation was a factor in the reduced number of providers contacted for this study: Pioneer Broadband acquired Aroostook Internet and GWI acquired MidCoast Internet.

³² One service provider cited competition as a barrier to adoption, which suggests that adoption is taking place through other providers.

Table 4-8: Service Provider Barriers to Service Expansion

Barriers to Service Expansion	2011	2013
Cost		
High cost of building infrastructure	37%	56%
Lack of funding/capital	53%	19%
Low return on investment	68%	6%
Infrastructure build time	--	6%
Technical		
Lack of available spectrums (wireless)	16%	25%
Lack of utilities (wired, wireless)	11%	6%
Lack of access to pole attachments (wired)	16%	6%
Need for greater backhaul capacity (wired, wireless)	21%	6%
Technology of transmission (wired, wireless)	5%	--
Lack of access to remote terminals (wired)	5%	--
Policy and Regulations		
Uncertain regulatory environment	--	6%
Restrictive municipal ordinances governing towers	11%	6%
Lack of clear, consistent definition of broadband	5%	--
Location		
Maine geography and climate	16%	44%
Lack of potential customer density	11%	25%
High number of camps and seasonal homes	11%	6%
No Barriers		
100% of homes/businesses in footprint to have broadband access by year end	--	6%

Table 4-9: Service Provider Barriers to Service Adoption

Barriers to Service Adoption	2011	2013
Cost		
Affordability, costs too high	74%	31%
Use of free public wifi service	5%	--
Pirating of neighbor's service	5%	--
Education/Awareness		
Not a priority, lack of awareness of benefits	68%	69%
Lack of technical assistance, digital literacy	42%	25%
Age of population	37%	6%
Non-use at work	11%	--
Fear of technology	5%	6%
Tools		
Inadequate or no computer	53%	25%
No Barriers		
Not a major issue	--	6%
Our customers come to us first for high speed	--	6%

Service provider recommendations. Service providers were also asked to recommend actions for increasing broadband expansion and improving adoption. As in the 2011 assessment, providers emphasized education, funding/price issues, marketing, and policies and regulations as key to broadband growth. In 2013, a larger percentage of providers recommended educating consumers than in 2011, and fewer providers recommended state subsidy and funding (Table 4-10).

Table 4-10: Service Provider Recommendations 2011-2013

Service Provider Recommendations	
2011	2013
Education	
<ul style="list-style-type: none"> • State and service providers should offer technical assistance and increased access to training • State and service providers should expand internet training classes 	<ul style="list-style-type: none"> • [State and/or service providers should] educate public on value of high-speed internet • [State and/or service providers should] educate consumers on the financial benefits of broadband • [State and/or service providers should] provide educational outreach programs • [State and/or service providers should] provide free class on the internet and its benefits • [State and/or service providers should] educate the public as to broadband benefits • [State and/or service providers should] offer computer skills classes to the community • [State and/or service providers should] have one-on-one discussions with business owners to assess business needs and computer skill level of employees; create plan to increase job skills and meet demand from the employer
Funding/Price	
<ul style="list-style-type: none"> • State should offer subsidies and incentives for rural penetration • State should allocate funding for newer technologies to support greater speeds • State should support efforts to improve access for online education and online patient monitoring • State should subsidize new consumer subscriptions for lower-income populations • State or federal government should subsidize PC purchases and internet fees for households below national poverty level • State should fund grants that offer higher-cost solutions/higher cost per potential subscriber 	<ul style="list-style-type: none"> • State agencies could subsidize broadband service • [Service providers should] lower price

Service Provider Recommendations	
2011	2013
Marketing	
<ul style="list-style-type: none"> • Providers should try to engage communities, working to get residents actively involved • Providers should offer a trial or test drive • State should take steps to promote broadband • Providers should increase marketing • Marketing should promote content relevant to aging population, e.g., e-health 	<ul style="list-style-type: none"> • State agencies could coordinate and assist with broadband marketing efforts by service providers
Policies & Regulations	
<ul style="list-style-type: none"> • State/federal governments should change medical insurance regulations so that online visits are reimbursable • State government should work with municipalities to revamp tower ordinances • State government should reform pole access so as to allow ISPs to attach to poles and to make the attachment process more equitable and timely • FCC should resolve questions surrounding the USF • Maine PUC should keep rural exemptions in place 	<ul style="list-style-type: none"> • [State should] provide access to state tower infrastructure and relax regulations. Access to currently restricted frequencies • [State and/or service providers should] treat bandwidth as a universal commodity, much like electricity, which everyone deserves
Other	
	<ul style="list-style-type: none"> • Broadband subscriptions continue to increase. I am not sure any government program will make a difference in the current growth rate. • I think we're doing fine. We should spend money on infrastructure, building and improving what we have started.

4.2 BROADBAND CONSUMERS

Results of the 2013 surveys of broadband consumers, changes in broadband subscribership, and drivers of and barriers to adoption since the 2011 baseline assessment are analyzed in the following sections, with a focus on residential and small business consumers (establishments with less than 100 employees), CAIs, healthcare organizations, Native American Tribes, and State agencies.

4.2.1 Residential and Business Consumers

The results of the 2013 residential and business consumer surveys update our information on computer and broadband internet use in Maine and, together with socioeconomic modeling, identify determinants of and barriers to broadband

adoption. When compared with the 2011 baseline assessment results, they also show changes in Maine broadband subscribership.

Of the residential and business consumers surveyed by mail and online questionnaires, the total number of completed responses used in this update was 2,834 (2,466 residential and 368 business). The household response rate in 2013 was 3 percentage points lower than 2011; the business response rate was 7 percentage points lower.³³ A breakout of the percentage of returns by county for both years is provided in Table 4-11.

Table 4-11: Household and Business Survey Respondents by County

Name of County	Household % of Respondents		Business % of Respondents	
	2011	2013	2011	2013
Androscoggin	10.09%	7.33%	8.92%	7.67%
Aroostook	5.89%	5.96%	7.41%	7.95%
Cumberland	21.24%	20.98%	24.41%	19.89%
Franklin	2.43%	1.47%	2.53%	1.70%
Hancock	4.76%	4.04%	5.72%	5.11%
Kennebec	9.32%	7.07%	8.08%	8.52%
Knox	4.20%	2.58%	3.20%	2.84%
Lincoln	2.54%	4.36%	2.53%	3.98%
Oxford	2.93%	4.67%	3.03%	3.69%
Penobscot	11.12%	11.56%	12.46%	11.08%
Piscataquis	1.59%	1.33%	0.51%	1.42%
Sagadahoc	1.80%	2.93%	2.02%	3.41%
Somerset	3.88%	6.67%	3.20%	4.55%
Waldo	2.40%	2.80%	2.53%	3.98%
Washington	2.29%	2.80%	2.86%	1.99%
York	13.51%	13.47%	10.61%	12.22%
Total	100%	100%	100%	100%

³³ To maintain consistency in the residential and business survey samples, the same mailing lists were used for both 2011 and 2013 surveys, with the result that some surveys were nondeliverable in 2013 due to changes in recipient status (e.g., moves out of state, deaths, business closures).

Residential Consumers Survey Results

The results of the 2013 residential consumer surveys, the economic modeling of these results, and a comparative analysis with the 2011 assessment provide current information on household computer and internet use and on the drivers of and barriers to adoption in households in Maine.³⁴ These findings help define the status and potential of broadband subscribership within this consumer group.

Respondent profile. The 2013 survey sample represents a range of households that vary in age, size, and income, key characteristics found to determine household computer use and broadband internet subscribership. The 2013 sample shows little change since 2011 in the distribution of respondent income, slight change in household size, and significant change in household age.

In specific, responses to the 2013 survey indicate an over 10 percentage point increase in households with people over the age of 64 and a corresponding decrease in percentages from the younger aged groups (Figure 4-1).

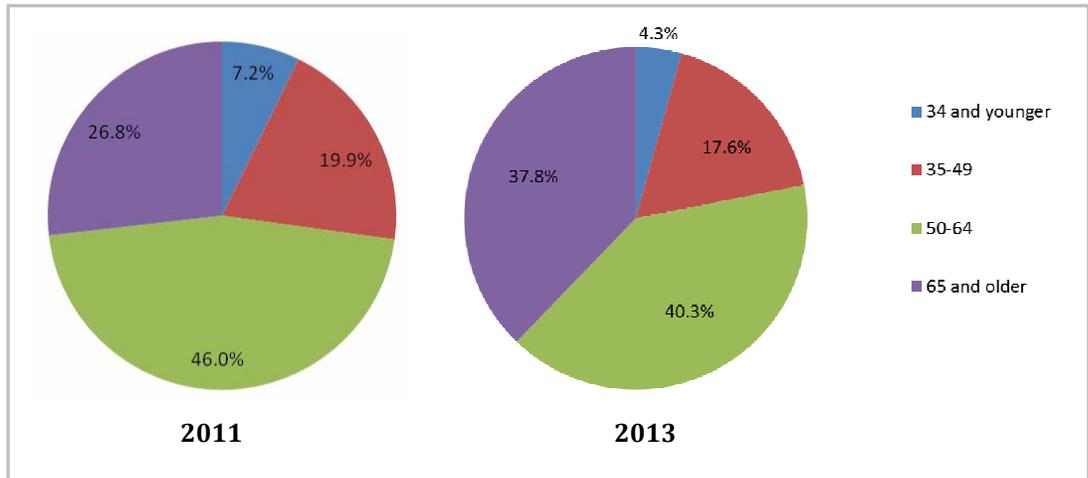


Figure 4-1: Household Survey Respondents by Age

Respondents from households with only people over the age of 64 and with no children under the age of 18 increased from 23.7 percent to 41.7 percent and from 76.4 percent to 81.4 percent respectively (Table 4-12). Household size of respondents decreased slightly in 2013.

³⁴ The residential consumer survey questionnaire is provided in Appendix A. Complete survey results to each question of the residential consumer questionnaire with charts and graphs are provided in Appendix B.

Table 4-12: Household Survey Respondents by Selected Size and Age

Household Size	2011 Survey % of Respondents	2013 Survey % of Respondents
3 or fewer people	82.03%	84.60%
More than 3 people	17.97%	15.40%
	100.00%	100.00%
Presence of children		
No children under the age of 18	76.44%	81.40%
One or more children under 18	23.56%	18.60%
	100.00%	100.00%
Presence of senior citizens		
Household contains only people over the age of 64	23.67%	41.70%

Note: Percentages are based on 2,674 and 2,357 observations from the 2011 and 2013 surveys, respectively.

As noted below, the distributions of household income are reasonably similar between the current survey and the one conducted in 2011. Over 16 percent of respondents have annual incomes of \$100,000 or more, whereas about 21 percent make less than \$25,000 per year.

Table 4-13: Household Survey Respondents by Annual Income

Annual Household Income	2011 Survey % of Respondents	2013 Survey % of Respondents
Less than \$15,000	8.83%	8.60%
\$15,000 to \$24,999	10.55%	12.90%
\$25,000 to \$34,999	11.92%	12.0%
\$35,000 to \$49,999	14.81%	13.30%
\$50,000 to \$64,999	14.61%	15.40%
\$65,000 to \$79,999	11.60%	10.70%
\$80,000 to \$99,999	10.23%	10.30%
\$100,000 to \$149,999	11.24%	10.90%
\$150,000 or more	6.22%	5.90%
Total	100.00%	100.00%

Note: Percentages are based on 2,492 and 2,138 observations from the 2011 and 2013 surveys, respectively. Due to the fact that survey respondents did not answer all of the questions, the sample used in this analysis is smaller than the total number of surveys returned.

Details on current household computer and internet use in Maine and on changes since 2011 follow.

Computer and internet use. Of the households surveyed, 85.9 percent have at least one computer in the home; 9.7 percent have a laptop computer or tablet from school; and 89.8 percent have some form of internet connection. These percentages show no significant change from the 2011 results (Table 4-14).

Table 4-14: Presence of Household Computer and Internet Connection

Household Computer and Internet Connection	% of Respondents	
	2011	2013
At least one computer in the home	86.5%	85.9%
Laptop computer or tablet from school	10.2%	9.7%
Some form of internet connection	89.6%	89.8%
Some form of broadband internet connection	72.7%	75.3%

Results show a significant increase, however, in the percentage of households that subscribe to high-speed or broadband internet services, from 72.7 percent in 2011 to 75.3 percent in 2013.³⁵

Of the households that do not have a computer, 34.4 percent would like to own one, but only 17.1 percent plan on obtaining one in the next 12 months. Since 2011, both percentages have gone down (from 41.2% and 30.3% respectively), and the gap between desire for a computer and the plan to obtain one has widened (Figure 4-2).

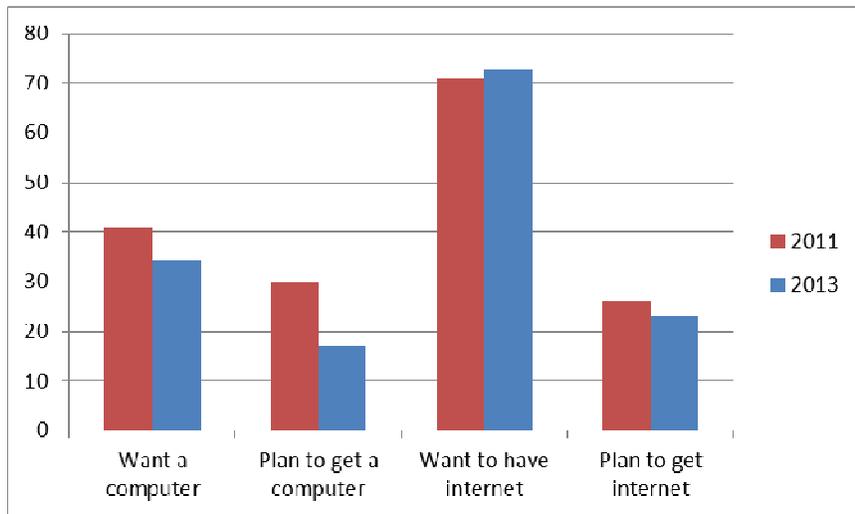


Figure 4-2: Computer and Internet Gap of Households

³⁵ As noted in Section 2.1, specific broadband technologies included in this survey are DSL, cable, fixed wireless, fiber optic, and T-1. Mobile wireless, whether at broadband speeds or not, is not included.

The percentage of households connected to the internet in 2013 (89.8%) has not changed since 2011 (89.6%). Of those who are not connected to the internet, 72.7 percent would like to connect, but only 22.9 percent plan to connect in the next 12 months. The gap between the desire for internet connection and the action to connect has also widened since 2011 from 44.7 percent to 49.8 percent.

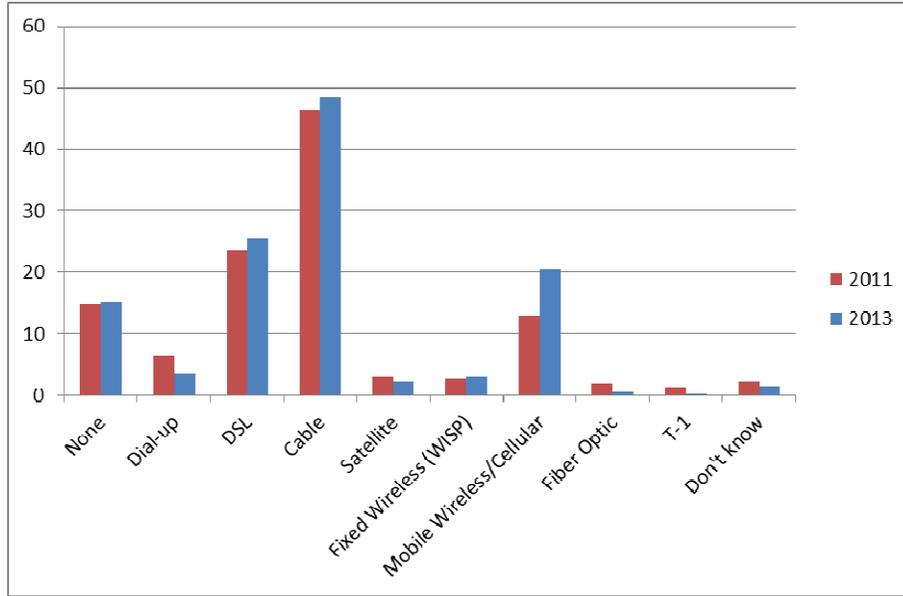


Figure 4-3: Household Use of Internet Technologies

As noted above, results show that 75.3 percent of households surveyed subscribe to high-speed or broadband internet services from their home, a significant increase from 72.7 percent in 2011. The use of DSL, cable and fixed wireless has all increased; less than 1 percent of households have a fiber optic/T-1 connection. The use of dial-up, which does not achieve broadband-level speeds, is reduced by half (Figure 4-3).

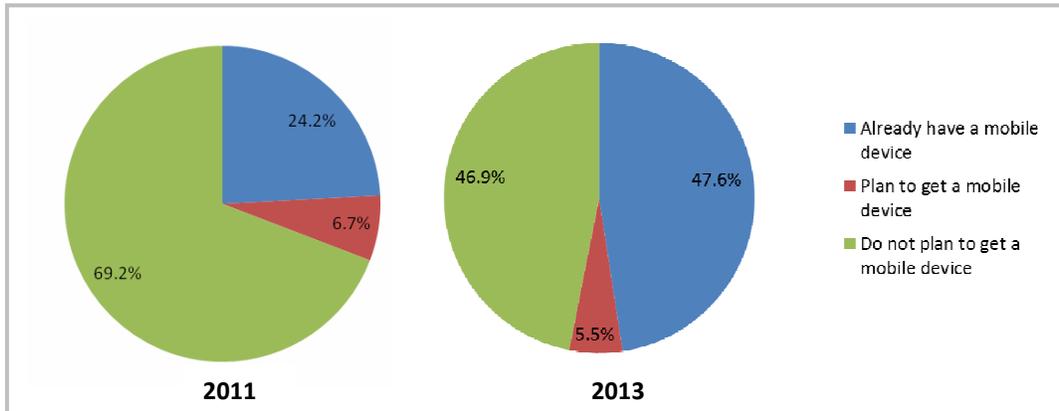


Figure 4-4: Household Use of Mobile Devices

The most significant change in internet technology use since 2011 has been in mobile wireless. The use of mobile devices, whether or not at broadband-level speeds, has almost doubled—from 24.2 percent to 47.6 percent (Figure 4-4). Our findings indicate that the majority of residential consumers use mobile devices in and outside their homes to complement other internet technologies—only 2.8 percent of household respondents in 2013 identified mobile devices as their sole means of connecting to the internet.

A major reason respondents use the internet in their homes is for communications and social networking. 83.0 percent indicated that they, or others in their household, use the computer for email, Facebook, Twitter, Skype and other forms of communications. 74.0 percent use the computer for checking news, weather or sports; 72.0 percent for online shopping, banking or bill paying; and 56.4 percent for word processing. In addition 52.8 percent use the computer for looking up information about businesses or other organizations, and 51.7 percent for looking up health-related information or for communicating with health providers. With the exception of word processing, these percentages have risen since 2011 (Table 4-15).

Table 4-15: Household Uses of the Internet

Use of Computer	% of Respondents	
	2011	2013
Email, Facebook, Twitter, Skype or other communications	81.6%	83.0%
News, weather, or sports	73.3%	74.0%
Online shopping, banking or bill paying	70.2%	72.0%
Word processing	58.2%	56.4%
Info on businesses and other organizations	52.7%	52.8%
Medical or health	50.4%	51.7%
Town, state or federal government	48.0%	48.1%
Games, music, TV shows, or movies online	47.8%	49.6%
Travel, hotel, or rental car reservations	44.9%	46.3%
Political candidates, election issues	25.3%	32.3%
Working from home for an employer	22.7%	21.0%
Searching or applying for a job	20.4%	16.9%
Home-based business; self-employment	16.1%	14.2%
Education/school assignments for children	17.8%	15.3%
Online classes, trainings, or webinars	15.7%	14.4%
Education/school assignments for adults	13.8%	11.9%
Other	6.8%	5.9%

Using the internet for games, music, TV shows and movies online; for travel, hotel and rental car reservations; and for information on political candidates and election issues has also risen in 2013. The increased use of entertainment online is not surprising given that almost one-third of household respondents in 2011 (31.3%) identified they would access more entertainment if they had higher-speed internet. The increased use of the internet for researching political and election issues could be a factor of the proximity of the 2013 survey with the 2012 national election.

Use of the internet for job-related and educational purposes, including working from home for an employer, job searching, conducting a home-based business, education and school assignments for children and adults, and online classes, has decreased since 2011.

