Broadband Infrastructure in Michigan

Update to First Working Report on the State of Broadband in Michigan

CONNECT Michigan®

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1. Introduction

This updated assessment of the broadband market in Michigan is conducted by Connect Michigan in partnership with the Michigan Public Service Commission and the Michigan Collaborative Broadband Committee, as part of the State Broadband Data and Development grant program (SBDD), funded by the National Telecommunications and Information Administration (NTIA).[1,2]

As part of the SBDD grant program, in May of 2010, Connect Michigan produced an initial map of broadband availability to identify served and unserved areas across the state. Since the initial map's release, Connect Michigan has collected and released new data every six months, with updates in October 2010 and April 2011.

This update of broadband availability estimates in the state analyzes broadband availability in Michigan, current as of April 2011, and updates similar broadband data collected in October 2010 and presented as part of an initial working report released in June 2011, which can be found here: http://www.connectmi.org/_documents/MI_Planning_Report_web_w_Appendix_A1.pdf.

As mentioned in the June 2011 report, a statewide, JPEG format map showing broadband availability across Michigan is available at: ftp://ftp.connectmi.org/CMIPublic/Connect_Michigan_Mapping/Statewide_Maps/MI_Statewide_Broadband_Official.pdf.

An interactive version is available at: http://www.connectmi.org/mapping/_interactive_map_interface/?q=map.

In addition, the broadband availability data collected by Connect Michigan in their raw format has been sent on a semi-annual basis to the NTIA to be used in the National Broadband Map, and comprises the source of Michigan's broadband availability estimates reported by the NTIA and the FCC in the National Map. The National Broadband Map can be found here: www.broadbandmap.gov, and the Map's specific page for Michigan can be found here: http://www.broadbandmap.gov/summarize/state/michigan.

Connect Michigan's initial residential technology assessment was analyzed and released as part of the program's June 2011 working report, and can be found here: http://www.connectmi.org/_documents/MI_RES_FINAL.pdf.

Connect Michigan's business technology assessment was released during the spring of 2011 and can be found here: http://www.connectmi.org/_documents/MI_BTA_FINAL.pdf.

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1   Broadband Data Improvement Act, P.L. 110-385, ("BDIA").
2   State Broadband Data and Development grant program Notice of Funding Availability, NTIA, U.S. Department of Commerce, July 9, 2009. ("SBDD NOFA"). Available at http://www.ntia.doc.gov/frnotices/2009/FR_BBNOFA_090709.pdf.

2. Connect Michigan Broadband Inventory and Analysis – Spring 2011

2.1 Broadband Availability in Michigan: Statewide Assessment

2.1.1 Fixed Broadband Inventory

This section provides the statewide assessment of the availability of broadband speeds and platforms in Michigan. However, as discussed in more detail below, at a more granular level the picture in Michigan can change, and statewide figures can present a distorted view.

Table 1 reports updated summary statistics of the estimated fixed, terrestrial broadband availability inventory across the state of Michigan. The table presents the number and percentage of unserved and served households by fixed broadband by speed tiers.[3,4] Table 1 is based on data from all terrestrial, non-mobile platforms, including cable, DSL, fiber, and fixed wireless. Table 1 excludes mobile and satellite service territory. Table 2, in Section 2.1.2, presents served and unserved household data by all terrestrial broadband platforms, including mobile.

Table 1 – Estimate of Broadband Service Availability in the State of Michigan – By Speed Tier Among Fixed Platforms			
SBDD Download Speed Tiers	Unserved Households	Served Households	Percent Households By Speed Tier
At Least 768 Kbps	87,786	3,697,875	97.68%
At Least 1.5 Mbps	125,453	3,660,208	96.69%
At Least 3 Mbps	188,145	3,597,516	95.03%
At Least 6 Mbps	242,577	3,543,084	93.59%
At Least 10 Mbps	319,598	3,466,063	91.56%
At Least 25 Mbps	2,375,555	1,410,106	37.25%
At Least 50 Mbps	2,962,767	822,894	21.74%
At least 100 Mbps	3,785,661	0	0.0%
At Least 1 Gbps	3,785,661	0	0.0%

Source: Connect Michigan, April 2011.