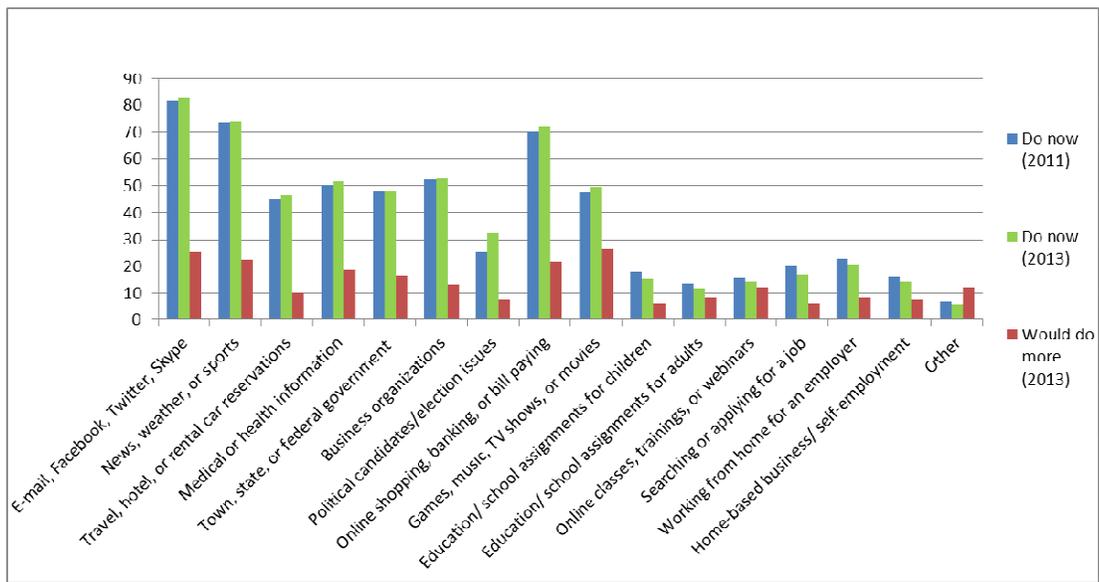


Figure 4-5: Changes in Household Uses of the Internet

If respondents had access to higher-speed internet, 26.4 percent indicated they would use the internet more for online games and entertainment, 25.6 percent for social media, 22.4 percent for news, weather and sports, and 21.8 percent for online shopping. 18.7 percent would use the internet for researching health-related information and communicating with healthcare providers (Figure 4-5). For educational purposes, 12.2 percent would pursue online classes for adults, 8.4 percent would access educational assignments for adults, and only 6.1 percent would access educational assignments for children.

The percentages for using higher-speed internet access for earning an income are also low. 8.0 percent would work at home, 7.6 percent would run a home-based business, and 6.2 percent would job search. 32.9 percent indicated that their current

service was fast enough. These percentages are comparatively lower than those indicated by the 2011 survey, with the exception of social media, which rose slightly (by 1.5%). The percentage of respondents who are content with the current speed of service also rose (by 3.2%).

Drivers of Computer and Internet Use. Economic modeling of household survey data suggests that household characteristics, such as the presence of senior citizens, number of people, and having one or more children in the household have a statistically significant impact on computer use and broadband adoption. Household income and educational attainment also influence the extent to which computers are used by Maine families and their broadband adoption decisions. We find that a household’s county of residence has some impact on computer use and broadband internet subscribership in Maine, even after accounting for differences in income, educational attainment, and household size and characteristics.

Results show that the presence of children in the household increases the likelihood of having a computer and spending 20 hours or more online per week. The presence of children also increases the number of computer applications used as compared to households without children under the age of 18. Households comprised solely of senior citizens, on the other hand, are less likely to have a computer and to spend 20 hours or more online per week; they also use fewer applications on the computer than other households (Tables 4-16 and 4-17).

Table 4-16: Computer Use and Broadband Subscribership by Household Size and Age

Household Characteristic	Computer in home	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	20 Hours or More Online
Household size					
3 or fewer people	89.48%	76.07%	2.13%	6.27	40.68%
More than 3 people	97.53%	87.66%	1.56%	8.58	67.40%
Presence of children					
No children under 18	89.04%	76.06%	2.20%	6.19	40.59%
One or more children under 18	97.33%	85.29%	1.44%	8.37	62.14%
Presence of senior citizens					
Household contains people under 65	94.25%	81.47%	2.17%	7.30	51.54%
Household contains only people over 64	79.26%	66.56%	1.52%	4.53	24.43%
All households—2011	86.45%	72.71%	3.03%	6.59	41.94%
All households—2013	85.27%	75.27%	0.63%	6.18	46.68%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

Larger-sized households in general are more apt to have broadband internet and spend 20 hours or more online per week; larger households also tend to use a wider variety of computer applications.

Table 4-17: Effects of Household Size and Age on Computer Use and Broadband Subscribership

Household Characteristic	Computer In home	Broadband Internet	Fiber optic or T-1 Internet	Number of Computer Apps	20 hours or More Online
Household size					
3 or fewer people	no effect	negative	no effect	negative	negative
More than 3 people	no effect	positive	no effect	positive	positive
Presence of children					
No children under 18	negative	no effect	no effect	negative	negative
One or more children under 18	positive	no effect	no effect	positive	positive
Presence of senior citizens					
Household contains people under 65	positive	no effect	no effect	positive	positive
Household contains only people over 64	negative	no effect	no effect	negative	negative

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the household characteristic has a positive (or negative) and statistically significant effect (at a 10 percent significance level) on the selected indicator of household computer use or broadband internet subscribership. Cells are indicated as “no effect” in cases where the characteristic does not have a statistically significant effect.

The 2013 survey results show that age is a differentiating factor between those respondents in the computer gap, i.e., the gap between the desire for a computer and a plan to obtain one, as noted above (p. 4-17). The average age of those inside the gap is found to be 65; the average age of those outside the gap is 56. According to survey results, those outside the gap are more likely to indicate that they do not own a computer because they have a mobile device.

As age impacts computer, internet and the number and variety of internet applications used in the home, survey data suggests that it determines the type of use. Results show a significant correlation between age and internet use for employment and educational purposes (children and adults). As age increases, internet usage for these purposes decreases.

A related driver of internet and broadband adoption is homeboundness. The 2011 results identified a significant relationship between frequency of homeboundness and hours of internet access by respondent alone and by household as a whole. In

the 2013 survey, 11.9 percent of residential respondents reported at least one person in the household unable to leave home due to an ongoing physical, mental, or emotional condition. 9.2 percent reported one or more people either occasionally or very frequently homebound (Figure 4-6). These findings have not changed substantially since 2011.

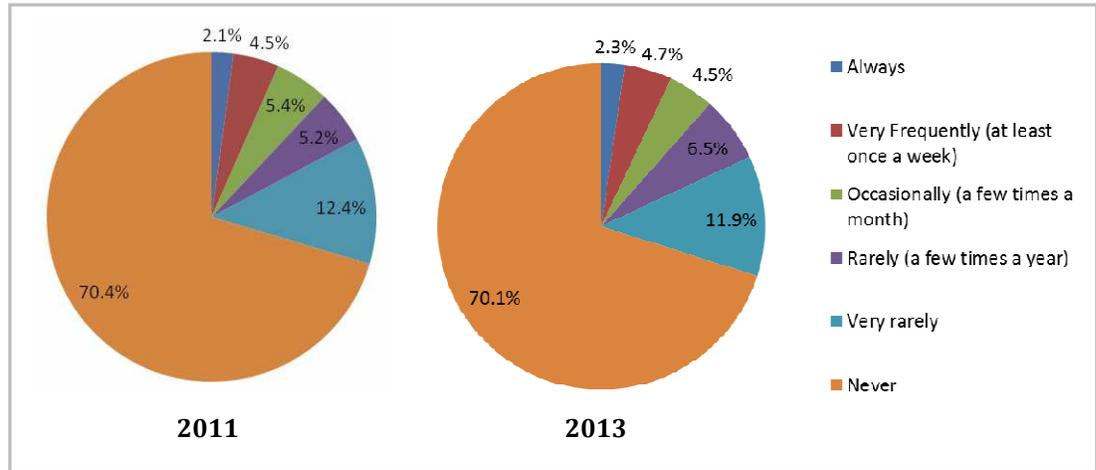


Figure 4-6: Frequency in Homeboundness

Household income and educational attainment also influence the extent to which computers are used by Maine families and their broadband adoption decisions. As noted earlier, 16 percent of households that responded to the survey have annual incomes of \$100,000 or more, whereas about 21 percent make less than \$25,000 per year. In general, the higher the income category, the greater the percentage of respondents who indicate they have a computer and broadband internet in the home. Results suggest that households with annual incomes of less than \$15,000, \$15,000 to \$24,999, and \$25,000 to \$34,999 are generally less likely to use computers and/or have broadband internet service (Tables 4-18 and 4-19).

Households in the categories of \$50,000 or more in annual income are more likely than the lower income households to have a computer or subscribe to broadband internet. The higher-income Maine households also tend to use a greater number of computer applications and are more apt to spend 20 hours or more online per week. The percentage of broadband subscribership has dropped in the two lowest categories since 2011 and increased in the higher categories.

Table 4-18: Computer Use and Broadband Subscribership by Household Income

Annual Household Income	Computer in Home	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	20 Hours or More Online
Less than \$15,000	62.33%	47.33%	2.00%	3.13	24.33%
\$15,000 to \$24,999	75.33%	56.67%	3.56%	4.17	30.67%
\$25,000 to \$34,999	85.80%	69.94%	0.21%	5.33	35.28%
\$35,000 to \$49,999	91.76%	77.31%	1.34%	6.14	43.19%
\$50,000 to \$64,999	96.96%	83.41%	2.28%	7.00	47.03%
\$65,000 to \$79,999	98.78%	88.03%	1.42%	7.71	51.93%
\$80,000 to \$99,999	98.65%	91.03%	2.24%	8.15	49.55%
\$100,000 to \$149,999	99.20%	89.78%	2.20%	8.84	62.32%
\$150,000 or more	99.63%	91.82%	4.09%	9.52	64.68%
All households—2011	86.45%	72.71%	3.03%	6.59	41.94%
All households—2013	85.27%	75.27%	0.63%	6.18	46.68%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

Table 4-19: Effects of Household Income on Computer Use and Broadband Subscribership

Annual Household Income	Computer in Home	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	20 Hours or More Online
Less than \$15,000	negative	negative	no effect	negative	negative
\$15,000 to \$24,999	negative	negative	positive	negative	negative
\$25,000 to \$34,999	no effect	no effect	negative	negative	negative
\$35,000 to \$49,999	no effect	no effect	no effect	negative	no effect
\$50,000 to \$64,999	positive	positive	no effect	positive	no effect
\$65,000 to \$79,999	positive	positive	no effect	positive	no effect
\$80,000 to \$99,999	positive	positive	no effect	positive	no effect
\$100,000 to \$149,999	positive	positive	no effect	positive	positive
\$150,000 or more	positive	positive	no effect	no effect	positive

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the income category has a positive (or negative) and statistically significant effect (at a 10 percent significance level) on the selected indicator of household computer use or broadband internet subscribership. Cells are indicated as “no effect” in cases where the category does not have a statistically significant effect.

In 2013, we find that educational attainment has a stronger effect on computer and internet use than in 2011. Households having at least one person with a four-year or graduate degree are more likely than other households to have a computer in the

home and to subscribe to a broadband internet service. These households also tend to use a greater number of computer applications.

Table 4-20: Computer Use and Broadband Subscribership by Household Educational Attainment

Highest Level of Education in Household	Computer in Home	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	20 Hours or More Online
Some high school	42.62%	26.23%	3.28%	1.21	4.92%
High school / GED	72.73%	58.80%	1.35%	3.62	25.73%
Classes beyond high school	86.89%	71.95%	2.37%	5.36	41.71%
Two-year, trade, technical school	92.11%	76.97%	1.45%	6.10	43.03%
Four-year college or university	95.55%	83.74%	1.92%	7.50	49.39%
Advanced (graduate) degree	98.80%	88.68%	2.71%	8.76	57.52%
All households—2011	86.45%	72.71%	3.03%	6.59	41.94%
All households—2013	85.27%	75.27%	0.63%	6.18	46.68%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

The 2013 results show that households in the two lowest educational attainment categories use computers less intensively (e.g., fewer applications and less time spent online), and they are less likely to have a computer in the house and subscribe to a broadband internet service (Table 4-21).

Table 4-21: Effects of Household Educational Attainment on Computer Use and Broadband Subscribership

Highest Level of Education in Household	Computer In Home	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	20 Hours or More Online
Some high school	negative	negative	no effect	negative	negative
High school / GED	negative	negative	no effect	negative	negative
Classes beyond high school	no effect	no effect	no effect	negative	no effect
Two-year, trade, technical school	positive	no effect	no effect	negative	no effect
Four-year college or university	positive	positive	no effect	positive	no effect
Advanced (graduate) degree	positive	positive	no effect	positive	positive

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the education category has a positive (or negative) and statistically significant effect (at a 10 percent significance level) on the selected indicator of household computer use or broadband internet subscribership. Cells are indicated as “no effect” in cases where the category does not have a statistically significant effect.

The household county of residence has, in some cases, an impact on computer use and broadband internet subscribership that is separate from the influences of household size and age characteristics, income, and educational attainment. Compared to households located elsewhere in Maine, those in Androscoggin, Cumberland, Sagadahoc and York counties, for example, are more likely to subscribe to broadband service; while households in Cumberland, Knox and Lincoln counties tend to use a greater number of computer applications (Table 4-22).

Table 4-22: Household Computer Use and Broadband Subscribership by County

County	Computer In home	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	20 Hours or More Online
Androscoggin	90.66%	81.02%	3.61%	6.47	41.57%
Aroostook	87.92%	71.67%	1.25%	5.95	40.00%
Cumberland	94.37%	89.67%	1.17%	7.64	51.29%
Franklin	87.72%	66.67%	3.51%	5.71	35.09%
Hancock	90.45%	65.73%	3.37%	6.62	40.45%
Kennebec	85.14%	75.71%	2.29%	6.26	44.29%
Knox	93.75%	79.69%	3.91%	7.20	50.00%
Lincoln	90.51%	73.72%	0.73%	7.12	41.61%
Oxford	85.41%	70.27%	4.32%	5.70	46.49%
Penobscot	91.62%	73.90%	1.33%	6.58	47.05%
Piscataquis	81.82%	52.73%	1.82%	5.36	34.55%
Sagadahoc	92.54%	87.31%	1.49%	7.35	41.04%
Somerset	89.33%	66.85%	3.37%	5.69	44.94%
Waldo	95.08%	72.13%	0.82%	6.24	41.80%
Washington	88.35%	57.28%	3.88%	5.87	41.75%
York	93.02%	86.23%	1.25%	6.97	48.48%
All households—2011	86.45%	72.71%	3.03%	6.59	41.94%
All households—2013	85.27%	75.27%	0.63%	6.18	46.68%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

Looking at differences over time, Sagadahoc and Waldo counties show the largest increase in broadband adoption (over 12%) and Lincoln County, the largest increase in the number of applications used and hours spent online. With the exception of Franklin County, all counties show increases in broadband adoption and hours spent online (Table 4-23).

Table 4-23: Differences in Computer Use and Broadband Subscribership over Time

County	Computer In home		Broadband Internet		Number of Computer Apps		20 Hours or More Online	
	2011	2013	2011	2103	2011	2013	2011	2013
Androscoggin	83.92%	90.66%	73.59%	81.02%	6.32	6.47	39.42%	41.57%
Aroostook	81.93%	87.92%	65.06%	71.67%	5.80	5.95	38.99%	40.00%
Cumberland	88.81%	94.37%	84.09%	89.67%	7.38	7.64	44.98%	51.29%
Franklin	92.65%	87.72%	68.18%	66.67%	6.46	5.71	42.42%	35.09%
Hancock	86.57%	90.45%	59.85%	65.73%	6.74	6.62	38.46%	40.45%
Kennebec	84.47%	85.14%	70.04%	75.71%	6.20	6.26	43.31%	44.29%
Knox	87.07%	93.75%	74.45%	79.69%	7.05	7.20	47.62%	50.00%
Lincoln	81.94%	90.51%	68.06%	73.72%	6.47	7.12	29.41%	41.61%
Oxford	77.11%	85.41%	71.95%	70.27%	5.67	5.70	37.97%	46.49%
Penobscot	88.85%	91.62%	67.74%	73.90%	6.25	6.58	42.62%	47.05%
Piscataquis	75.56%	81.82%	46.51%	52.73%	4.95	5.36	26.83%	34.55%
Sagadahoc	96.08%	92.54%	74.51%	87.31%	7.92	7.35	40.43%	41.04%
Somerset	83.64%	89.33%	61.32%	66.85%	5.72	5.69	40.38%	44.94%
Waldo	91.04%	95.08%	59.70%	72.13%	6.24	6.24	40.00%	41.80%
Washington	87.50%	88.35%	56.45%	57.28%	6.00	5.87	38.71%	41.75%
York	87.40%	93.02%	80.00%	86.23%	6.91	6.97	44.72%	48.48%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

Additional drivers to household internet use are the type of technology used to connect to the internet and the reasons households connect. As noted above, households have doubled their use of mobile devices for connecting to the internet. Although residential respondents appear to use this technology primarily to complement other internet technologies, our results indicate that those respondents outside the computer gap (the gap between the desire to have a computer and the plan to obtain one) are more likely to indicate that they do not own a computer because they have a mobile device. 12.5 percent of those not in the computer gap cited they use a mobile device instead of a computer as compared to 1.8 percent of the overall sample and 0.0 percent of those within the gap.

Finally, of the reasons to connect, residential consumers identify communications and social networking; news, weather and sports information; and online shopping, banking or bill paying as primary drivers, with online games and entertainment as potential drivers for future internet use (see pp. 4-19ff).

Barriers to computer and internet use. Of the households that do not have a computer in the home, 54.1 percent indicated the main reason to be lack of interest or need; 18.3 percent indicated high cost; and 13.7 percent indicated lack of knowledge or difficulty in using. The percentage of respondents indicating lack of interest, also cited first in the 2011 survey, has increased, and the percentage indicating cost, also cited second in 2011, has decreased (Figure 4-7).

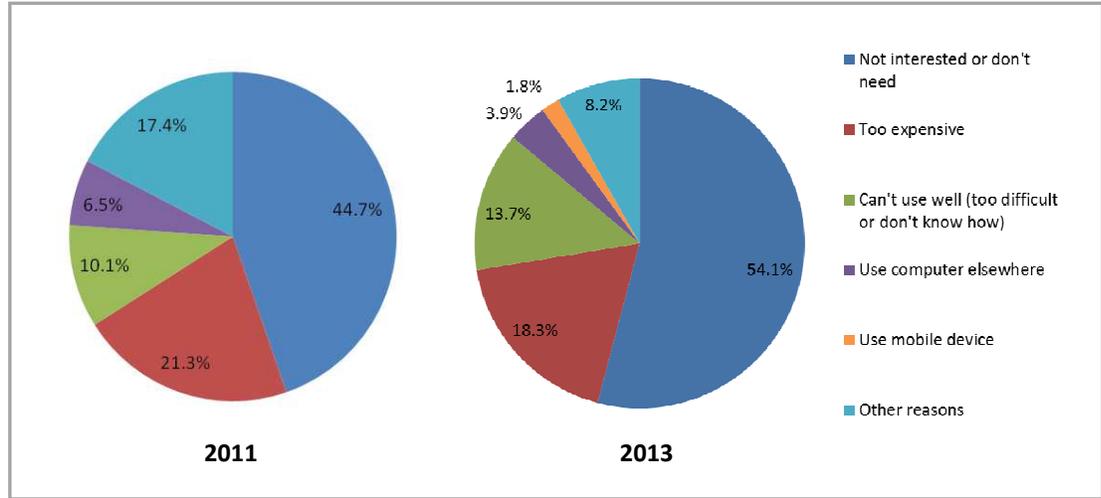


Figure 4-7: Reasons for Not Having a Computer in the Home

Not owning a computer continues in 2013 to be the primary barrier to connecting to the internet, with cost second. The percentage of respondents who identified ownership as a barrier and the percentage who identified cost have both decreased since 2011, however, and the percentage of respondents who cited lack of interest has increased (Figure 4-8). As in 2011, cost, or perceived cost, continues to be a barrier to consumers subscribing to faster internet service in 2013 (Figure 4-9).

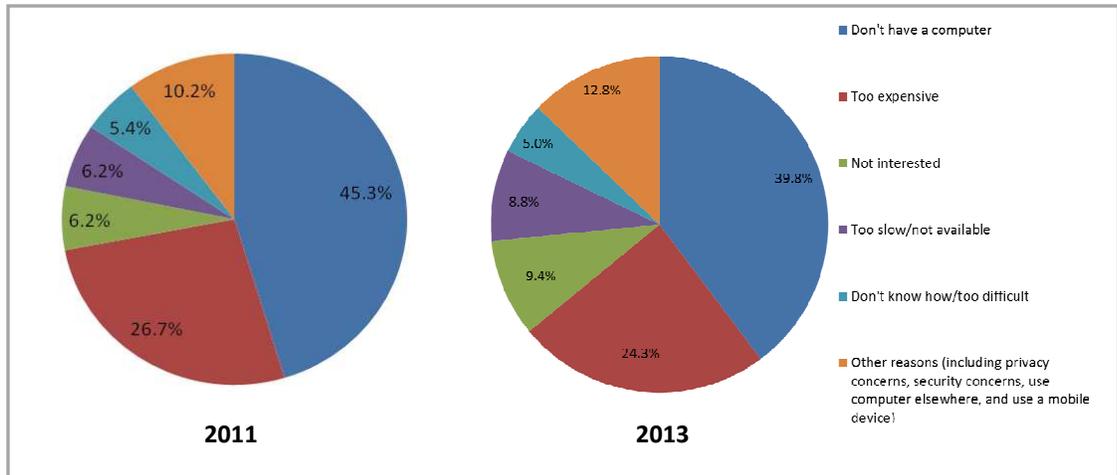


Figure 4-8: Reasons for Not Having Internet in the Home

Cost as a barrier is also indicated in the economic analysis, which shows the impact that annual income has on the presence of a computer in the home and on broadband internet use. Income is a limiting factor, however, for only households with annual incomes less than \$35,000. Despite this limitation, 75 percent of

households in the \$15,000 to \$24,999 category and 85 percent in the \$25,000 to \$34,999 category have broadband internet.