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3   Speed tiers are based on the tiers defined by the NTIA in the SBDD NOFA, Technical Appendix.

4   "*Unserved area* means a proposed funded service area, composed of one or more contiguous Census Blocks, where at least 90 percent of households in the proposed funded service area lack access to facilities-based, terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband above). A household has access to broadband service if the household can readily subscribe to that service upon request."
SBDD NOFA Section III Page 32549.

The total number of households in Michigan in 2000 was 3,785,661 for a total population of 9.9 million people.[5,6] Table 1 indicates that 97.68% of households are able to connect to broadband at download speeds of at least 768 Kbps. [7,8] This implies that the number of households originally estimated by Connect Michigan to be unserved has dropped from 121,701 households to 87,786 households (or 2.32% of total households), a drop of over 27 percentage points.[9] Further, approximately 3,597,516 households across Michigan have broadband available of at least 3 Mbps download speeds. The percentage of Michigan households having fixed broadband access available of at least 6 Mbps download speeds is estimated at 93.59%.

Furthermore, more current data collected by Connect Michigan since the fall of 2010 indicates a significant increase in the percentage of households that are able to access broadband at speeds of 25 Mbps or greater. In Connect Michigan's June 2011 working report, broadband of speeds at least 25 Mbps or greater was available to only 11.4% of households in the state, whereas estimates today indicate that 37.25% of households are able to access broadband at those speeds. Similarly, using data collected in the fall of 2010, only an estimated 4.32% of Michigan households had access to broadband at speeds of at least 50 Mbps download or greater, and today Connect Michigan estimates that 21.74% of households can access broadband at those speeds.

The number of households that are underserved (able to subscribe to broadband at speeds of at least 768 Kbps download but unable to subscribe to broadband at speeds of at least 3 Mbps download or greater) has also fallen, from 118,836 (or 3.14% of households) to 99,301 (or 2.62% of households).[10]

Taking into account both fixed and mobile broadband service platforms, an estimated 99.78% of Michigan households have broadband available from at least one provider at download speeds of 768 Kbps or higher. This implies that 0.22% of households remain unserved by a terrestrial broadband connection (including mobile).[11] Statewide mobile broadband availability is discussed in greater detail in Section 2.1.4.

As differences in broadband availability estimates between the fall of 2010 and the spring of 2011 show, additional participating broadband providers can have a large impact upon Michigan broadband mapping inventory updates. Further, the measured broadband inventory provides an estimate of the true extent of broadband coverage across the state. There is a degree of measurement error inherent in this exercise, which needs to be taken into consideration when analyzing the data. This measurement error will decrease as local, state, and federal stakeholders, identify areas where the displayed coverage is underestimated or overestimated. Connect Michigan welcomes such feedback to be analyzed in collaboration with broadband providers to correct errors identified in the maps.[12] The following section summarizes results from these mapping efforts focusing at the state and county levels.

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5   National Census, 2000, U.S. Census Bureau.

6   2010 Census data was not available in Census Block level format at the time of this report's writing. Connect Michigan anticipates that 2010 Census data will impact broadband availability percentages and intends to supplant the current 2000 Census data for 2010 Census data as soon as the latter become available.

7   Broadband is defined according to the current NTIA definition of at least 768 Kbps download and 200 Kbps upload speeds.

8   Broadband data collected from 108 Michigan broadband providers.

9   While the NTIA definition of "unserved" and "underserved" areas encompasses all broadband platforms, including mobile wireless networks, Table 1 focuses only on fixed, terrestrial broadband infrastructure. The table availability via hyperlink in Section 2.2.3 includes data across all terrestrial platforms.

10 Connect Michigan collected data from providers in order to estimate the statewide broadband inventory using the NTIA speed tiers defined in the SBDD NOFA. There is no speed tier in this classification that corresponds directly to the floor target selected by the National Broadband Plan, of 4 Mbps actual download speeds and 1 Mbps actual upload speed. The closest feasible comparison, therefore, is the NTIA defined tier of at least 3 Mbps to 6 Mbps download speeds.

11 Note that this measure of broadband availability is based on households passed, not geography served. Further, consumers may experience lower availability of mobile broadband service since typically each consumer has access to only one mobile broadband provider. Hence, existence of mobile broadband service by one provider does not necessarily imply that all mobile subscribers have access at that location. Only subscribers to the mobile services available within that location will experience reception.

12 Questions regarding the maps and data collection can be directed to maps@connectmi.org.

2.1.2 Broadband Availability by Technology Platform

Table 2 below reports broadband availability by technology platform. There are 8 mobile broadband providers serving an estimated 3,755,621 households, or 99.21%. There are a total of 23 cable providers reflected on the map, serving 89.81% of the state's households. Fixed wireless broadband is available from a reported 41 fixed wireless providers, supplying service to 31.54% of households across the state. There are 33 Digital Subscriber Line (DSL) broadband providers in Michigan who collectively provide service to 87.32% of Michigan households. Finally, 11 broadband providers offer fiber-to-the-home (FTTH) to 24,245 (or 0.64% of) households across the state. Fiber coverage is limited to just 13 Michigan counties.[13]

Table 2 – Availability Estimate by Broadband Platform in the State of Michigan			
Platform Type	**Served Households**	**Percent of Households Served**	**Number of Providers - By Platform**
Cable	3,399,847	89.81%	23
DSL	3,305,553	87.32%	33
Fiber	24,245	0.64%	11
Fixed Wireless	1,194,141	31.54%	41
Mobile	3,755,621	99.21%	8
Total – All Platform Except Mobile	3,697,875	97.68%	108

Source: Connect Michigan, April 2011.

2.1.3 Household Density Across Unserved, Underserved, and Served Areas

Given the direct correlation between density of population and the cost of providing broadband infrastructure outlined in Connect Michigan's initial planning report, this factor should play a significant role in explaining infrastructure investment across Michigan. The average density or number of households, per square mile, across Michigan is 65.20, varying greatly by county (see county-level analysis in Section 2.2).[14] Table 3 presents average household density by Census Block in areas that the broadband inventory measures as unserved, underserved, and served, based on NTIA definitions.

Consistent with expectations, the data continue to show correlation between density of households and infrastructure build-out across Michigan. The revised calculation of the average density of households per Census Block, considering only Census Blocks with population, is 7.37, down from the previous estimate of 8.95. The average population density in Census Blocks where service is offered with download speeds of 3Mpbs or more is estimated at the much higher 145.3.

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13 http://www.connectmi.org/research/_CountyLevelEstimatedAvailabilityByBroadbandTechnology.php
14 U.S. Census, 2000, U.S. Census Bureau. Household density is defined as number of households per square mile of land area.

Table 3 – Average Number of Households Per Square Mile Across Census Blocks with Fixed, Terrestrial Broadband Available		
By Download Speeds	**All Census Blocks**	**Census Blocks with Households**
Below 768 Kbps - "Unserved"	1.83	7.37
Between 768-3000 Kbps - "Underserved"	8.65	7.37
At Least 768 Kbps	95.55	109.61
At Least 3 Mbps	132.55	145.3

Note: Data does not include mobile or satellite broadband.
Source: Connect Michigan, April 2011.

Table 4 reports broadband availability in Michigan across areas defined as "rural" by the NTIA SBDD definition standards.[15] According to this definition approximately 1,797,196 households across Michigan are classified as rural (or 47.47% of total households). Of this, 95.29% are served by at least one terrestrial, non-mobile broadband provider with at least 768 Kbps download and 200 Kbps upload speeds. There remain 84,588 rural households that are unserved by any type of terrestrial broadband. Therefore, the overwhelming majority of unserved Michigan households that remain are in rural areas.