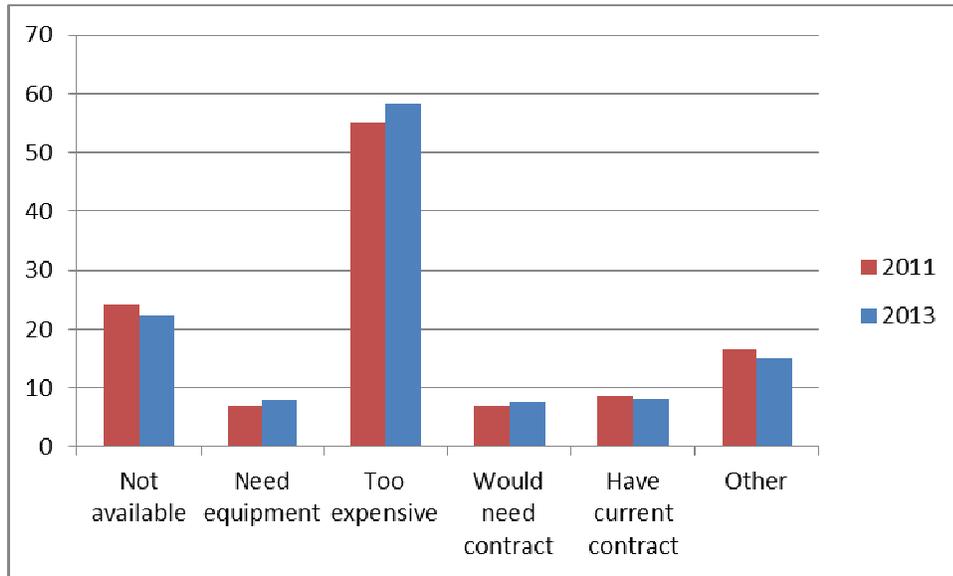


Figure 4-9: Reasons for Not Subscribing to Faster Internet Service

Business Consumers Survey Results

The results of the 2013 business consumer surveys, the economic modeling of these results, and a comparative analysis with the 2011 assessment provide information on office computer and internet use and on the drivers of and barriers to adoption in small businesses in Maine. These findings help define the current status and future potential of broadband subscribership within this key consumer group.

Respondent profile. The 2013 survey sample of respondents represents a diverse group of small businesses in Maine based on size, geography, industry and years in existence. The majority of respondents are single-location companies (85.2%). A small percentage (12.2%) have multiple locations in Maine, and their numbers have gone down (from 17.9%) since 2011. The 2013 findings indicate that roughly half are privately owned (48.9%), with proprietorships or partnerships increasing from (from 34.8% to 38.7%) since 2011. Based on 2012 employment data, the average number of full-time employees at businesses surveyed is seven, and of part-time employees, six. These numbers show no significant difference over time. 2013 findings indicate a shift, however, toward slightly older companies. A higher percentage of businesses surveyed have been in operation for 21 or more years (from 32.5% in 2011 to 63.8% in 2013).

A third of the respondents generate 20 percent of their revenue from individuals or businesses outside of the state, showing a general shift away from revenue

generated out of state. (In 2011, 39.8% generated 20% or less; and those indicating no business out of state was less 2 percentage points.) About half of respondents (52%) had a total sales revenue of less than \$250,000 in the past year. Revenue has gone down in the \$100,000-\$249,000, \$500,000-\$749,000, and \$750,000-\$999,000 categories and risen in the under-\$100,000 category.

Details on current small business computer and internet use in Maine and on changes since 2011 follow.³⁶

Computer and internet use. 2013 survey results indicate that 63.8 percent of responding businesses exhibit heavy computer use (44.9% use a computer almost all of the time; 18.9%, most of the day, almost every day). This finding shows little change since the 2011 survey, although most-of-the-day, almost-every-day and occasional use has increased (Figure 4-10). In addition, the percentage of businesses indicating that they had not used the computer at all in the previous week decreased (to 7.4%).

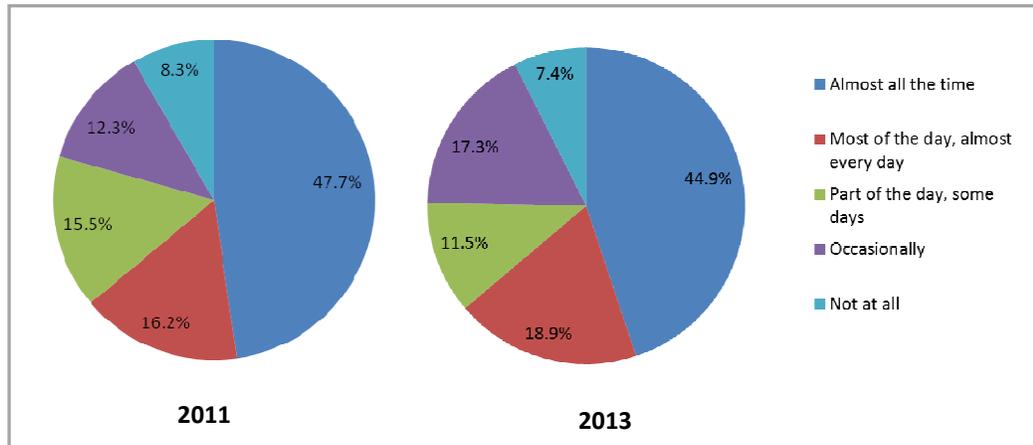


Figure 4-10: Frequency of Computer Use for Businesses

The percentage of business respondents that have some form of internet connection increased slightly since 2011 (from 90.1% to 93.7%) (Table 4-24). The percentage of respondents that have some form of broadband internet connection also increased (from 85.7% to 93.1%). Results indicate that internet connection and computer usage are directly related; that is, most businesses using computers are using the internet as well.

³⁶ For the business consumer questionnaire, see Appendix A. Complete survey results to each question of the business consumer questionnaire with charts and graphs are provided in Appendix B.

Table 4-24: Business Computer and Internet Connection

Business Computer and Internet Connection	% of Respondents	
	2011	2013
Some form of internet connection	90.1%	93.7% ³⁷
Some form of broadband internet connection	85.7%	93.1%
No internet connection; would like to connect	40.4%	43.5%
No internet connection; plan to connect in next 12 months	10.6%	17.4%

It is noteworthy that 43.5 percent of business respondents who do not connect to the internet would like to, but only 17.4 percent plan to set up internet service in the next 12 months. A larger percentage of businesses plan to connect than those surveyed in 2011, indicating that the gap between desire and action in this consumer group is closing (Figure 4-11).

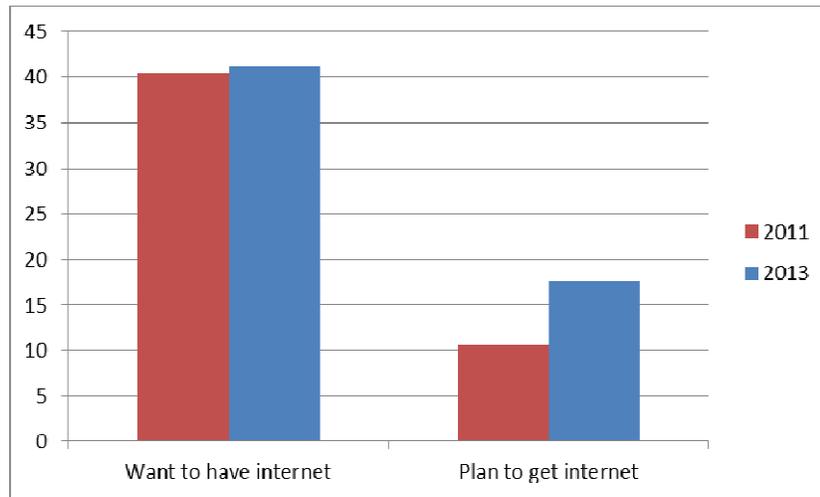


Figure 4-11: Internet Gap of Businesses

The percentage of businesses that have computers available for use by nonemployees, such as students, customers, patients, or the general public, remains small (11.5% in 2011; 10.9% in 2013). The percentage of these businesses that make internet available to nonemployees also remains small, although increasing (21.6 % in 2011; 23.8% in 2013).

As noted above, results show that 93.1 percent of businesses surveyed subscribe to high-speed or broadband internet services, an increase from 85.7 percent in 2011.

³⁷ This percentage is slightly higher due to discrepancies in respondent output to Question 3 (Is at least one computer at your business connected to the internet?) and Question 9 (What types of internet connection(s) does your business currently have?).

The percentage of businesses using DSL, cable and satellite technologies has also increased. The percentage using fixed wireless (4.7%) is basically the same as in 2011. The percentage using dial-up, fiber optic, and T-1 has decreased (Figure 4-12). The most commonly used internet connections by surveyed businesses include cable (44.8%), DSL (39.3%) and mobile wireless (26.1%).

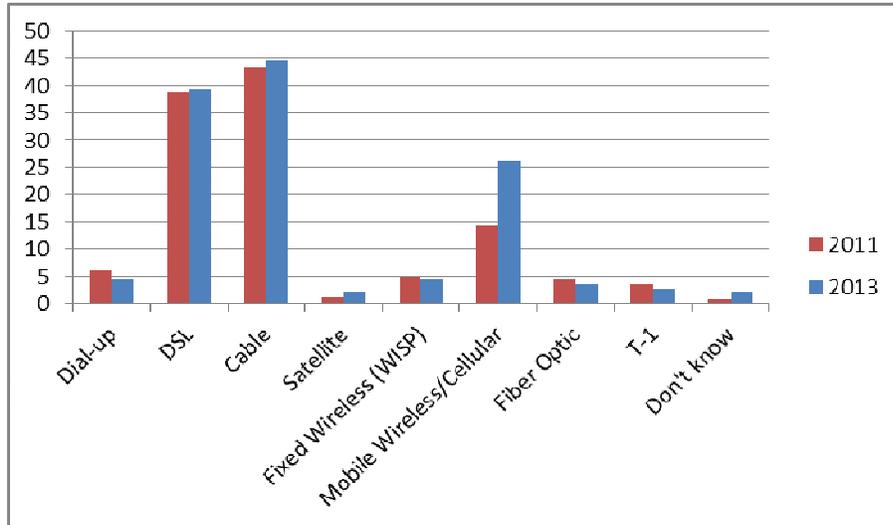


Figure 4-12: Business Use of Internet Technologies

Business use of mobile wireless, whether at broadband speeds or not, has increased significantly since 2011, paralleling the increase in use by other consumer groups. 53.2 percent of business respondents have or plan to obtain a mobile device as opposed to 41.0 percent in 2011 (Figure 4-13). It is noteworthy that respondents did not cite the use of a mobile device as a reason for *not* connecting a computer to the internet. This suggests that the use of mobile devices in the workplace is supplementing rather than replacing the use of other internet technologies.

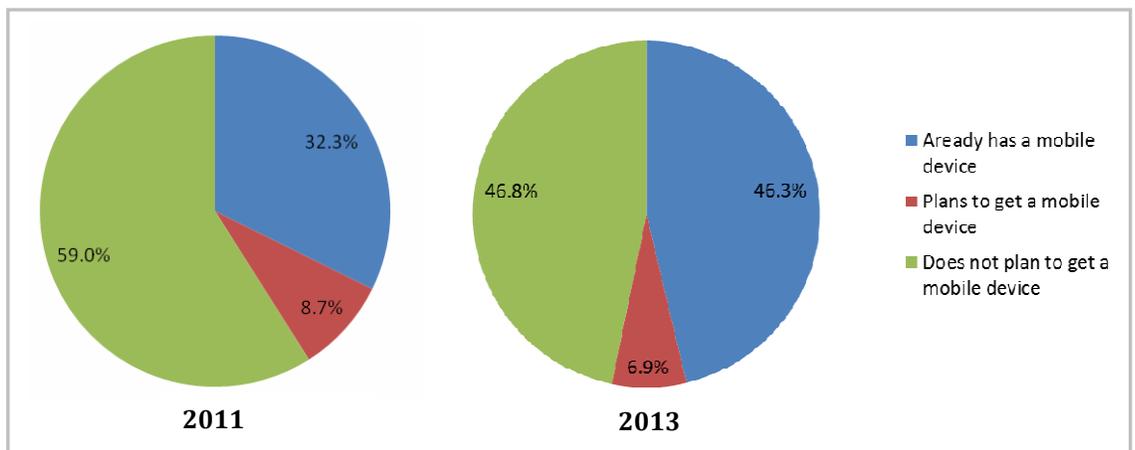


Figure 4-13: Business Use of Mobile Devices

Although the use of computers and broadband internet has increased since 2011, the percentage of businesses with a staff member dedicated to maintaining computer networks, hardware or software is slightly less. In the 2013 survey, 27.3 percent of respondents have an IT specialist, a decrease from 29.7 percent in 2011.

Business respondents indicated that the major reason they currently use the computer in their business is for email or other online communications (87.6%). Computers are also used for conducting business (80.3%), recordkeeping (71.5%), financial management and billing (63.1%), word processing (58.0%), and creating and maintaining a website (45.1%). (Table 4-25).

Table 4-25: Business Use of the Computer

Use of Computer	% of Respondents	
	2011	2013
Email or other communications	83.3%	87.6%
Conducting business	77.7%	80.3%
Maintaining a database/recordkeeping	63.7%	71.5%
Financial management/billing	57.9%	63.1%
Word processing	54.8%	58.0%
Conducting online research	51.2%	51.8%
Accessing government services	--	46.5%
Creating and maintaining a website	40.0%	45.1%
Online training	24.1%	30.1%
Travel and event coordination	29.0%	29.0%
E-commerce	27.1%	29.0%
Connecting with similar businesses	23.7%	23.9%
Connecting with other company locations	19.2%	20.8%
Processing online job applications	--	3.9%
Telemedicine	1.2%	1.4%
Other	5.5%	7.0%

The computer activities undertaken less frequently include telemedicine (1.4%), processing online job applications (39%), connecting with other company locations (20.8%) and with similar businesses (23.9%), e-commerce (29.0%), travel and event coordination (29.0%), and online training (30.1%). It is significant that all business uses of the computer have increased since 2011, with the exception of travel and event coordination, which shows no change.

If provided with access to higher-speed internet, a larger percentage of respondents than in 2011 indicated that their current service is sufficient for business use (an

increase from 58.3% to 64.2%). However, a significant portion of businesses (41.9%) maintained that their current internet access would be better if it were faster. An additional 3.3 percent indicated that their current connection was not fast enough to meet business needs. These two percentages are not significantly different from 2011 results.

In terms of computer use, 11 percent of business respondents would do more website development with higher-speed internet, 10.3 percent would use the computer to conduct more business, and 8.7 percent would conduct more research (Figure 4-14). These percentages are all slightly down in comparison to 2011 results (12.0% 18.0%, and 10.0% respectively). In 2013, less emphasis was placed on more email or other communications also (14.7% in 2011; 8.4% in 2013). This suggests that the current internet speeds are meeting business needs for email and communications, the most-cited business use of the computer.

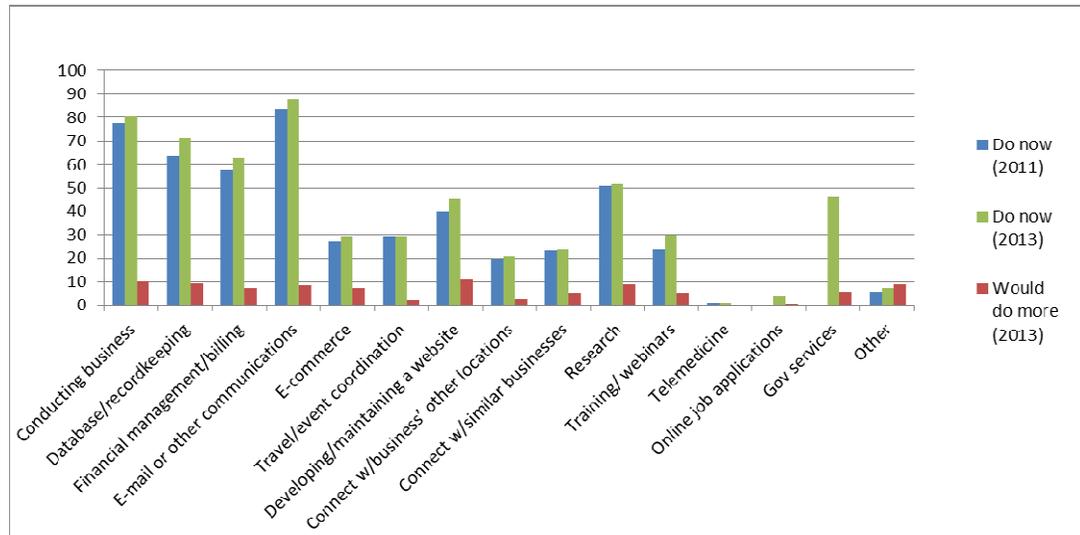


Figure 4-14: Changes in Business Uses of the Computer

Drivers of computer and internet use. Economic modeling of the business data indicates that an establishment’s size (i.e., number of employees) and industry category are key drivers of computer use and broadband internet subscribership. We find that businesses with fewer than five employees—a sizable percentage of all Maine businesses—are less likely than larger operations in our sample to subscribe to a broadband internet service, and small companies use computers less extensively than their larger counterparts.³⁸ Focusing on industrial categories, our results show that businesses in service-related sectors such as finance and

³⁸ According to 2010 *County Business Patterns* data from the US Census Bureau, establishments with fewer than five workers account for 57.9 percent of the employers in Maine.

insurance, information, and professional services use computers more extensively than companies in other industries. Similar to the results pertaining to households, we find that the county of location has some effect on business computer use and broadband internet subscribership, even after controlling for establishment size, years of operation, and industry.

In addition to these business characteristics, the type of technology that businesses use to connect to the internet and the reasons they connect can be factors driving computer and internet use.

Table 4-26: Business Survey Respondents by Employment Size

Size Category	2011 Survey % of Respondents	2013 Survey % of Respondents
Fewer than 5 employees	57.93%	58.94%
5 to 10 employees	20.50%	21.23%
11 to 25 employees	14.08%	12.57%
26 to 50 employees	5.17%	3.35%
More than 50 employees	2.32%	3.91%
Total	100.00%	100.00%

Note: Percentages are based on 561 and 358 observations from the 2011 and 2013 surveys, respectively.

Focusing on businesses in the size category of fewer than five employees, which accounts for 58 percent of all Maine businesses, we see that these very small businesses are less likely than larger companies to exhibit heavy computer use, subscribe to a broadband or fiber optic/T-1 internet service, or employ a worker with specific IT-related duties. Moreover, these very small establishments tend to use fewer computer applications as well (Table 4-27).

Table 4-27: Business Computer Use and Broadband Subscribership by Employment Size

Size Category	Heavy Computer Use	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	IT Specialist
Fewer than 5 employees	50.82%	81.63%	2.45%	4.64	22.04%
5 to 10 employees	76.74%	92.44%	7.56%	5.48	29.07%
11 to 25 employees	91.60%	97.48%	11.76%	6.45	45.38%
26 to 50 employees	89.74%	94.87%	10.26%	6.62	41.03%
More than 50 employees	96.00%	100.00%	44.00%	7.12	72.00%
All establishments--2011	63.88%	85.74%	7.64%	5.53	29.69%
All establishments--2013	63.84%	93.05%	5.74%	4.39	27.30%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

At the same time, the results suggest that larger numbers of employees have a positive effect on computer use, broadband subscribership, and the number of computer applications used (Table 4-28).

Table 4-28: Effects of Employment Size on Business Computer Use and Broadband Subscribership

Size Category	Heavy Computer Use	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	IT Specialist
Fewer than 5 employees	negative	negative	negative	negative	negative
5 to 10 employees	positive	positive	no effect	no effect	no effect
11 to 25 employees	positive	positive	positive	positive	positive
26 to 50 employees	positive	no effect	no effect	positive	no effect
More than 50 employees	positive	positive	positive	positive	positive

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the attribute has a positive (or negative) and statistically significant effect (at a 10% significance level) on the selected indicator of small business computer use or broadband Internet subscribership. Cells are indicated as “no effect” where the attribute does not have a statistically significant effect.

Moving to the analysis of the effects of establishment age on computer use and broadband internet subscribership, we see that the number of years that a company has been in operation appears to have little impact on whether it exhibits heavy computer use, the adoption of broadband internet, or whether it has an employee with computer-related responsibilities (Tables 4-29 and 4-30).

Table 4-29: Business Computer Use and Broadband Subscribership by Years of Operation

Years of Operation	Heavy Computer Use	Broadband Internet	Fiber optic or T-1 Internet	Number of Computer Apps	IT Specialist
Less than 5 years	64.10%	84.62%	2.56%	6.08	28.21%
5 to 10 years	55.04%	86.82%	3.88%	5.05	25.58%
11 to 25 years	63.04%	87.32%	6.88%	5.28	28.26%
More than 25 years	69.58%	87.53%	7.23%	5.17	30.92%
All establishments—2011	63.88%	85.74%	7.64%	5.53	29.69%
All establishments—2013	63.84%	93.05%	5.74%	4.39	27.30%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

Businesses in the youngest age category (less than 5 years) tend to use a wider range of computer applications, however, while the oldest establishments in the sample (more than 25 years) typically use fewer applications than other businesses.

Table 4-30: Effects of Years of Operation on Business Computer Use and Broadband Subscribership

Years of Operation	Heavy Computer Use	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	IT Specialist
Less than 5 years	no effect	no effect	no effect	positive	no effect
5 to 10 years	no effect	no effect	no effect	no effect	no effect
11 to 25 years	no effect	no effect	positive	no effect	no effect
More than 25 years	no effect	no effect	negative	negative	no effect

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the attribute has a positive (or negative) and statistically significant effect (at a 10% significance level) on the selected indicator of business computer use or broadband internet subscribership. Cells are indicated as “no effect” where the attribute does not have a statistically significant effect.