Table 4 – Rural Availability Estimate of Broadband Service of at Least 768 Kbps Download/200 Kbps Upload			
Platform Type	**Total Rural Households**	**Unserved Rural Households**	**Percent of Rural Households Served**
Fixed Broadband (Excluding Mobile)	1,797,196	84,588	95.29%
All Terrestrial Platforms (Including Mobile)	1,797,196	8,146	99.55%

Source: Connect Michigan, April 2011.

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15 "Rural Area. Any area, as confirmed by the latest decennial census of the Bureau of the Census, which is not located within: (i) a city, town, or incorporated area that has a population of greater than 20,000 inhabitants; or (ii) an urbanized area contiguous and adjacent to a city or town that has a population of greater than 50,000 inhabitants. For purposes of the definition of rural area, an urbanized area means a densely populated territory as defined in the latest decennial census of the U.S. Census Bureau."
SBDD NOFA Section III Page 32549.
This analysis includes only Census Blocks that following this definition are completely rural, and not any Census Blocks that fell within both rural and non-rural.

2.1.4 All Terrestrial Broadband Inventory – Including Mobile Wireless Networks

Table 5 represents data of availability of broadband across Michigan including all types of terrestrial platforms, including mobile broadband. In April 2011, there were a total of 8 facilities-based mobile broadband providers in Michigan providing data, collectively serving an estimated 99.21% of all households.[16,17]

Table 5 – Estimate Of Broadband Service Availability in the State of Michigan - By Speed Tier - All Terrestrial Platforms (Including Mobile)			
SBDD Download Speed Tiers	Unserved Households	Served Household	Percent Households by Tier
At Least 768 Kbps	8,197	3,777,464	99.78%
At Least 1.5 Mbps	14,615	3,771,046	99.61%
At Least 3 Mbps	29,074	3,756,587	99.23%

Source: Connect Michigan, April 2011.

2.2 Broadband in Michigan Counties

Section 2.2 provides links to tables and maps showing estimated broadband inventory across all Michigan counties. The data reveals that the large variances in measured broadband inventory across counties measured in 2010 have narrowed somewhat, although the large differences between county population and household density remain, highlighting the importance of granular data in order to identify gaps in infrastructure and adoption at the community level. Such information is essential to develop pragmatic policy solutions tailored to the challenges facing each community.

2.2.1 Terrestrial, Fixed Broadband Availability by County

To find maps presenting the estimated number and percentage of households served by terrestrial, non-mobile broadband at speeds of 768 Kbps download/200 Kbps upload and above, as well as 3 Mbps download speeds or more, and including household density by county and an indication of whether the county is urban or rural, follow these links on the Connect Michigan website:

Estimated Availability by County at 768 Kbps download/200 Kbps upload speeds - http://www.connectmi.org/_documents/MI_Availability_768Download_RuralCounties_040111.pdf

Estimated Availability by County at 3 Mbps download speeds - http://www.connectmi.org/_documents/MI_Availability_3MegDownload_RuralCounties_040111.pdf [18]

These data report greater variation of infrastructure build-out at different speed tiers across counties than at the statewide level. The data collected during the spring of 2011 reports higher broadband availability in several coun-

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16 Connect Michigan, spring 2011.

17 Note that this measure of broadband availability is based on households passed, not geography served. Further, consumers may experience lower availability of mobile broadband service since typically each consumer has access to only one mobile broadband provider. Hence, existence of mobile broadband service by one provider does not necessary imply that all mobile subscribers have access at that location. Only subscribers to the mobile services available within that location will experience reception.