Table 4-31: Business Computer Use and Broadband Subscribership by Industry

Industrial Category	Heavy Computer Use	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	IT Specialist
Agriculture, forestry, fishing and hunting	31.58%	61.40%	1.75%	3.86	10.53%
Mining and related	NA	NA	NA	NA	NA
Utilities	83.33%	100.00%	0.00%	6.50	25.00%
Construction	54.46%	92.08%	7.92%	4.81	25.74%
Manufacturing	73.08%	96.15%	1.92%	5.83	34.62%
Wholesale trade	73.33%	90.00%	10.00%	5.73	30.00%
Retail trade	60.99%	85.16%	4.40%	4.98	28.02%
Transportation/warehousing	78.57%	92.86%	0.00%	5.71	21.43%
Information	93.33%	100.00%	6.67%	5.93	26.67%
Finance and insurance	96.77%	100.00%	25.81%	7.03	58.06%
Real estate and related	78.05%	95.12%	2.44%	5.63	24.39%
Professional services and related	79.55%	87.50%	9.09%	6.25	35.23%
Management of companies/enterprises	NA	NA	NA	NA	NA
Administrative services and related	NA	NA	NA	NA	NA
Educational services	66.67%	83.33%	8.33%	5.42	58.33%
Health care/social assistance	60.00%	90.00%	10.00%	6.00	30.00%
Arts, entertainment and recreation	58.06%	87.10%	9.68%	4.77	35.48%
Accommodation/food service	65.63%	87.50%	3.13%	5.09	25.00%
Other services	48.15%	81.48%	7.41%	4.30	22.22%
Public administration	NA	NA	NA	NA	NA
Unclassified establishments	63.64%	84.30%	4.96%	4.53	27.27%

Note: Percentages are based on data from the surveys conducted in 2011 and 2013.

As shown in Tables 4-31 and 4-32, computer use and broadband subscribership of small Maine establishments differ systematically by major industrial category. For example, businesses in the finance and insurance industrial category are more likely than firms in other industries to exhibit heavy computer use, subscribe to a fiber optic or T-1 broadband internet service, and have an IT specialist. They tend to use a greater number of computer applications as well. On the other hand, establishments operating in the agriculture, forestry, fishing, and hunting sector lag behind other Maine companies in terms of these indicators of computer use and broadband internet subscribership.

Table 4-32: Effects of Major Industrial Category on Business Computer Use and Broadband Subscribership

Industrial Category	Heavy Computer Use	Broadband Internet	Fiber optic or T-1 Internet	Number of Computer Apps	IT Specialist
Agriculture, forestry, fishing and hunting	negative	negative	no effect	negative	negative
Mining and related	NA	NA	NA	NA	NA
Utilities	no effect	no effect	no effect	positive	no effect
Construction	negative	no effect	no effect	negative	no effect
Manufacturing	no effect	no effect	no effect	positive	no effect
Wholesale trade	no effect	no effect	no effect	no effect	no effect
Retail trade	no effect	no effect	no effect	no effect	no effect
Transportation/warehousing	no effect	no effect	no effect	no effect	no effect
Information	positive	no effect	no effect	no effect	no effect
Finance and insurance	positive	no effect	positive	positive	positive
Real estate and related	positive	positive	no effect	no effect	no effect
Professional services and related	positive	no effect	no effect	positive	positive
Management of companies/enterprises	NA	NA	NA	NA	NA
Administrative services and related	NA	NA	NA	NA	NA
Educational services	no effect	no effect	no effect	no effect	positive
Health care/social assistance	no effect	no effect	no effect	no effect	no effect
Arts, entertainment and recreation	no effect	no effect	no effect	no effect	no effect
Accommodation/food service	no effect	no effect	no effect	no effect	no effect
Other services	no effect	no effect	no effect	negative	no effect
Public administration	NA	NA	NA	NA	NA
Unclassified establishments	no effect	no effect	no effect	negative	no effect

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the attribute has a positive (or negative) and statistically significant effect (at a 10% significance level) on the selected indicator of business computer use or broadband internet subscribership. Cells are indicated as “no effect” where the attribute does not have a statistically significant effect.

Similar to the results for households, we find that the county of location has some bearing on a company’s computer use and broadband subscribership, after controlling for an establishment’s employment size, number of years in operation, major industrial category (Tables 4-33 and 4-34).

Table 4-33: Business Computer Use and Broadband Subscribership by County

County	Heavy Computer Use	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	IT Specialist
Androscoggin	60.81%	94.59%	8.11%	5.36	31.08%
Aroostook	64.62%	81.54%	6.15%	4.78	30.77%
Cumberland	70.47%	91.19%	8.81%	5.49	32.64%
Franklin	73.33%	93.33%	0.00%	5.73	46.67%
Hancock	85.11%	95.74%	10.64%	6.51	44.68%
Kennebec	69.12%	88.24%	13.24%	5.54	30.88%
Knox	66.67%	92.59%	0.00%	5.67	14.81%
Lincoln	48.00%	76.00%	0.00%	3.92	20.00%
Oxford	43.33%	80.00%	3.33%	4.40	20.00%
Penobscot	67.35%	85.71%	2.04%	4.87	23.47%
Piscataquis	NA	NA	NA	NA	NA
Sagadahoc	57.89%	84.21%	5.26%	4.79	10.53%
Somerset	60.61%	78.79%	12.12%	4.67	30.30%
Waldo	60.71%	85.71%	0.00%	5.36	25.00%
Washington	59.09%	68.18%	0.00%	5.09	9.09%
York	56.52%	86.96%	5.43%	5.17	32.61%
All establishments—2011	63.88%	85.74%	7.64%	5.53	29.69%
All establishments—2013	63.84%	93.05%	5.74%	4.39	27.30%

Note: Except where noted, percentages are based on data from the surveys conducted in 2011 and 2013.

For example, compared to establishments located in other Maine counties, businesses operating in Hancock County are more likely to exhibit heavy computer use and employ an IT specialist. Hancock County businesses also use a wider variety of computer applications. On the other hand, establishments located in Penobscot and Washington counties tend to lag behind other Maine companies based on indicators used in the analysis.

Table 4-34: Effects of County of Location on Business Computer Use and Broadband Subscribership

County	Heavy Computer Use	Broadband Internet	Fiber Optic or T-1 Internet	Number of Computer Apps	IT Specialist
Androscoggin	no effect	positive	no effect	no effect	no effect
Aroostook	no effect	no effect	no effect	no effect	no effect
Cumberland	no effect	no effect	no effect	no effect	no effect
Franklin	no effect	no effect	no effect	no effect	positive
Hancock	positive	positive	no effect	positive	positive
Kennebec	no effect	no effect	positive	no effect	no effect
Knox	no effect	no effect	no effect	no effect	no effect
Lincoln	no effect	no effect	no effect	negative	no effect
Oxford	negative	no effect	no effect	negative	no effect
Penobscot	no effect	no effect	negative	negative	no effect
Piscataquis	NA	NA	NA	NA	NA
Sagadahoc	no effect	no effect	no effect	no effect	negative
Somerset	no effect	no effect	no effect	no effect	no effect
Waldo	no effect	no effect	no effect	no effect	no effect
Washington	no effect	negative	no effect	no effect	negative
York	negative	no effect	no effect	no effect	no effect

Notes: Cells in the table are indicated as “positive” (or “negative”) in cases where the attribute has a positive (or negative) and statistically significant effect (at a 10 percent significance level) on the selected indicator of small business computer use or broadband internet subscribership. Cells are indicated as “no effect” where the attribute does not have a statistically significant effect. Regression models are described in the text.

In general, the 2013 analysis of business characteristics that drive internet use and broadband subscribership—employment size, industrial category, county of location—do not reveal significant differences since 2011, despite the increase in the share of businesses that subscribe to broadband services.

As noted above, the type of technology that businesses use to connect to the internet and the reasons they connect can be factors driving computer and internet use. Like households and other consumer groups, businesses have significantly increased their use of mobile devices to connect to the internet, whether these devices achieve broadband speeds or not. Our results suggest that this technology is used to complement rather than replace other internet and broadband technologies.

Finally, of the reasons to connect, business consumers identify email or other online communications, conducting business (80.3%), recordkeeping (71.5%), and financial management and billing as primary, with the need for more website development as a potential driver for future internet use (see p. 4-33ff).

Barriers to computer and internet use. In the 2013 results, 54.6 percent of business respondents reported the “business does not need the internet” as the primary reason for not connecting to it. Cost of internet services was the secondary reason cited at 18.2 percent. Although business respondents identified the same reasons in the 2011 results, the percentage citing lack of need has increased significantly (from 39.1% in 2011) and the percentage citing cost has decreased (from 28.3% in 2011). (Figure 4-15).

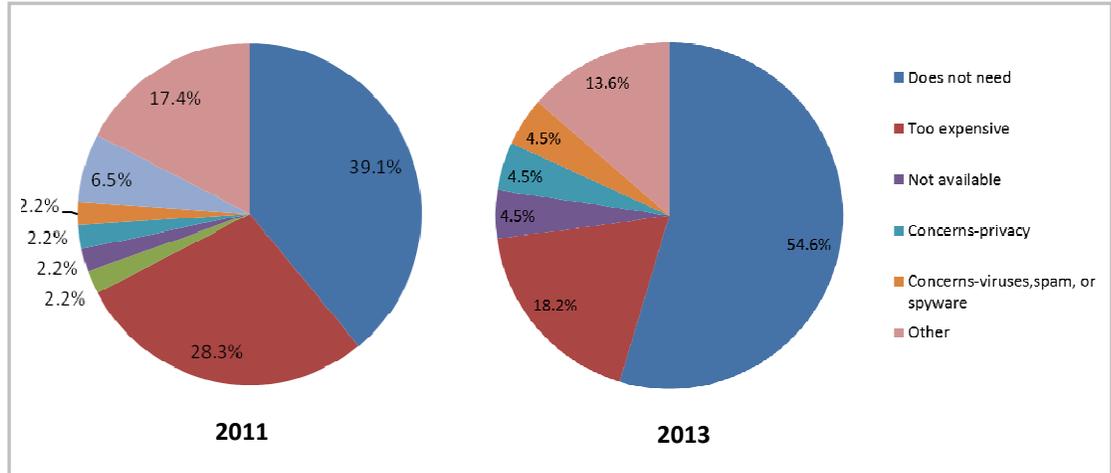


Figure 4-15: Main Reasons for Businesses Not Having Internet

Similarly cost and lack of interest are cited in both 2011 and 2013 surveys as barriers to upgrading to faster internet service (Figure 4-16). Both objections to purchasing faster internet have increased over time, which suggests that more businesses consider their access fast enough for the price they are paying.

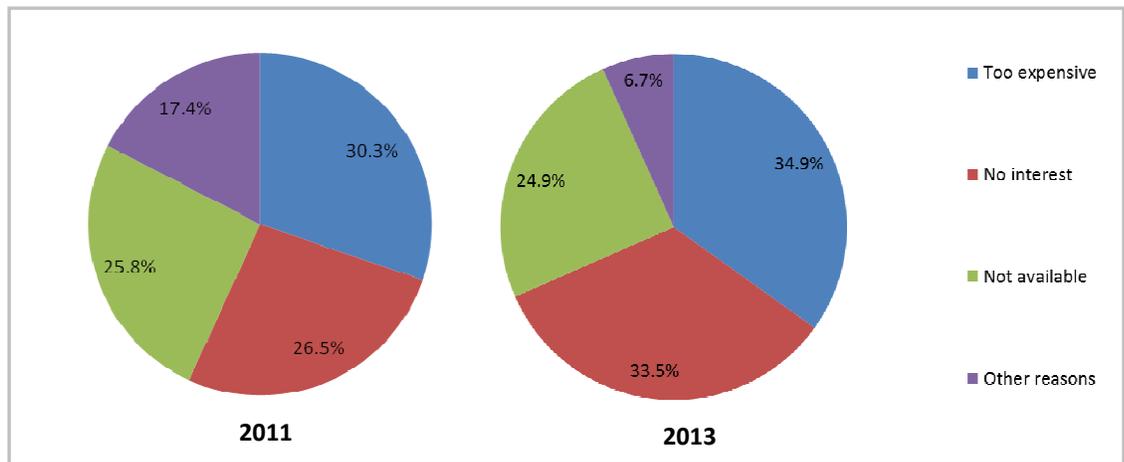


Figure 4-16: Reasons for Not Having Faster Internet Service

Further, business respondents to the 2013 survey indicate that the monthly price they are willing to pay for faster internet services has in general decreased, with the responses in the higher payment ranges shifting into the lower payment ranges.

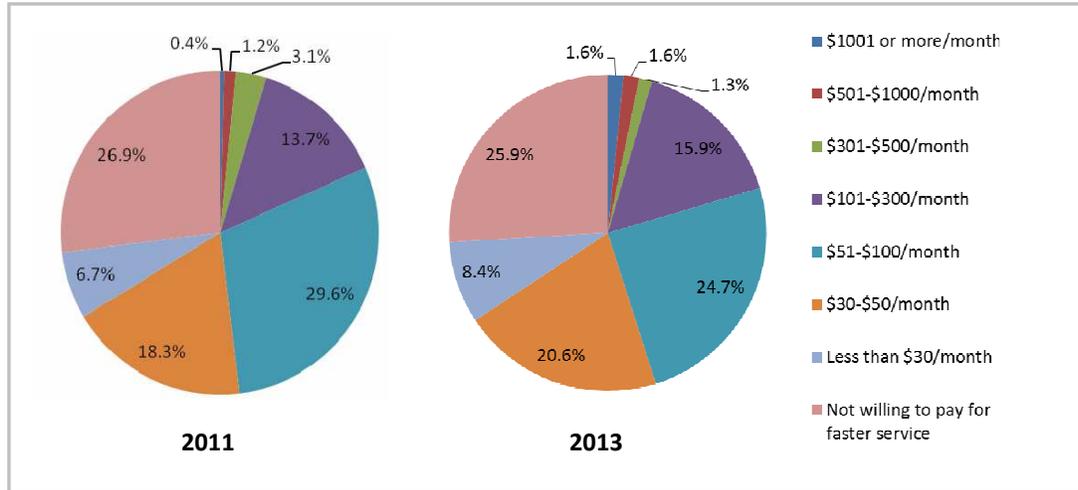


Figure 4-17: Monthly Amount That Businesses Will Pay for Faster Internet

In terms of cost range, there has been a shift in general toward internet being less expensive or in subscription of businesses to slower, less expensive connections (Figure 4-18).

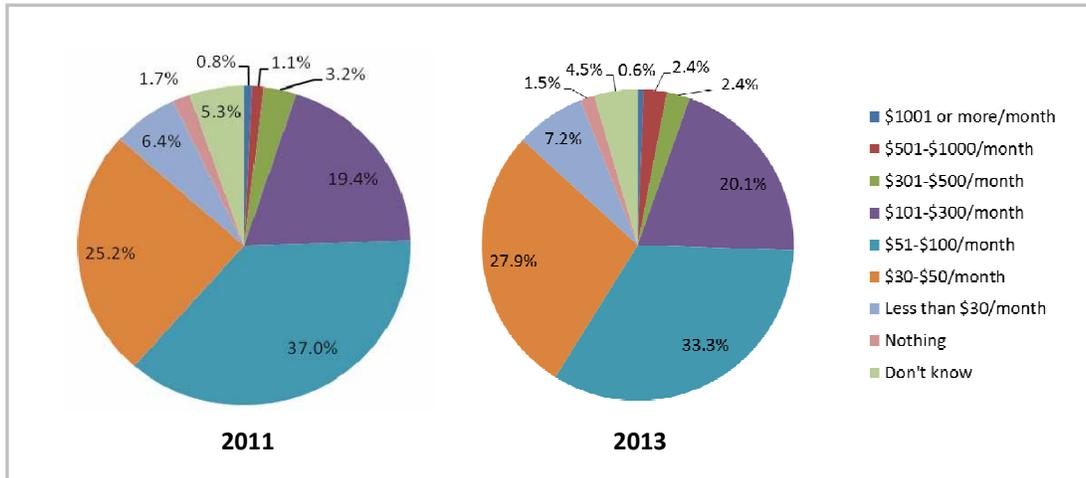


Figure 4-18: Monthly Amount That Businesses Pay for Internet

4.2.2

Comparison of Household and Business Drivers

The modeling of household and business survey data reveals several key drivers of computer use and broadband internet subscribership. For households, the factors that seem to increase computer use are the presence of children under the age of 18 and having more than three people in the household. Factors that tend to decrease

computer use and broadband internet subscribership in Maine households are low incomes and households that are made up of only senior citizens (Table 1-1).

Looking at how Maine compares with other US states in terms of these household characteristics, it is apparent that Maine's household demographics—especially its size and age characteristics—do not support high computer use and broadband internet subscribership. Maine ranks 48th nationally both in terms of the percentage of households with children and the percentage of households with more than three people.³⁹ This means that Maine has an under abundance of the types of households that are more likely to use computers and to subscribe to broadband internet services.

It is also the case that Maine has one of the highest percentages of households that are made up of senior citizens (5th nationally) and the state is almost in the top one-third (18th nationally) based on the percentage of households with annual incomes of less than \$15,000. This means that Maine has an overabundance, especially in the case of older households, of the types of households that are less likely to use computers and subscribe to broadband internet services.

Maine's unfavorable demographics for household computer use and broadband internet subscribership extend to its companies as well. Ranking 48th nationally as compared to other states, Maine has a relatively small percentage of its businesses with fewer than 100 employees in the finance and insurance industry.⁴⁰ Across many sectors of high-end and professional service providers, Maine tends to lag behind the rest of the country. This means that Maine has an under abundance of small businesses in sectors that are more likely to use computers and subscribe to broadband internet services. On the other hand, Maine ranks 9th nationally in terms of the percentage of establishments with between one and four employees. This means that Maine has an over-abundance of establishments that are less likely to use computers and subscribe to broadband internet services.

4.2.3 **Community Anchor Institutions (CAIs)**

The 2013 survey of Maine CAIs provides new findings on computer and internet use and broadband subscribership among this stakeholder group. Based on an expanded questionnaire designed to collect more specific information than the 2011

³⁹ Information used to compare Maine to other states in terms of household characteristics is from US Census 2005-2009 American Community Survey 5-Year Estimates.

⁴⁰ This information used to compare Maine with other states in terms of business characteristics is from the US Census Bureau, County Business Patterns data.

survey, the 2013 survey results establish a broader baseline for future planning and measurement.⁴¹

CAI Survey Results

Respondent profile. The 2013 survey sample of CAI respondents represents a range of local government and nongovernment community support and public safety organizations. Schools, libraries and healthcare institutions were not included, as they were surveyed separately (Sections 4.2.4 and 4.2.5). Of the 4,351 CAIs recorded in the Maine Broadband Inventory and Mapping Project database at the time of survey, 1,762 were contacted.⁴² Of the number contacted, 290 responses were used in our assessment, representing a response rate of 16.5 percent.

Availability. In the two-year period between surveys, the availability of broadband has increased for most CAI types. Table 4-35 shows the record counts in the Maine Broadband Inventory and Mapping Project database by CAI type for those institutions confirmed to have broadband service, those confirmed not to have broadband service, and those for which broadband service is unknown. Based on this information, 95.4 percent of CAIs in Maine have access to broadband, which represents a slight increase from 94.4 percent in 2011.

Table 4-35: Availability of Broadband Services by CAI Type

CAI Type	Broadband Services Available									
	Yes		No		Unknown		Total		% Yes	
	2011	2103	2011	2013	2011	2013	2011	2013	2011	2013
Library	202	275	0	12	137	16	339	303	100%	95.8%
Medical & healthcare	639	1035	17	24	251	182	907	1,241	97.4%	97.7%
Other community support-government	427	530	2	2	726	628	1,155	1,160	99.5%	99.6%
Other community support-nongovernment	65	67	32	23	125	40	222	130	67.0%	74.4%
Public safety	475	538	96	92	277	235	848	865	83.2%	85.4%
School (K-12)	623	831	0	7	321	126	944	964	100%	99.2%
University, college, other postsecondary	29	73	0	0	52	15	81	88	100%	100%
Total	2,460	3,349	147	160	1,889	1,242	4,496	4,751	94.4%	95.4%

⁴¹ The 2013 CAI survey results are based upon responses to an expanded postal mailed and online questionnaire used to collect more detailed information on computer and internet use and broadband subscribership than the 2011 telephone survey with optional online response. The 2013 survey also targeted specific institutions that did not respond to the 2011 survey. The 2013 CAI survey questionnaire and results are in Appendices A and B.

⁴² The number of CAI records in the Maine Broadband Inventory and Mapping Project database, though representative, is not a total number of CAIs in the state.

Respondents to the 2013 survey, which targeted a limited sample of CAI types (excluding schools, libraries and healthcare organizations), indicate that 92 percent have access to broadband, 3 percentage points less than the percentage of availability according to CAI database records cited above. In terms of access to specific broadband technologies, 2013 survey results show that the majority of CAI respondents have access to DSL (68%) and cable (65%), as well as to mobile wireless service (52%)—whether this service achieves broadband speeds or not (Figure 4-19).