18 Based on NTIA definitions, broadband is defined as 768 Kbps download and 200 Kbps upload speeds or more. Areas with service below these speeds are deemed "unserved." Areas where broadband is available at speeds between 768 Kbps download and 200 Kbps upload and 3 Mbps are defined as "underserved." Areas where broadband is available at 3 Mbps or above are defined as "served." SBDD NOFA. Technical Appendix Page 32557.

ties than what was reported in the spring of 2010, however, reflecting:

- The addition of data from providers that are new participants in the Connect Michigan program;
- Updates to existing provider datasets;
- And/or broadband infrastructure investments, additions, and upgrades.

To access this data in table format, follow this link to the Connect Michigan website: http://www.connectmi.org/research/_EstimatedAvailabilityByCounty.php.

Further, detailed information on the estimated inventory of broadband in each county can be found on the Connect Michigan website at http://www.connectmi.org/mapping/county_maps/.

For more granular information regarding the estimated broadband inventory see the Michigan online broadband inventory map at http://www.connectmi.org/mapping/_interactive_map_interface/?q=map.

2.2.2 Michigan's Underserved Households Across Counties

Michigan does not have a high percentage of underserved households - 99,301 households (or 2.62 %) are able to subscribe to broadband via fixed, terrestrial provider at speeds of at least 768 Kbps download/200 Kbps upload but are not able to subscribe to broadband at speeds of at least 3 Mbps download.[19] To find a map illustrating by percentage the underserved households in each county in Michigan, follow this link to the Connect Michigan website: http://www.connectmi.org/_documents/MI_Availability_ServedUnserved_Comparison_040111.pdf

2.2.3 Broadband Availability by Platform, by County

To access a table reporting measured percentages of households served by the type of platform by each county, including cable, DSL, fiber, fixed wireless, and mobile wireless technologies, follow this link to the Connect Michigan website: http://www.connectmi.org/research/_CountyLevelEstimatedAvailabilityByBroadbandTechnology.php.

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19 "*Underserved area* means a proposed funded service area, composed of one or more contiguous Census Blocks meeting certain criteria that measure the availability of broadband service and the level of advertised broadband speeds. […] Specifically, a proposed funded service area may qualify as underserved for last mile projects if at least one of the following factors is met, though the presumption will be that more than one factor is present: 1. No more than 50 percent of the households in the proposed funded service area have access to facilities-based, terrestrial broadband service at greater than the minimum broadband transmission speed (set forth in the definition of broadband above); 2. No fixed or mobile broadband service provider advertises broadband transmission speeds of at least three megabits per second ("mbps") downstream in the proposed funded service area; or 3. The rate of broadband subscribership for the proposed funded service area is 40 percent of households or less." SBDD NOFA.

Conclusion

The data presented in this update report reflects the difference simple time (for further infrastructure investment) and additional data collection efforts can make in broadband deployment and broadband availability estimates. Data collected and reflected in this report indicates much higher broadband availability in many counties of Michigan, both at higher speed tiers and by certain platforms, than the data just six months older and collected in the fall of 2010. Part of the change represents the addition of datasets by broadband providers in the state that were unable to participate in the fall of 2010.

At least some of the changes, however, might be due to the fact that Michigan's broadband landscape has seen some additional network investments that have closed the broadband availability gap for just over a quarter of Michigan's previously unserved households.

Furthermore, the differences between the data of the fall of 2010 and the spring of 2011 underscore the need for broadband mapping and data collection that is conducted on a continual basis to ensure that outdated data is not inadvertently used to arrive at false broadband policy conclusions.

They also underscore the need for a robust data validation process involving multiple methodologies to confirm on the ground the estimates these data provide. To date, in addition to confirmation of service areas by each participating provider, Connect Michigan has conducted field validation efforts for change to 75 (or 55.56% of) participating providers.

To find a list of participating and non-participating providers in the Connect Michigan data collection process, follow this link to the Connect Michigan website: http://connectmi.org/research/_Participating_Non-Participating_ Providers.php.

This report will be updated on a regular basis.