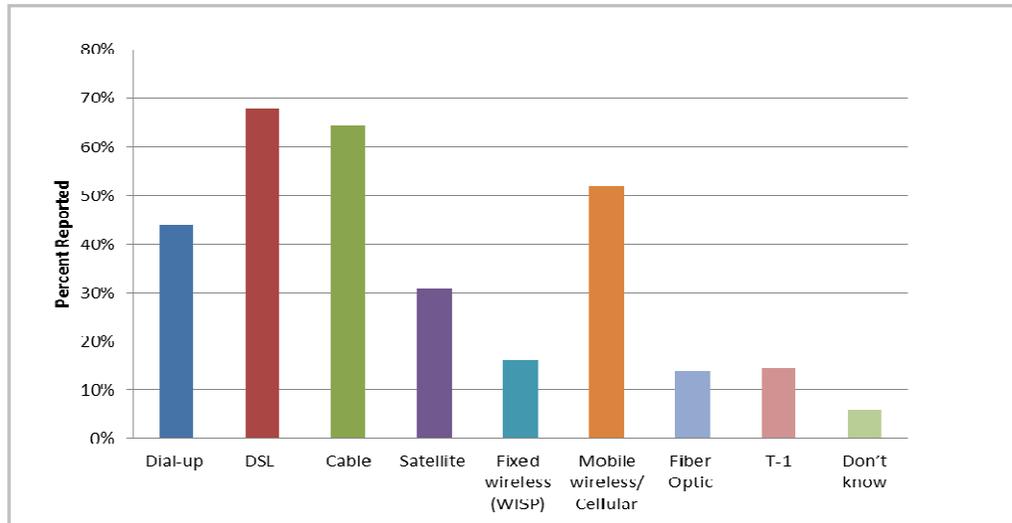


Figure 4-19: Availability of Internet Technologies to CAIs

Computer and internet use. 75 percent of respondent CAIs exhibit heavy computer use (61% almost all of the time; 14% most of the day, almost every day). Only 4 percent indicate that they had not used the computer at all in the previous week. This percentage of computer use is higher than that of small businesses (63.8%) in the state (Figure 4-20).

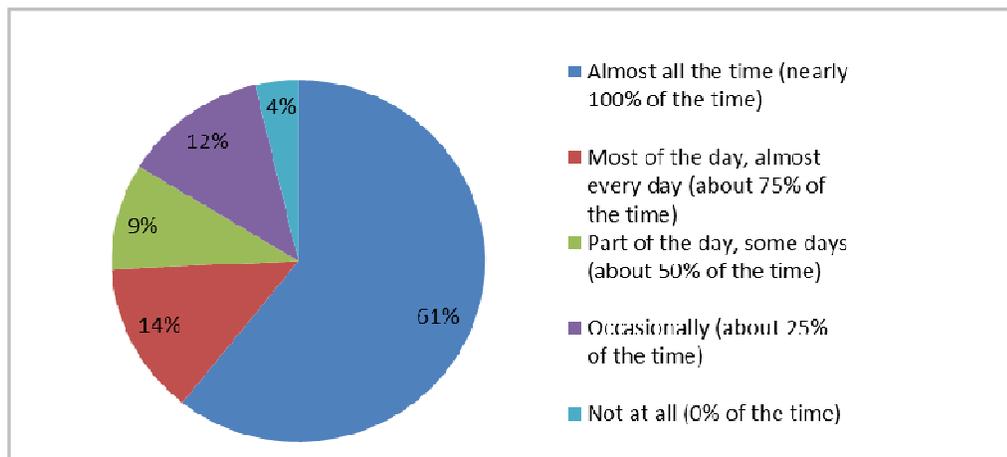


Figure 4-20: Frequency of Computer Use for CAIs

As with small businesses, the majority of CAI respondents cite computer use for employees only—9.5 percent make computers available for use by nonemployees and the general public. Public access to the internet (through WiFi) is higher at 25.9 percent. The amount of public access that CAIs provide is markedly different than school and library institutions, which provide nearly 100 percent access to computers and to computers with internet.

According to the 2013 survey response, the percentage of CAIs with some form of internet connection is high at 95.9 percent. The percentage with some form of broadband internet connection is lower at 88 percent. As is characteristic of other consumer groups, including businesses and households, a gap exists between the percentage of CAIs who have no connection and would like to connect (50.0%) and the percentage of those who plan to connect in the next 12 months (28.6%) (Table 4-36).

Table 4-36: CAI Internet and Broadband Connection

CAI Internet and Broadband Connection	% of Respondents 2013
Some form of internet connection	88%
Some form of broadband internet connection	91%
No internet connection; would like to connect	50.0%
No internet connection; plan to connect in next 12 months	28.6%

Those CAIs that have internet access connect primarily to cable (49%) and secondarily to DSL (35%). The third highest percentage connects to mobile wireless (21%) (Figure 4-21).

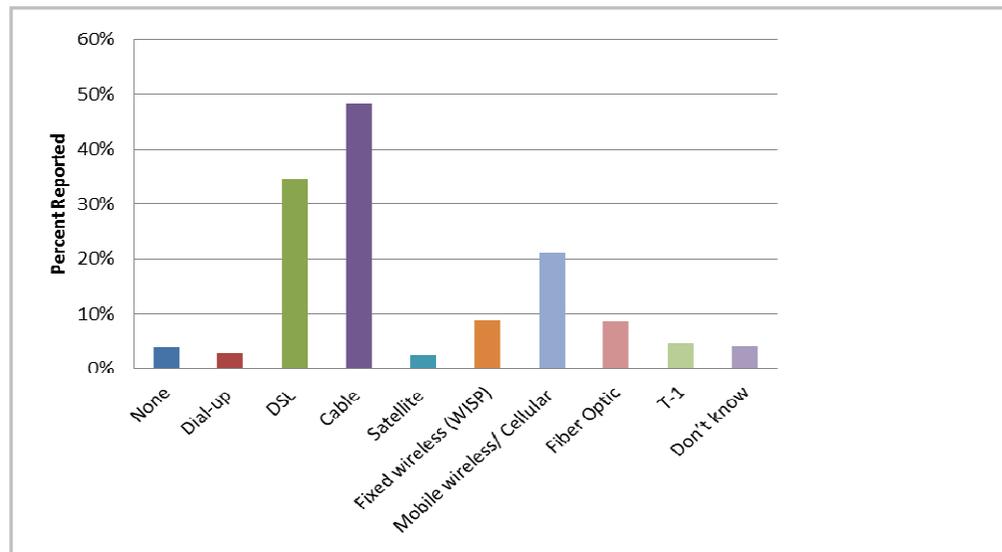


Figure 4-21: CAI Use of Internet Technologies

In response to a different question on mobile devices, CAIs indicated two times as much use (44%) (Figure 4-22).



Figure 4-22: CAI Use of Mobile Devices

One-half of CAI respondents indicate they either use or plan to obtain a mobile device to connect to the internet. This figure is comparable to the 53.2 percent of businesses who use or plan to obtain mobile devices. As with businesses, households, and schools and libraries, CAI’s use of mobile devices to connect to the internet is primarily in addition to using other forms of internet connection.

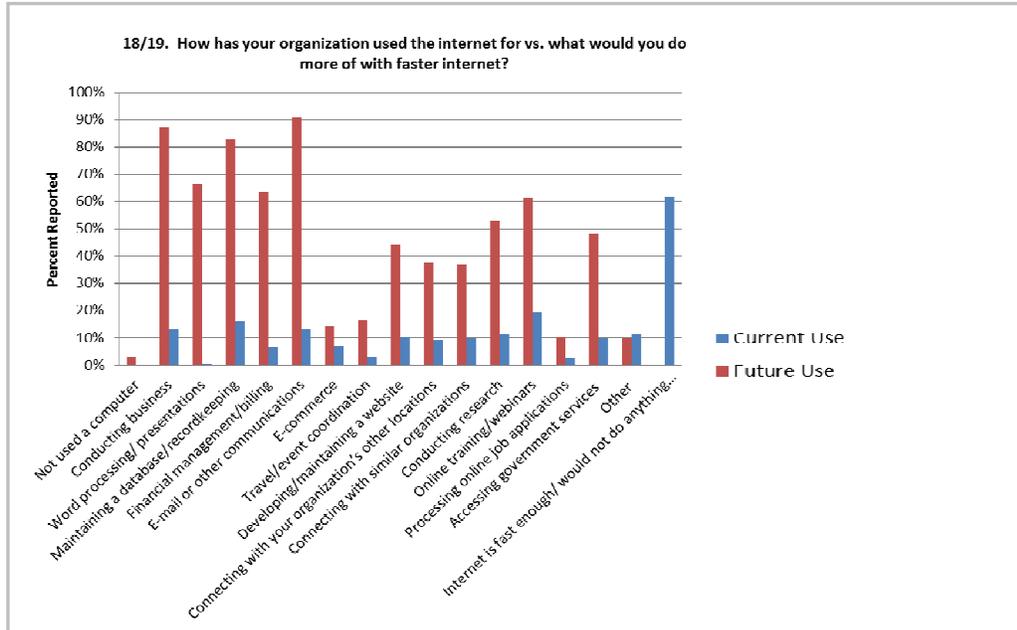


Figure 4-23: CAI Current and Future Uses of the Internet (2013)

Similar to businesses and other organizations, CAIs connect to the internet primarily for basic email and communications functions (91%), conducting business (87%), recordkeeping (83%), word processing (67%), and financial management (63%). With access to faster internet services, they would do more online training (19%), recordkeeping/maintaining a database (16%), and business in general (13%). It is noteworthy that a high percentage of CAIs (62%) cite that their service is fast enough (Figure 4-23).

Drivers of computer and internet use. As referenced in the 2011 needs assessment, CAIs subscribe to internet and broadband internet to fulfill basic internal office functions, such as email communications, digital data archiving, financial management and billing, and research. Other internal drivers are connecting to state-maintained web sites and state-mandated reporting. Providing online access to government information and services, including ambulance and emergency response, live streaming of meetings, and video-based training are external drivers to subscribership. To maintain this level of functionality, a relatively high percentage of CAIs (46.2%) have an employee dedicated to IT duties.

Barriers to computer and internet use. 2013 survey results show that the main reasons CAIs do not connect to the internet are cost (28.6%) and lack of perceived need (21.4%). Although CAI respondents to the 2011 telephone survey also cited cost, the primary reason was availability. Availability continues to be an issue in 2013, but for a smaller percentage (7.1%) of respondents.

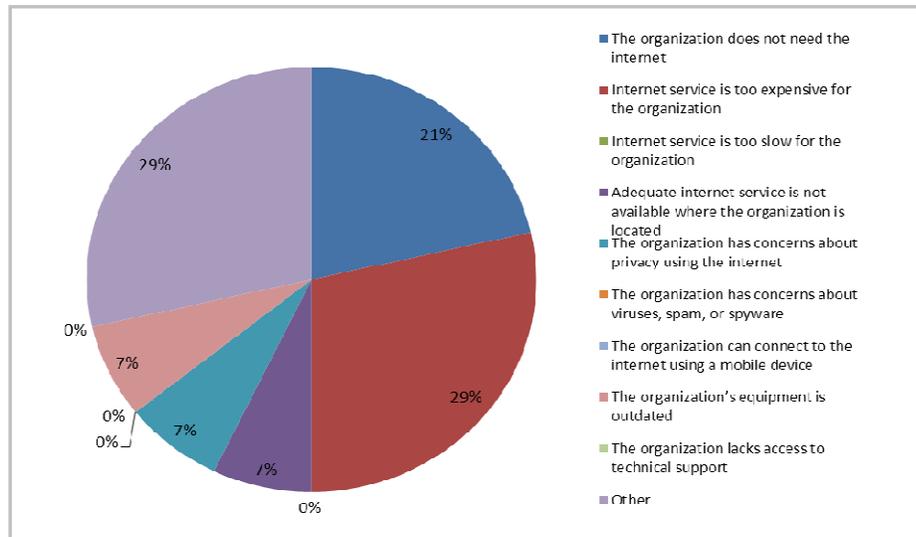


Figure 4-24: Reasons for CAIs Not Connecting to the Internet (2013)

The primary reason CAIs cited for not subscribing to faster internet is lack of interest (32.2%). Most of these same respondents also indicated that their internet service was sufficiently fast (95.7%). Secondarily, CAIs indicated that faster internet service was not available (22%) and, thirdly, that faster internet was too expensive (19%), suggesting that CAIs, like small businesses, consider their access fast enough for the price they are paying. 41.1 percent of CAIs indicated that they would not be willing to pay for faster internet.

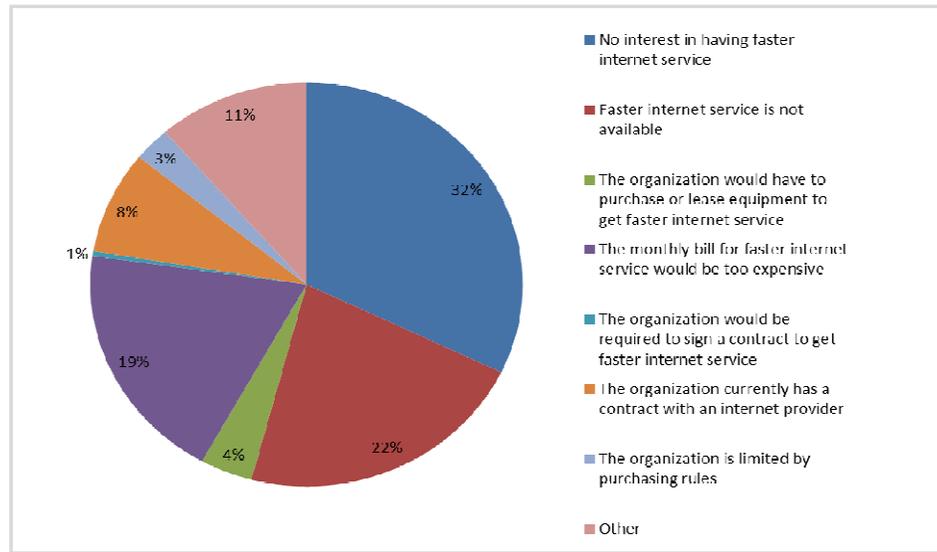


Figure 4-25: Reasons for CAIs Not Subscribing to Faster Internet (2013)

4.2.4 Schools and Libraries

Schools and Libraries Survey Results

Respondent profile. The following update on broadband availability, use and drivers, gaps, and barriers to adoption in Maine’s K-12 schools and libraries is based upon the 2011 and 2013 surveys of participants in the Maine School and Library Network (MSLN), conducted by Networkmaine on behalf of the ConnectME Authority. With a 100 percent response rate for both years, the 2011 survey was completed by 877 respondents; the 2013 survey, by 907 respondents.⁴³

Availability. The availability of broadband to Maine’s K-12 schools and libraries has changed little since 2011. In 2013, schools and libraries enjoy fully subsidized broadband connections leading to 100 percent availability of broadband connectivity of at least 10 Mbps. Use of fiber optic connections has grown by only 4 percent, however, from 44 percent in 2011 to 48 percent in 2013.

⁴³ For the MSLN survey questionnaire and results, see Appendix C.

Schools and libraries have not been in the position to benefit from recent middle mile infrastructure investments as much as other sectors given that MSLN is in the midst of multi-year contracts for transport services that run from 2010 to 2015. Low growth in the use of fiber optics in the last mile is also the result of this multi-year contract process. Consequently 52 percent of schools and libraries are still serviced using traditional copper-based lines.

The speed of broadband connections has increased over the past two years however. In 2011, 84 percent of K-12 schools and libraries had broadband connections with speeds less than 100 Mbps, with 16 percent with speeds of 100 Mbps or greater. In 2013, the percentage of K-12 schools and libraries with broadband connections at speeds 100 Mbps or greater nearly doubled to 30 percent (Figure 4-26).

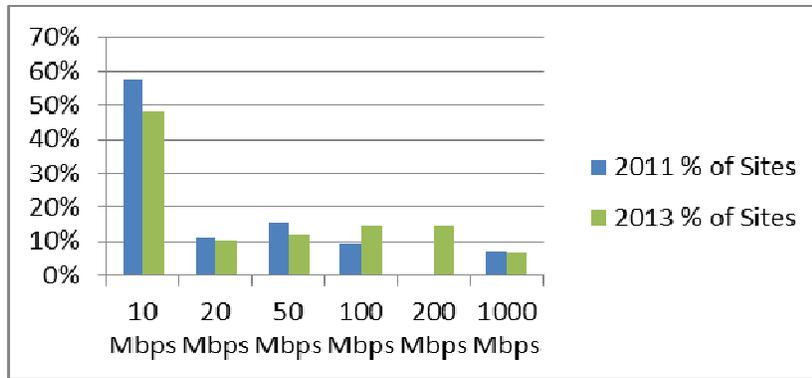


Figure 4-26: Distribution of Bandwidth in Maine Schools and Libraries

Given that more than half of Maine K-12 schools and libraries are served over copper-based lines, growth in bandwidth heightens the concerns about near-term broadband scalability. Copper-based lines cannot sustain the bandwidth levels that K-12 schools and libraries will require before the existing transport contracts end in 2015, and a substantial increase in fiber optic build-out in the last mile will need to occur to meet this need. The recent White House announcement on the ConnectEd⁴⁴ initiative, which calls for building infrastructure that will deliver 100 Mbps (scalable to 1.0 Gbps) to 99 percent of the K-12 schools and libraries by 2018, may become a source of funding for such a last mile build-out.

Mobile wireless technology, although not used in the classroom, is increasingly used in the daily operation of the schools and libraries. 2013 MSLN survey findings indicate that access to mobile wireless service has risen from 18.2 percent in 2011 to 72.7 percent in 2013. Mobile wireless technology as discussed in this report

⁴⁴ <http://www.whitehouse.gov/blog/2013/06/06/what-connected>

should not be confused, however, with WiFi network technology that is widely available and heavily used throughout Maine’s K-12 schools and libraries.

Use and drivers. High speed broadband connectivity continues to be essential to K-12 schools and libraries as they change and adapt their services to meet the needs of their communities. The 2013 survey shows that internet connectivity is in use at least 75 percent of the time for 96 percent of Maine’s K12 schools and libraries and 100 percent of the time for 83 percent.

As referenced in the 2011 needs assessment, Maine has invested heavily in one-to-one computing initiatives, such as the Maine Learning Technology Initiative,⁴⁵ for over a decade. These initiatives, which have expanded beyond the 7th- and 8th-grade levels, are driving the need for ever higher broadband speeds. As the number of students with access to a learning device (laptop or tablet) increases, schools are increasing their use of internet- or cloud-based services for a range of functions, from collaboration tools and online testing to learning management systems. In 2012, 67 middle schools and high schools in Maine made digital library reference materials available to students through a special costing arrangement with the Maine Department of Education and educational publisher Gale, part of Cengage Learning, which allowed even the smallest schools to take advantage of the opportunity.⁴⁶

Although a limited number of Gale-Cengage Learning printed reference materials are common in school libraries, the new digital editions provide improved opportunities for students, allowing users from a participating school unlimited and simultaneous access. The high school virtual collection includes over 250 volumes; the middle school collection includes nearly 100 volumes of rich digital content.

Many of these new digital library resources are helping students prepare for the Maine Comprehensive Assessment System (MeCAS) Online Science Test, a next generation assessment tool. Maine, working with other New England states, will pilot the use of next generation question types made possible through online delivery and response, which will render number two pencils and bubble sheets obsolete. Next generation question types, be they multi-media based, interactive, or adaptive to the student’s previous responses, will better assess the students true understanding of the topics.

In addition to online reference materials and testing, video of all types—including streaming of recorded content and live interactive video communications—is creating a growing need for high speed broadband in both schools and libraries.

⁴⁵ <http://www.maine.gov/mlte/>

⁴⁶ <http://www.gale.cengage.com/>

The Maine State Library’s partnership with the Maine Department of Labor’s Career Centers on the Maine Public Library Information Commons Project,⁴⁷ for example, has led to the installation of video conferencing equipment and computers in 107 libraries across Maine. The success of this partnership has in turn resulted in a new partnership with the Maine Volunteer Lawyers Project⁴⁸ on the Lawyers in Libraries Project,⁴⁹ which utilizes video conferencing units to provide legal clinics on a monthly basis in libraries across the state.

This spring the project will transition to using desktop video conferencing to connect lawyers with low-income Maine citizens for one-to-one legal sessions. This project would not be possible without the video infrastructure provided by Networkmaine and the robust bandwidth provided through the MSLN Project for public libraries. With both of these projects, bandwidth becomes more and more vital to Maine public libraries as the use of video conferencing units, desktop video conferencing and video-based instruction continues to grow.

In 2012 the Maine State Library conducted 11 regional meetings with libraries across Maine to discuss digital literacy efforts in public libraries. The importance of the robust connections at libraries was discussed at every meeting as libraries see an increased use of the Learning Express Library⁵⁰ and Popular Software Tutorials learning portal as a key tool for their digital literacy efforts.

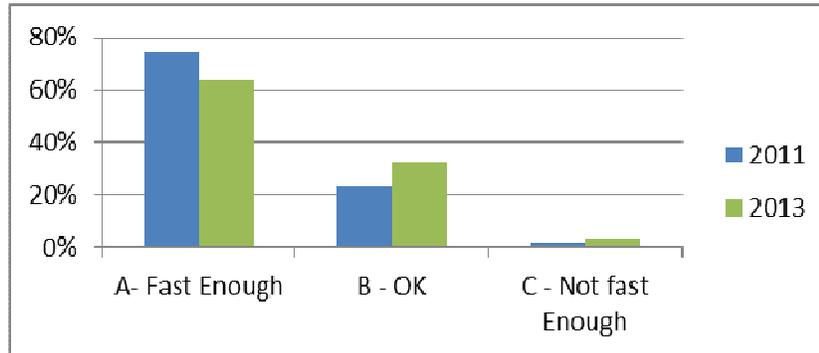


Figure 4-27: Satisfaction with Broadband Speed in Schools and Libraries

Gaps. Maine has yet to meet the “100 Mbps per 1000 students by 2011” goal set by the State Education Technology Directors Association (SETDA).⁵¹ Despite increases in connection speeds for many Maine schools and libraries over the past two years,

⁴⁷ <http://maine.gov/msl/recovery/index.shtml>

⁴⁸ <http://www.vlp.org/>

⁴⁹ <http://www.maine.gov/msl/commons/legal/lawyers.htm>

⁵⁰ <http://www.maine.gov/msl/commons>

⁵¹ http://www.setda.org/c/document_library/get_file?folderId=270&name=DLFE-211.pdf

MSLN participants indicate in both 2011 and 2013 surveys that satisfaction of schools and libraries in their available bandwidth is decreasing (Figure 4-27).

Without major investments by both broadband providers and the public sector to transition Maine's broadband infrastructure from primarily copper-based to fiber-based, the gap between needed and available bandwidth will continue to widen.

Little to no progress has been made in broadband services to Maine's island communities. The broadband connections to the majority of schools and libraries on Maine's coastal islands continue to be limited to just 10 Mbps. As the investments needed to improve this situation exceed what the market on the islands can support, public investments or incentives will most likely be needed to fill this gap.

Barriers. The primary barriers to adoption, as in 2011, continue to be price and availability. Although the Maine Telecommunications Education Access Fund (MTEAF) and the federal Schools and Libraries (E-Rate) Universal Service Fund (USF) programs have removed the financial barriers for individual K-12 schools and libraries, neither fund is keeping up with the increases in bandwidth demand. The annual assessments into the MTEAF are decreasing as intra-state revenue of voice network service providers continues to decline. The MTEAF assessment is projected by the Maine Public Utilities Commission (MPUC) to be \$3.25 million at a 0.6 percent assessment for FY13 rate, down from \$3.8 million in 2011.⁵² Although the federal E-Rate program has a yearly inflation-based increase in its cap, these increases pale in comparison to the yearly increase in demand for E-Rate funds.⁵³

4.2.5 Healthcare Organizations

The 2013 survey of health organizations updates our knowledge and provides new findings on computer and internet use and broadband subscribership of this key consumer group. In the last two years, Maine Department of Health and Human Services (DHHS)-sponsored programs to improve healthcare quality, safety, and efficiency have grown through the use of broadband-based health information technology (HIT), including such applications as the HealthInfoNet health information exchange (HIE), electronic health records (EHRs), and e-prescribing. To gather current information on the adoption of broadband for these and other uses, the survey team developed an expanded online survey in collaboration with the Office of the State Coordinator for HIT (OSC), the DHHS agency that coordinates HIT

⁵² MPUC Docket #2013-00016 Procedural Order March 8, 2013.

⁵³ Sixth Report and Order, 25 FCC Rcd at 18781, para. 36.

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-175A1.pdf

efforts across the state.⁵⁴ The findings establish a new baseline on the implementation and use of broadband to deliver healthcare services in Maine. The 2013 survey results are based on a sample of 513 healthcare facility locations, out of a total number of 3,135 survey recipients, representing a 16.4 percent response rate.⁵⁵

Healthcare Organizations Survey Results

Respondent profile. The 2013 survey sample comprises a range of healthcare organizations, from behavioral health facilities (the majority at 52.0%) to long-term care facilities (12.2%), ambulatory healthcare facilities (8.6%), dental facilities (4.9%), federally qualified health centers (FQHCs) or rural health clinics (RHCs) (4.9%), and home health agencies (4.0%). Pediatric care facilities, hospitals, pharmacies and shelters comprise less than 1 percent of the sample (Figure 4-28).⁵⁶

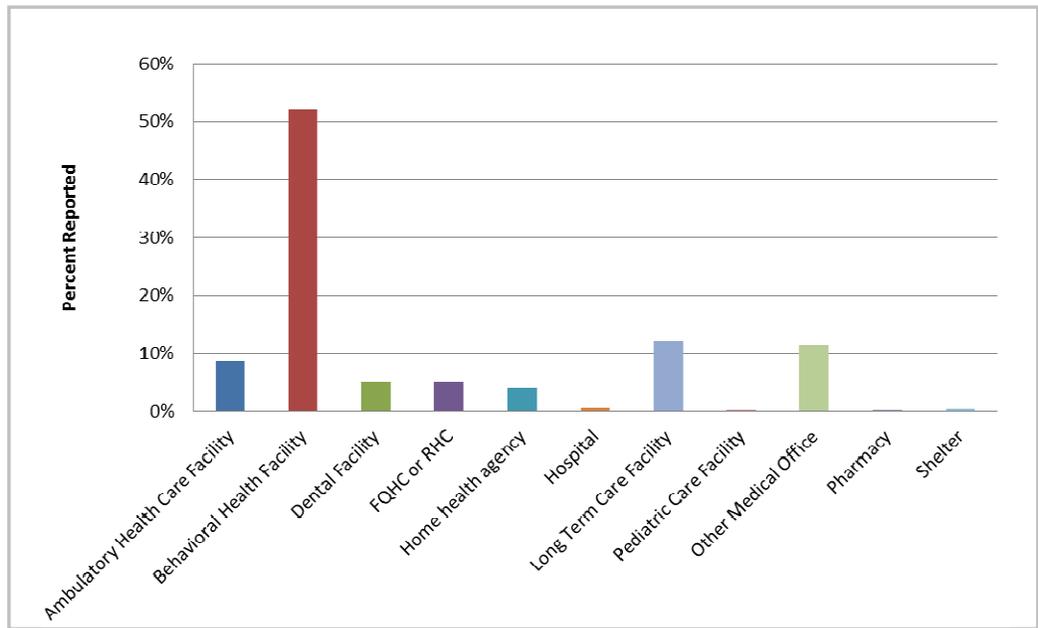


Figure 4-28: Healthcare Organization Respondent Categories

⁵⁴ The 2011 survey findings were based on data from an existing 2011 Health Information Survey conducted by the Muskie School Cutler Institute for Health and Social Policy, University of Southern Maine, for the OSC. The 2013 survey results are based an expanded email and online questionnaire developed in collaboration with the OSC for this update. The 2013 survey questionnaire and results are in Appendices A and B, respectively.

⁵⁵ The healthcare organizations that participated in this survey include practices with one or multiple locations. In instances where a practice had multiple locations, each facility location was surveyed as a separate entity.

⁵⁶ Roughly 11 percent of respondents fall into the “medical office—other” category, including facilities for physical therapy, chiropractic services, podiatry, optometry, and outpatient services.

The majority of respondent organizations are practice locations not affiliated with a hospital, FQHC, or RHC (79.6%); 15.2 percent are affiliated with a hospital, and 5.2 percent are part of a FQHC or RHC (Figure 4-29).⁵⁷

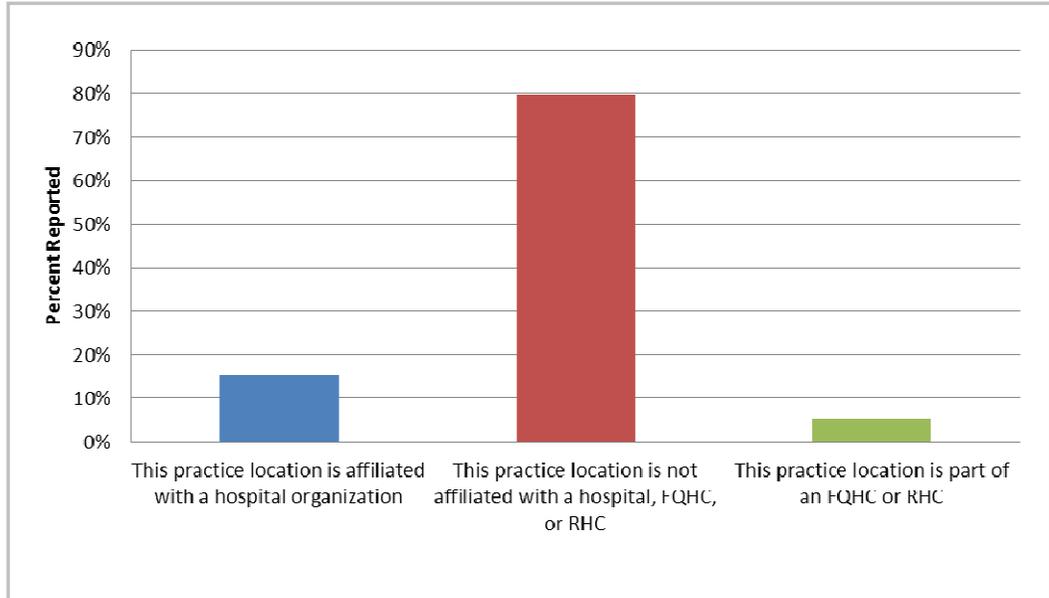


Figure 4-29: Healthcare Organization Respondent Ownership Structure

Over half (64.2%) practice at multiple locations within Maine; 34.7 percent practice at a single location within Maine. Only 1.0 percent of respondents have multiple locations within the US as a whole.

Many of the respondent organizations are longstanding: 72.2 percent have been in practice for over a decade, with 30.7 percent over 30 years. The largest percentage of organizations are small, with less than 5 employees (28.2%); 19.5 percent have 20 to 50 employees. Only 10.8 percent of respondents have over 100 employees.

Availability. 2013 survey results show that 98 percent of surveyed healthcare facilities have access to the internet, an increase of 8 percentage points since 2011 (Figure 4-30).

⁵⁷ The Universal Service Fund (USF) Rural Health Care Program provides reduced rates for telecommunications services and internet access to eligible healthcare providers.

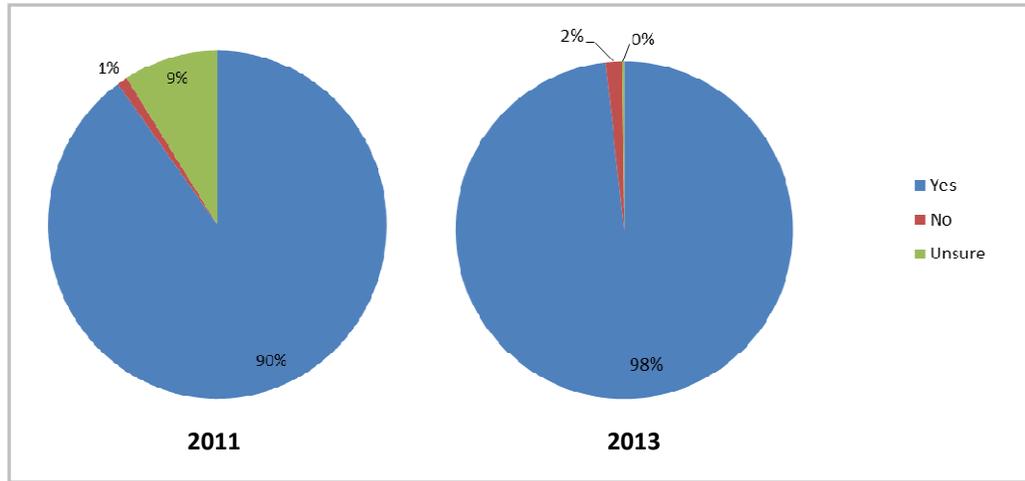


Figure 4-30: Availability of the Internet to Healthcare Organizations

95 percent of surveyed organizations have access to broadband, an increase of 7 percentage points since 2011. In terms of specific broadband technologies, 61 percent have access to cable, 53 percent to DSL, 34 percent to fiber optic, and 32 percent to T-1. The availability of mobile wireless—whether at broadband speeds or not—is also relatively high at 30 percent (Figure 4-31).

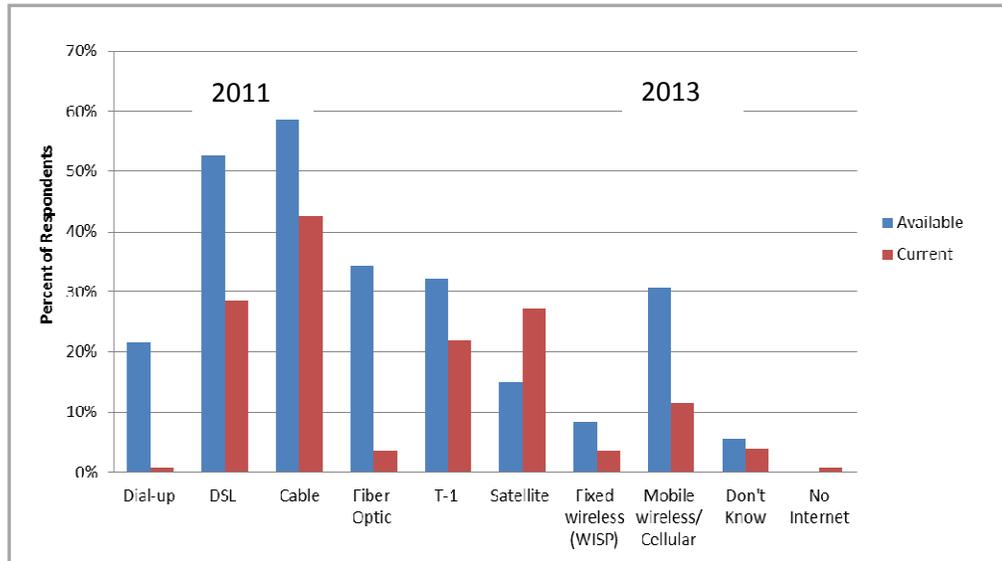


Figure 4-31: Availability of Internet Technologies and Current Use by Healthcare Organizations

Computer and internet use. 79 percent of respondent health organizations exhibit heavy computer use (68% almost all of the time; 11% most of the day, almost every day). Only 1 percent indicated they had not used the computer at all in the previous week, and 2 percent indicated that they had no computer at the practice location (Figure 4-32).

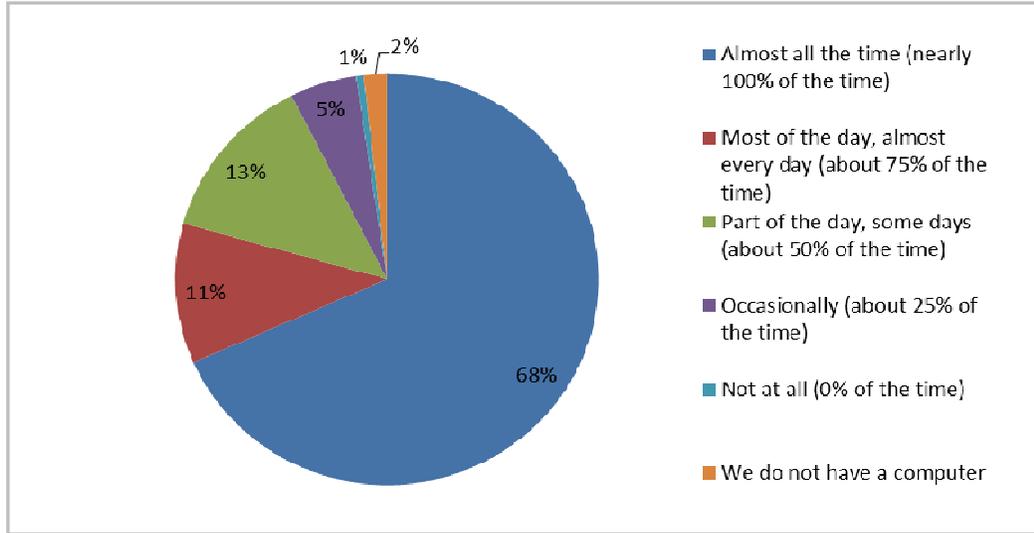


Figure 4-32: Healthcare Organizations Frequency of Computer Use

The percentage of respondents that use some form of broadband is relatively high at 95 percent. In terms of specific broadband technologies, 43 percent connect to cable, 29 percent to DSL, and 22 percent to T-1. Only 4 percent use fiber optic or fixed wireless technologies (Figure 4-31). 12 percent use mobile devices to connect—whether at broadband speeds or not.

As is characteristic with other consumer groups, including households, businesses, and CAIs, a gap exists between the percentage of healthcare organizations that have no internet connection and would like to connect (46%) and the percentage of those that plan to connect in the next 12 months (33%). The gap within this stakeholder group appears to be smaller, however, by at least 10 percentage points.

Table 4-37: Healthcare Organizations Internet and Broadband Connection

Medical Internet and Broadband Connection	% of Respondents 2011	% of Respondents 2013
Some form of internet connection	90%	98%
Some form of broadband internet connection	88%	95%
No internet connection; would like to connect	--	46%
No internet connection; plan to connect in next 12 months	--	33%

Similar to businesses and CAIs, healthcare organizations connect to the internet first and foremost to conduct basic communications (98%) and office functions, such as recordkeeping and maintaining a database (74%) and managing finances and billing (67%). Other major reasons to connect, such as providing or accessing training online (77%) and conducting the healthcare practice (63%), are specific to the needs of this consumer group. The percentages of respondents who use the internet to participate in the HIE (22%), provide telemedicine services (13%), and transmit medical imagery (13%) are significantly lower (Figure 4-33).

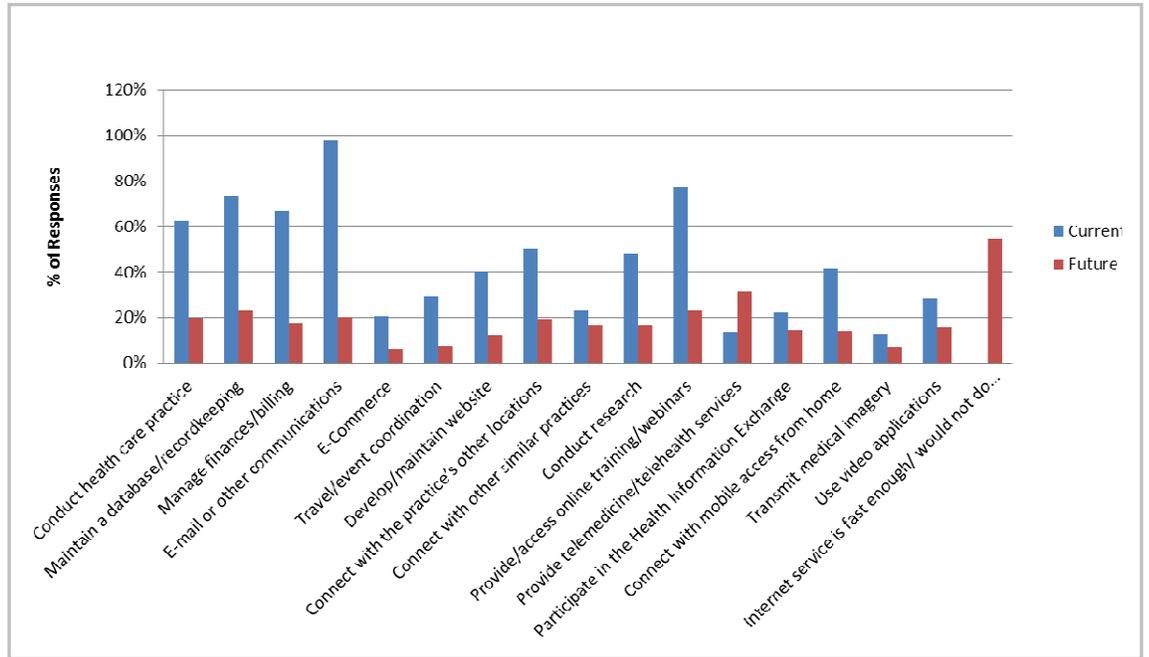


Figure 4-33: Healthcare Organizations Current and Future Uses of the Internet

Significantly, the largest percentage of respondents indicated that they would do more telemedicine/telehealth (32%) if they had faster internet. They also cited recordkeeping (24%), and online training (23%) as important. Fewer respondents indicated they would connect with other offices of the same practice (19%) or with other practices (17%), participate in the health information exchange (14%) and transmit medical imagery (7%).

Over half indicated that their internet service is fast enough (55%). When questioned separately on internet speed specifically, only 4 percent of respondents indicated that their internet speed was not fast enough to do what the practice needs. However, a sizable percentage (40%) indicated that, although the practice can do what it needs with current speeds, faster internet would be better (Figure 4-34).

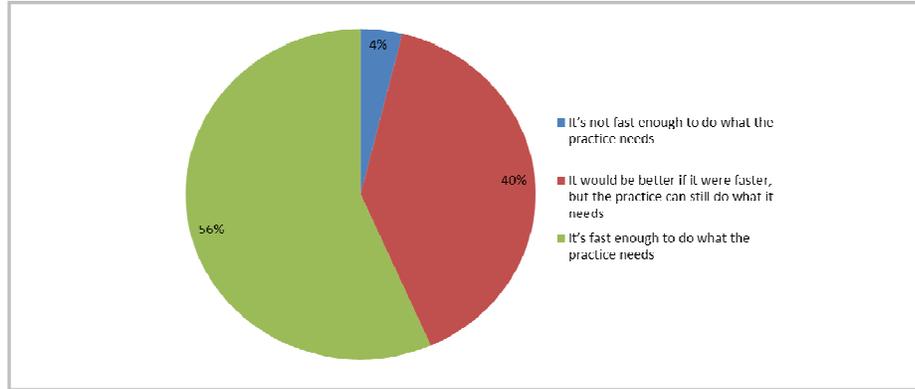


Figure 4-34: Healthcare Organizations Speed of Internet Connection

Drivers of computer and internet use. A major driver of high-capacity broadband connectivity is Maine’s HIE, a secure, interoperable network for centralizing and sharing healthcare information with healthcare organizations, providers, public health agencies and consumers statewide.⁵⁸ Administered through Maine’s HealthInfoNet, a public-private nonprofit organization, and supported by federal grant monies under the Health Information Technology for Economic and Clinical Health Act, the network currently connects 35 out of 38 Maine hospitals and many of Maine’s healthcare facilities. One-third of the 2013 survey respondents are connected (Figure 4-35).⁵⁹ The highest percentage of participation is shown among FQHCs or RHCs (57.1%), behavioral health facilities (51.4%), ambulatory healthcare facilities (45.9%), and those facilities that are affiliated with a hospital (73.7%) or part of an FQHC or RHC (60.0%).

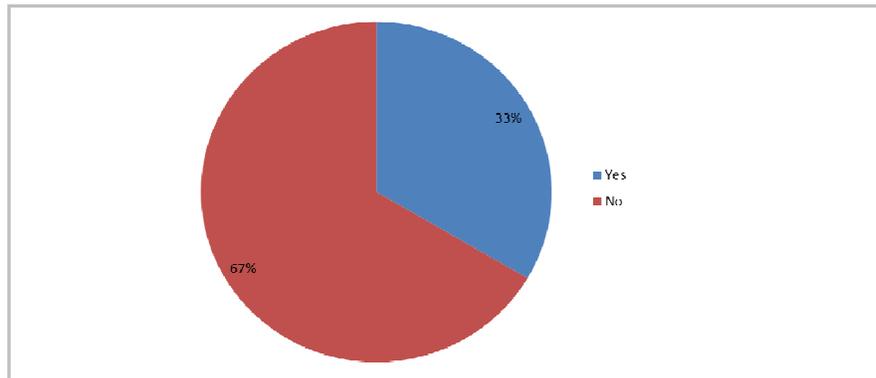


Figure 4-35: Healthcare Organizations Participation in Maine’s HIE

⁵⁸ <http://www.hinfonyet.org/about-us>

⁵⁹ Note that connection to the HIE does not necessarily mean use of it; in response to a different question, only 22 percent cited they used the system (p. 4-57).

Of those respondents that are connected to the HIE, the largest percentage (82%) have read-only rather than interactive access for data exchange (Figure 4-36). Behavioral health facilities indicate they have read-only access, whereas FQHCs or RHCs (72.7%) and ambulatory healthcare facilities (64.7%) are most likely to interact fully with the system.

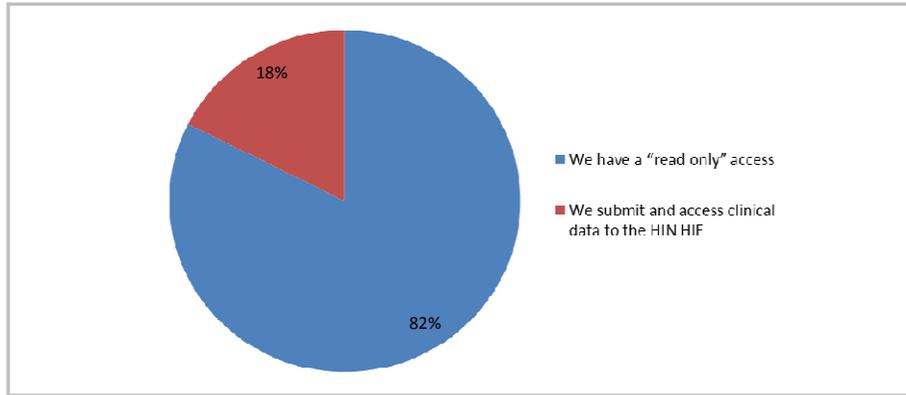


Figure 4-36: Health Organizations Type of Access to HIE

Other major drivers to broadband subscribership in the healthcare industry are the availability of EHR, e-prescribing, and telemedicine systems that improve patient care. HealthInfoNet, which also serves as the Maine Regional Extension Center,⁶⁰ helps Maine primary care providers and critical access and rural hospitals adopt and effectively use certified EHRs and e-prescribing technologies. The “meaningful use” of EHRs is also incentivized through the Centers for Medicare and Medicaid Services (CMS) EHR Incentive Programs, which make 100 percent federally funded payments to eligible professionals and hospitals for adopting, implementing, upgrading, and demonstrating meaningful use of the technology.⁶¹

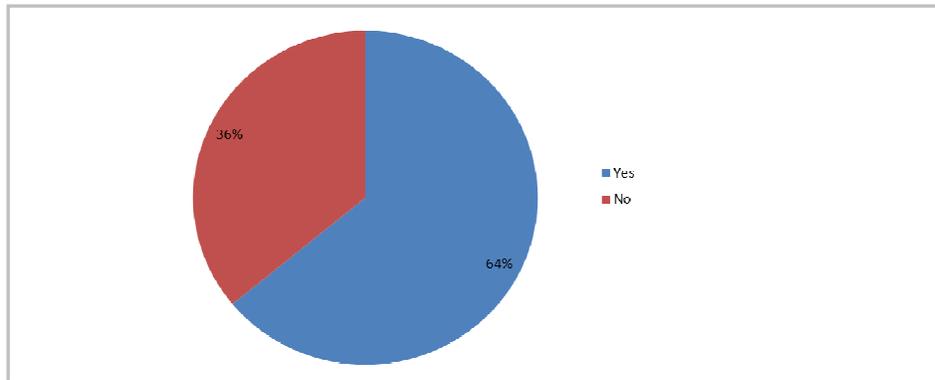


Figure 4-37: Healthcare Organizations That Use EHRs

⁶⁰ <http://www.hinfonyet.org/providers/maine-regional-extension-center>

⁶¹ <http://www.maine.gov/dhhs/oms/HIT/>

The 2013 survey findings indicate that 64 percent of respondents have installed and use an EHR system (Figure 4-37), and of that 64 percent, over 80 percent use the system heavily (Figure 4-38). Healthcare organizations more likely to report that they have installed and used an EHR system are ambulatory healthcare facilities (86.5%), FQHCs or RHCs (85.7%), behavioral health facilities (72.5%), dental facilities (70.0%), and respondents that are affiliated with a hospital (86.6%) or part of an FQHC or RHC (84.0%). These organization types also cite the heaviest usage.

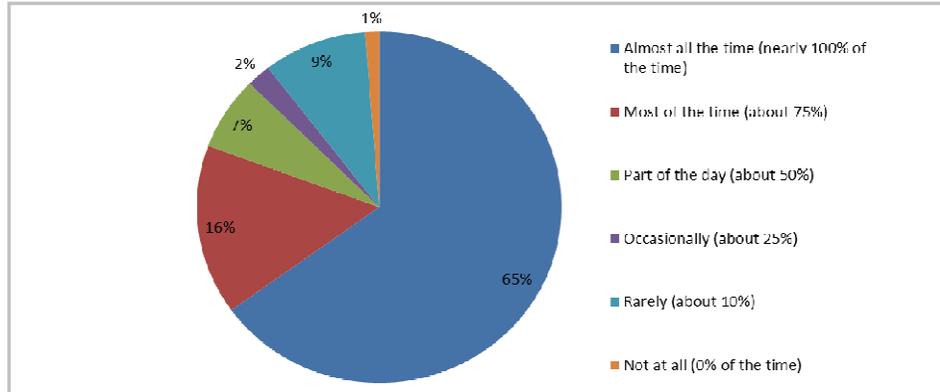


Figure 4-38: Frequency of EHR Use

Of those respondents that use an EHR system less than 50 percent of the time, almost half (47%) indicated that they are still in the process of implementing such a system (Figure 4-39). 76.7 percent of behavioral health facility respondents are in the implementation process.

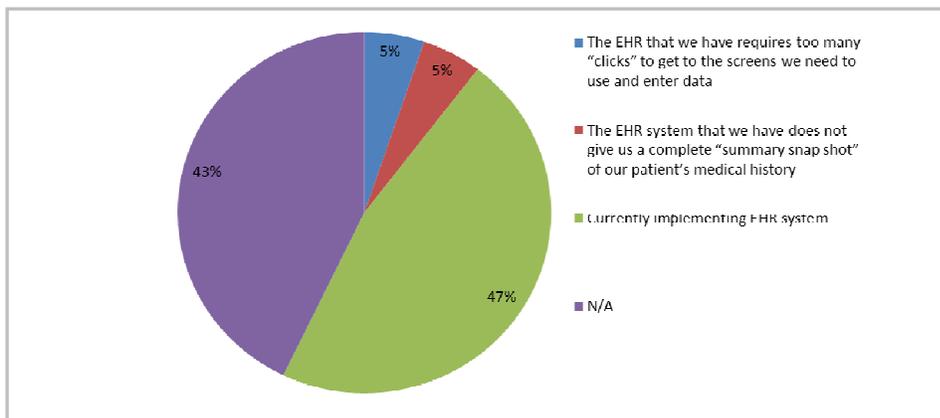


Figure 4-39: Reasons for Using EHRs Less Than 50 Percent of the Time

Awareness of the CMS Medicare and Medicaid incentive payment programs for meaningful use of EHRs is not comprehensive among surveyed respondents. Almost half (45%) indicated they had not heard of the programs (Figure 4-40). Ambulatory healthcare facility and FQHC or RHC respondents indicated the highest percentages

of awareness (89.2% and 95.2% respectively); long-term care facility respondents indicated the lowest (19.2%).

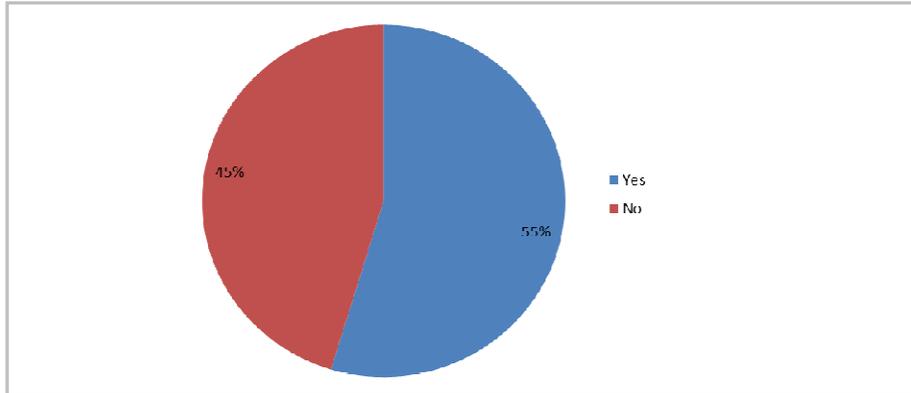


Figure 4-40: Awareness of Medicaid and Medicare EHR Incentive Payment Programs

Only 17 percent of respondents indicated knowledge of professionals at their practice participating in EHR incentive payment programs (Figure 4-41).

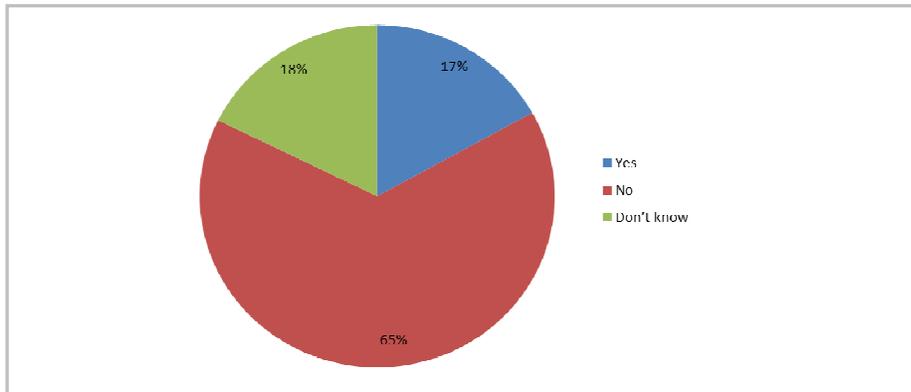


Figure 4-41: Participation in EHR Incentive Payment Programs

Of these, almost half (48%) indicated that one to three professionals at their respective practices participated (Figure 4-42).

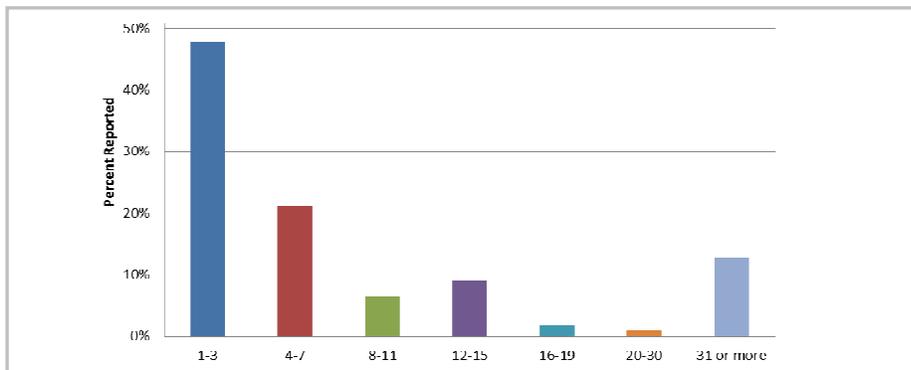


Figure 4-42: Professionals Participating in EHR Incentive Payment Programs

Table 4-38: Healthcare Organizations Use of EHRs

Use of Electronic Health Records (EHRs)	% of Respondents-- 2013
EHR installed and in use	64%
Frequency of EHR use	
• Almost all of the time (100%)	65%
• Most of the time (75%)	16%
• Part of the day (50%)	7%
• Occasionally (25%)	2%
• Rarely (10%)	9%
• Not at all (0%)	1%
Reasons for less than 50% use	
• Currently implementing EHR	47%
• Too many clicks	5%
• No patient summary snapshot	5%
Reasons for no EHR system	
• Funding/costs	59%
• Not needed	32%
• Too complicated	13%
• Plan to close/sell practice in 3-5 years	6%
• Lack of access to required internet speeds	2%
Awareness of Medicaid/Medicare EHR incentive payment program	
• Aware	55%
• Not aware	45%
Participation in EHR incentive program	
• No	65%
• Yes	17%
• Don't know	18%
Number of professionals participating in EHR incentive program	
• 1-3	48%
• 4-7	21%
• 8-11	6%
• 12-15	9%
• 16 and over	16%
Reasons for lack of participation in EHR incentive program	
• Behavioral health care facility—do not qualify	43%
• Unaware of the Meaningful Use Program	39%
• Do not employ type of professionals who are eligible	7%
• Long term care facility—do not qualify	7%
• Do not serve enough Medicare/Medicaid patients to qualify	4%

In comparison with EHR systems, respondents' use of e-prescribing (27%) and telemedicine systems (7%), additional drivers of broadband adoption, is relatively low (Figures 4-43 and 4-44).⁶² Results show that the use of e-prescribing is more likely among ambulatory healthcare facilities (83.8% use e-prescribing), FQHCs or RHCs (85.7%) or organizations that are part of an FQHC or RHC (80.0%) or affiliated with hospitals (42.1%). FQHC or RHC respondents or those organizations affiliated with FQHC or RHCs are most likely to provide telemedicine services (19.1% and 20.0% respectively).

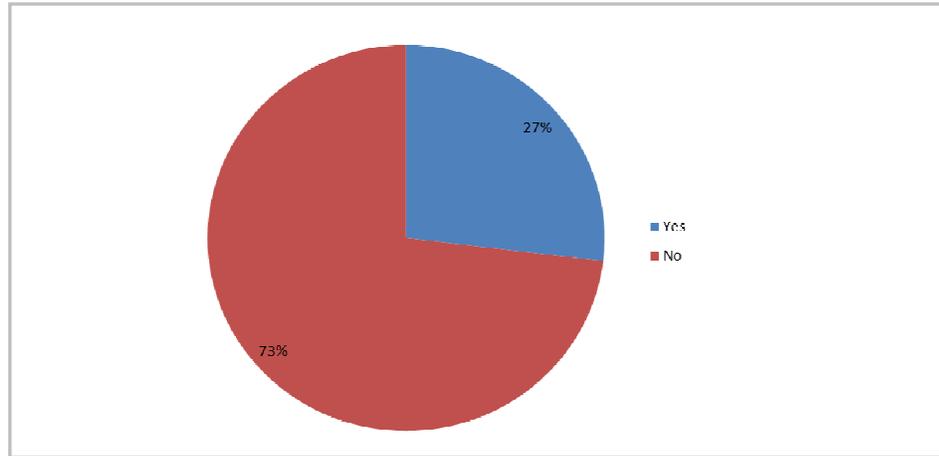


Figure 4-43: Healthcare Organizations That Provide E-Prescription Services

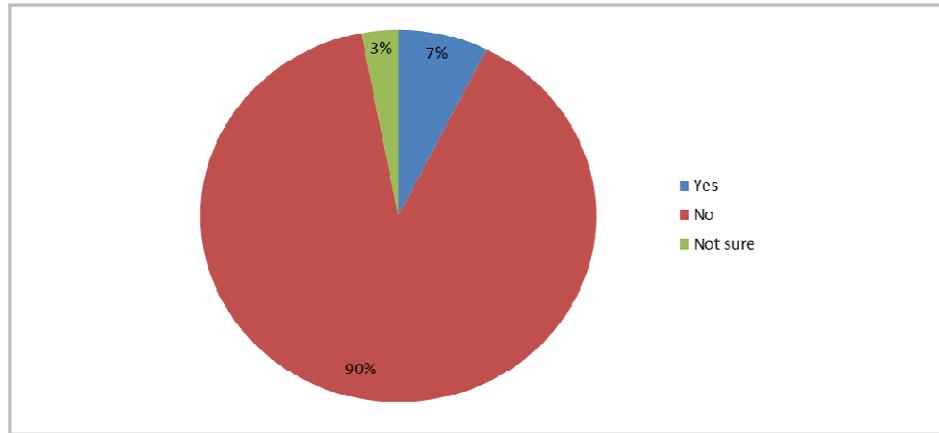


Figure 4-44: Healthcare Organizations That Provide Telemedicine Services

⁶² From 2011 to 2013, the use of telemedicine dropped from 18 to 7 percent, in large part due to differences in measurement criteria between the 2011 Muskie School study and this update. The update focuses on the use of high-speed internet for delivering telemedicine services, whereas the Muskie School examined the use of telecommunications—telephones, e-mail, videos—to provide diagnosis, treatment, education and other healthcare activities, a somewhat broader focus.

It is important to note that the largest percentage of respondents (32%) indicated they would do more telemedicine if they had faster internet (see Figure 4-33).

Barriers to computer and internet use. Although the Maine healthcare community has made meaningful gains since 2011 in using broadband to deliver services, barriers still exist in the adoption of internet and broadband-driven HIT to improve patient care. As with other consumer groups, lack of awareness of broadband’s benefits (including federal payment incentives), access to adequate service, and perceived value for the cost continue to be the biggest barriers. Lack of IT support in small practices also continues to be a barrier, although a significant percentage (66%) of 2013 respondents indicated that they have an employee dedicated to IT duties (Figure 4-45).

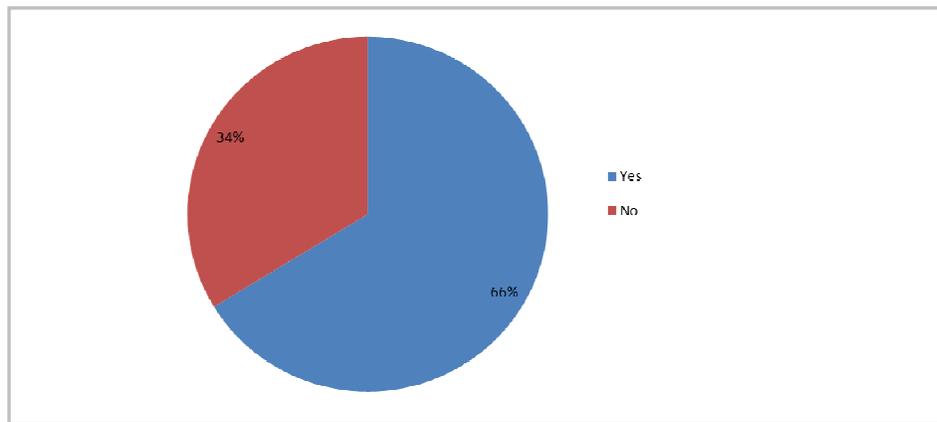


Figure 4-45: Healthcare Organizations with IT Expertise on Staff

Of those few respondents that are not connected to the internet (2%), the majority (40%) indicated lack of perceived need as the primary reason, adequate service as secondary (30%), and cost as third (20%) (Figure 4-46).

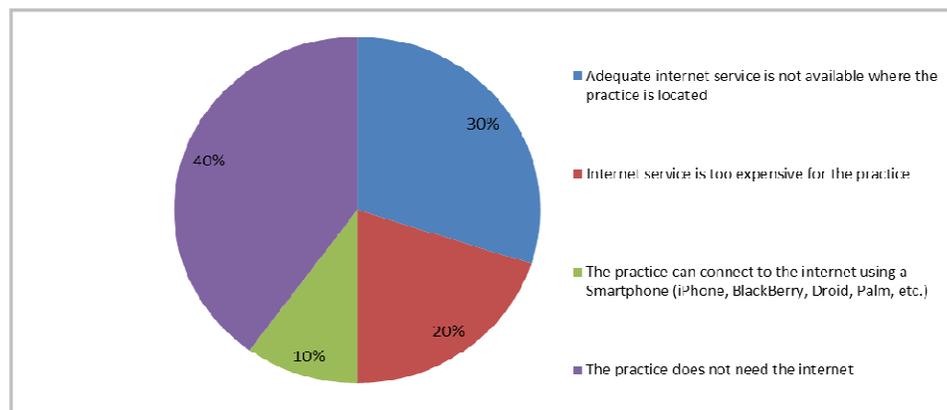


Figure 4-46: Reasons for Not Having Internet in Healthcare Organizations

Although cost of internet service is a continued concern for healthcare as well as other organizations, roughly a third of respondents currently pay in the \$30-\$100 range and a third in the \$101-\$300 range per month (Figure 4-47).

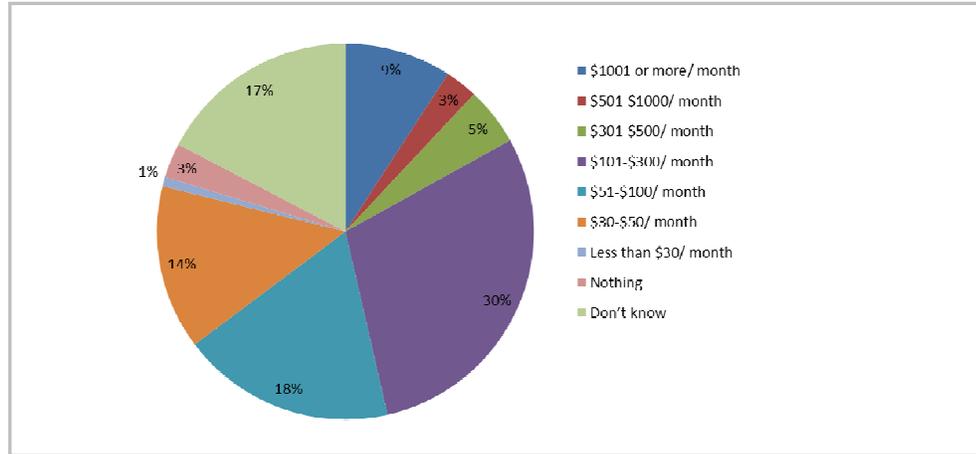


Figure 4-47: Healthcare Organizations Cost of Internet per Month

Cost concerns and lack of awareness of broadband benefits are also barriers to respondents' use of applications that require access to high-speed internet services. 2013 survey findings indicate cost is the major reason respondents have not implemented an EHR system (59%), with lack of perceived need second (32%) (Figure 4-48).

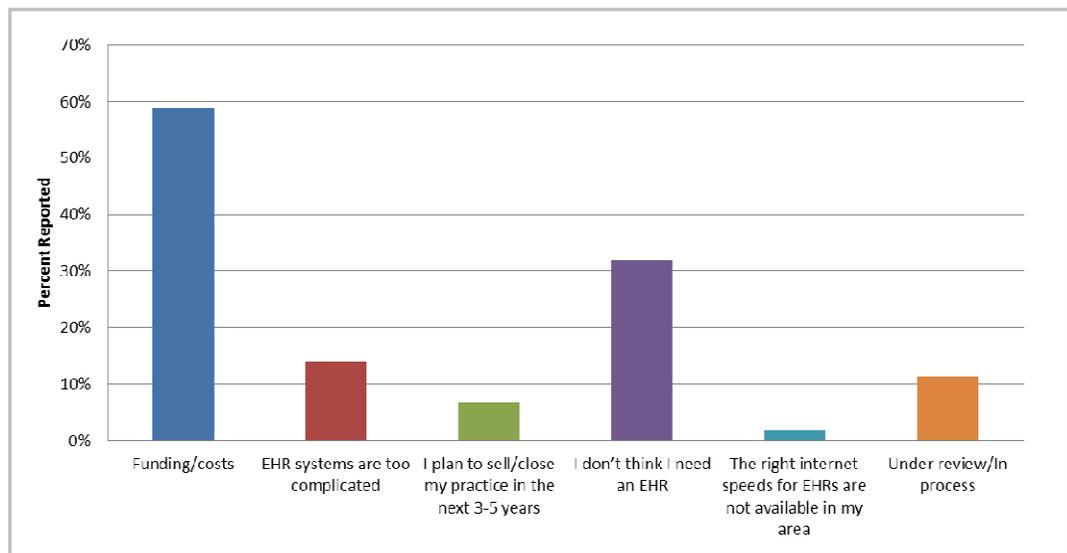


Figure 4-48: Reasons for Not Implementing an EHR System

As noted earlier, lack of awareness of the CMS Medicare and Medicaid incentive payment programs for meaningful use and their financial benefits to healthcare providers is a barrier to the use of an EHR system, as almost half (45%) indicated they had not heard of the programs (Figure 4-40). In addition to lack of eligibility, lack of awareness of the programs is a barrier to participating in them (Figure 4-49). It is significant that over half of healthcare respondents indicated interest in being contacted regarding grant opportunities.

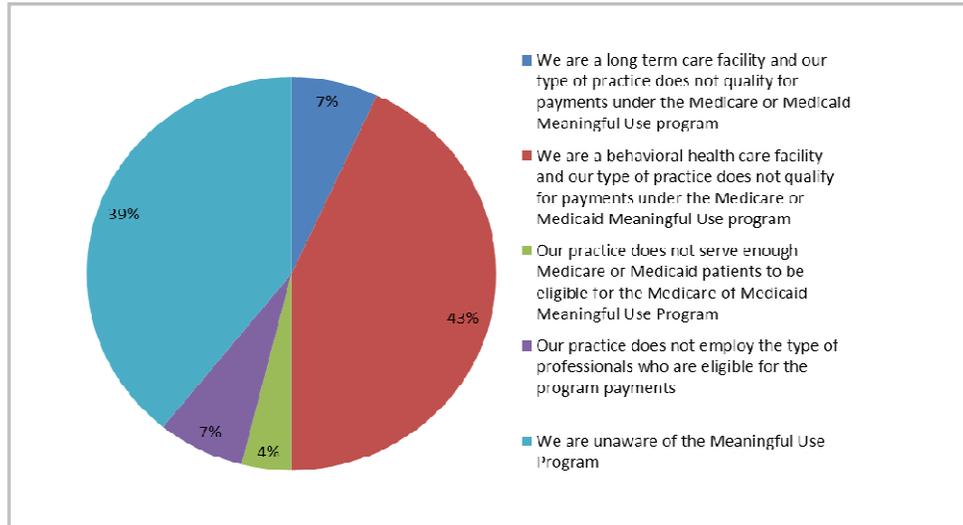


Figure 4-49: Reasons for Not Participating in Medicare and Medicaid Meaningful Use Program

Finally, lack of perceived need is the major reason healthcare organizations cited for not providing telemedicine services (53%), with funding costs second (19%), and reimbursement issues third (13%) (Figure 4-50).

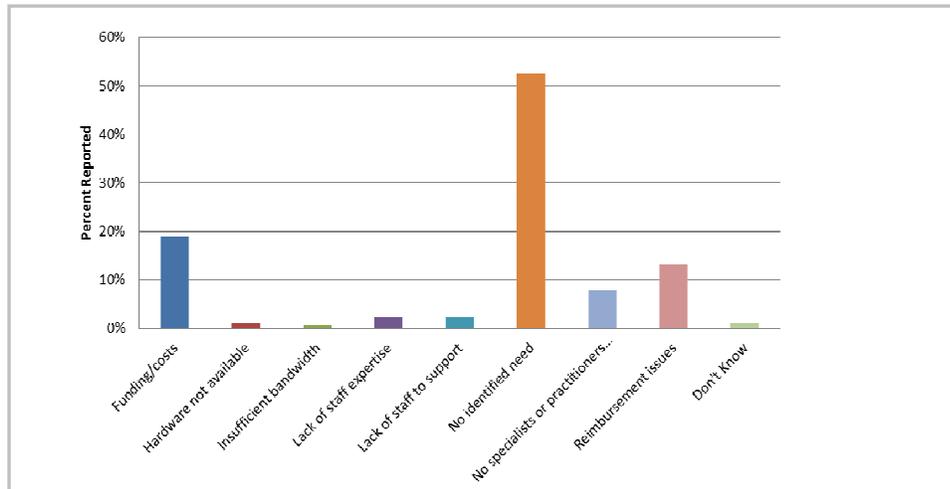


Figure 4-50: Reasons for Not Providing Telemedicine Services

Although insufficient bandwidth is not emphasized as a barrier (less than 1%), the largest percentage of respondents (32%) indicated that with faster internet, they would do more telemedicine (Figure 4-33).

Since 2011, the lack of perceived need for telemedicine services has increased (from 42% to 53%) as has concern for costs (from 12% to 19%) and for reimbursement issues (from 9% to 13%).

4.2.6 Native Indian Tribes

Respondent profile. For purposes of this update, the focus of the 2013 survey was a segment of Maine's Native Indian Tribes residing on populated Indian lands.⁶³ According to the 2010 Census, this population represents 610 members of the Penobscot Nation residing on Indian Island, 718 members of the Passamaquoddy Tribe at Indian Township, and 749 residents on the Passamaquoddy lands at Pleasant Point. Unlike the 2011 survey, which was based on an interactive online interview of Tribal leadership, the 2013 survey targeted a broader base of respondents within this sample using a mailed questionnaire with an online option, the same survey vehicle used in the residential consumer survey (Section 4.2.1).

Of the 318 Native Indian households to which the questionnaire was mailed, 19 surveys were returned, yielding a low response rate of 5.9 percent. The low response together with the small targeted sample produced results with a large margin of error. A qualitative review of the information is nevertheless useful as it shows general patterns of Tribal household computer use and broadband subscribership, which closely align with the findings of the larger 2013 residential survey. This is not surprising as Maine Tribal communities, as noted in the 2011 needs assessment, are more closely integrated into statewide social and infrastructure systems than Tribal communities in other states, and do not fit the typical profile envisioned in many of the FCC programs targeting populations on Tribal lands.

As with the residential respondent sample, the Native Indian Tribes surveyed represent a range of households that vary in age and income, with income the largest variance between the Tribal and residential survey responses. In general, Tribal households show similarities in age to households in other Maine communities, although adult members of Tribal households are slightly younger in age than adults in other community households. Both survey groups have a low

⁶³ This focus is aligned with the FCC's definition of Tribal populations as residents living within the present boundaries of any Indian reservation.
http://www.usac.org/_res/documents/li/pdf/fcc/Tribal-Order.pdf

percentage of children under 18. The range of annual household incomes reported by Tribal respondents fall into two groupings with roughly half reporting incomes less than \$25,000 annually and close to half reporting earnings from \$35,000 to \$65,000 annually. This varies significantly from the residential survey results, which show that over 35 percent of respondents have income \$65,000 or over (Table 4-13).

100 percent of Tribal respondents indicated they or a member of their family living with them had obtained at least a high school or GED-level of educations with 72 percent indicating that at least one individual residing at that location had a two-year, four-year, or advanced-level degree.

As was found in the general profile of Maine households, a subset of this group also experiences periods when either they or a member of their family are homebound due to illness or other incapacity. More than 10 percent experience this weekly, and 5 percent indicate being homebound permanently.

Availability. An analysis of the current broadband availability data published by the ConnectME Authority indicates that 100 percent of populated Tribal lands in Maine have access to broadband-level internet service, a higher level of availability since 2011, and higher than in many other regions in the state.

Table 4-39: Availability of Broadband Services to Tribal Reservation Communities in Maine

Community	Service Provider	Technology	Advertised Speed
Indian Township	Axiom Technologies	Asymmetric xDSL	6–10 Mbps
		Terrestrial Fixed Wireless	3–6 Mbps
	FairPoint Communications	Asymmetric xDSL	6–10 Mbps
Pleasant Point	Time Warner Cable	DOCSIS 3.0 Cable Modem	50–100 Mbps
	Axiom Technologies	Asymmetric xDSL	6–10 Mbps
	Pioneer Broadband	Terrestrial Fixed Wireless	1.5–3 Mbps
	FairPoint Communications	Asymmetric xDSL	6–10 Mbps
Indian Island	Time Warner Cable	DOCSIS 3.0 Cable Modem	50–100 Mbps
	Axiom Technologies	Asymmetric xDSL	6–10 Mbps
		Terrestrial Fixed Wireless	3–6 Mbps
	Premium Choice Broadband	Terrestrial Fixed Wireless	3–6 Mbps
	FairPoint Communications	Asymmetric xDSL	6–10 Mbps
	GWI	Asymmetric xDSL	1–25 Mbps
	Symmetric xDSL	10–25 Mbps	
	Time Warner Cable	DOCSIS 3.0 Cable Modem	50–100 Mbps

According to availability reports from service providers, Tribal lands have a variety of service providers and technology options, although published service maps

indicate that not all options are available in every location. Table 4-39 summarizes the general availability profile within the boundaries of the three reservation communities surveyed.

Use. Similar to the residential survey response, a large percentage (90%) of Tribal respondents reported owning a computing device used to access the internet. More than a third reported spending 35 or more hours per week using the internet; the average time is indicated to be 7 to 13 hours a week. Some 89 percent of Tribal respondents subscribe to the internet at broadband-level speeds, which is higher than the larger residential respondent group (75.3%). The use of mobile technology in Tribal households who responded (40%) is comparable to that of the larger population.

Not surprisingly, Tribal respondents use the internet for the same types of tasks and with the same frequency as the other households in this study (Table 4-15). In order of the highest level of activity to the lowest, Tribal households use the internet for:

- Social networking
- News and current events
- Banking and commerce
- Health-related information and services
- Entertainment
- Government-related activity
- Employment search
- Education and distance learning
- Home-based business

Again, similar to residential survey respondents, Tribal respondents indicate that if they had access to higher-speed internet, their pattern of use in general would not change. For those who indicated they would do more with higher speed, the top five activities are also similar to other households:

- Social networking
- Entertainment
- Online commerce
- Health-related information and services
- Education and distance learning

Drivers and Barriers. As with the larger residential population, income appears to be a determinant of computer use and broadband internet subscribership. Other characteristics, such as age, educational attainment or homeboundness, do not appear to determine computer use and broadband subscribership among Tribal

respondents. This finding may be more a factor of the low respondent response, however, than an indicator that no correlation in fact exists.

The responses to questions on spending patterns suggest a correlation between income and the amount respondents are willing to spend for broadband service. When asked what factor would weigh most on a consumer's willingness to buy a faster internet service, half of the group indicated they perceived the cost of faster service too high to consider. When asked directly, respondents indicated they were already spending as much as they were willing to pay for service. These findings correlate with the findings from the residential consumer survey.

Although in 2011 cost was indicated as the number one barrier to computer use and broadband subscribership, the major barrier in 2013 is cited as lack of interest due to a perceived lack of value in owning a computer. Cost, however, is cited in 2013 as the major barrier, or perceived barrier, to increased use with higher speed internet. Again, these findings support the findings from the residential survey sample.

In summary, Tribal household respondents to the 2013 survey indicate:

- Increased satisfaction with the level of service provided on Tribal lands
- Multiple options for service at or exceeding Tier 3 speeds
- Use of computers and broadband subscribership virtually identical to the general population
- Income levels among Tribal populations on Tribal lands less dispersed than across the broader population
- A correlation between income level and the cost Tribal households are willing to pay for broadband service
- Maine's Native Tribes have broadband communications access at levels exceeding the baseline profile of the FCC programs

4.2.7 State Agencies

Respondent profile. As with the 2011 needs assessment report, data for this update came primarily from the Maine State Office of Information Technology (OIT), which provides centralized technical resources to State agencies.

Availability. Over 99 percent of State facilities have access to broadband internet service, an increase of one percentage point since 2011. No mission-critical sites are without broadband. The exceptions remain remote parks and campgrounds, although the number of these without available service has decreased as commercial carriers have expanded their reach. The State has also seen new carrier Ethernet cloud offerings lower the cost of access. This reduction can be partially attributed to a more competitive business environment resulting from the completion of the 3 Ring Binder project.

Use. Over 99 percent of State agencies continue to use broadband to meet a wide array of internal operational and public service needs.

The State, for example, recently undertook a major project to upgrade the telecommunications services to its facilities, which provided more bandwidth and greater flexibility. It also allowed for an increase in voice over IP (VoIP). Previously limited, in 2013 nearly 50 percent of the State's 15,000 telephone extensions are now VoIP.

As with other organizations, the State has had to support an explosion in the use of mobile devices. In response to the high demand for WiFi within State facilities, the State has increased its wireless access points to more than 400, with as many as 1,000 or more concurrent connections on any given day. Through these wireless access points, the State offers secure access to its internal network for authorized users as well as public access to the internet. As recently as three years ago, two-thirds of the devices gaining access via the State's wireless access points were state issued. Now with the huge increase in mobile devices owned by private citizens, only one-third of the devices gaining access are state issued.

The State has also seen new carrier Ethernet cloud offerings lower the cost of access. This reduction can be partially attributed to a more competitive business environment resulting from the completion of the 3 Ring Binder project.

Mobile service is also a necessity for many State employees working in areas such as law enforcement (e.g., Maine State Police, Maine Warden Service) where their office is their vehicle. The State relies on the coverage of commercial carriers to meet this need. Employees in these areas are not new to the use of mobile devices and have mobile applications in place to support their work. For other agencies such as the Maine DHHS and Maine DOT, the adoption of mobile devices is more recent, and many are undertaking pilot projects. These agencies are discovering that while mobile devices and networks are generally available, the applications required to access internal systems are not.

Maine's OIT is embracing the ever increasing demand for mobile computing by adopting the "anytime, anywhere, any device" strategy as part of its vision and its planning for future applications and networking. One step being undertaken now is the implementation of a mobile device management (MDM) solution. The MDM service will improve the State's abilities to monitor, manage, and support mobile computing by offering such tools as over-the-air distribution of applications,

password protection, anti-virus deployment, and the capability to wipe a device clean remotely.

The State has also upgraded its disaster recovery program with the addition of a new data center and increased broadband capacity between facilities to deploy disaster recovery capabilities over a fiber-based network.

Finally, the State continues to broaden its online public services. The Maine.gov portal now includes park pass sales, the saltwater recreational fishing registry, property transfer tax declaration filing, the Governor's Energy Office website and home heating calculator, and the Voter Information Services Lookup, which provides users with sample ballots.⁶⁴ In addition, InforME partnered with the Bureau of Motor Vehicles and AAA in 2012 to create a satellite driver's license renewal service. This service allows users to renew their driver's license at a participating AAA branch office.

To meet the access needs of smartphone and tablet users, several Maine.gov online services and websites are now available for mobile devices including the Maine Foliage website, the Business Answers licensing assistance tool, and the Absentee Ballot Request service. Social media options, including Twitter, Facebook, and a Flickr photo gallery, are now employed.⁶⁵

Drivers. Wireless broadband access is leading the demand for greater bandwidth. The State has seen the number of users of its wireless network expand exponentially and the majority of the devices shift from State-owned to belonging to private citizens. Among state employees, expanded home access along with a higher comfort level and ease of use plus rising gas prices have all contributed to a larger pool of telecommuters. The rapid increase in the use of smartphones and tablets in general is changing the way users interact with governmental entities. New and enhanced services are needed to assist citizens in easily locating information and transacting with government more efficiently.

Another major driver is the increasing need for online data sharing with the federal government as well as with other states. Many of Maine's state agencies have federal counterparts with which they communicate. The Maine Revenue Service, for example, exchanges information daily with the Internal Revenue Service. When Maine State or local law enforcement stops an out-of-state driver, the officer accesses the National Law Enforcement Telecommunications System (NLETS) and the National Crime Information Center (NCIC) to check the validity of the driver's

⁶⁴ <http://www.maine.gov/portal/>

⁶⁵ 2011 InforME Annual Report and 2012 InforME Annual Report.
<http://www.maine.gov/informe/board/annualreports.htm>

operating license and to research any outstanding warrants or missing person notices. The State is currently making preparations to support the federal requirements established by the Patient Protection and Affordable Care Act (PPACA) for sharing of health insurance data. Under this legislation, health insurance information exchanges are scheduled to come online this fall.

A third major driver is the movement toward advanced public safety communications. With the transition to NG911, calls will come to public safety and first responders not only through phones but also by instant messaging and other types of communications. Future bandwidth demands will be further impacted by the implementation of FirstNet's public safety broadband network.

FirstNet, an agency created within the NTIA to ensure the establishment of the first nationwide interoperable public safety network, recently awarded Maine's Emergency Management Agency (MEMA), in coordination with Maine's OIT, a million dollar grant for planning the implementation of the public safety network in Maine. The project, which totals approximately \$1.3 million with state matching funds, is part of the State and Local Implementation Grant Program (SLIGP). The first phase consists of outreach, education, and data collection activities while the second phase includes a needs assessment and requirements definition along with an assessment of existing infrastructure assets. The State will use the grant funding to disseminate information on FirstNet, gather stakeholder input, and establish guidelines for system governance and processes.

Using state input through the SLIGP projects, FirstNet will then define the buildout in each state. While these implementation details are yet to be determined, FirstNet is currently evaluating a contiguous LTE-based mobile wireless wide area network (WAN) as well as a radio area network (RAN). In its implementation proposals, FirstNet will leverage commercial infrastructure in the rollout of the public safety network.⁶⁶ The expected upgrades to and expansion of existing commercial networks will present opportunities for the ConnectME Authority to collaborate with industry stakeholders and foster the development of public-private partnerships.

Barriers. Geography and funding continue to be the two greatest barriers to expanding access and increasing network capacities among state agencies.

⁶⁶ <http://www.maine.gov/connectme/about/meetings/docs/PSBNPresentation%2010-3-12.pdf>