Broadband Activities in the Commonwealth

An Annual Status Report

Presented to:

Governor Robert F. McDonnell,

The General Assembly of Virginia, and the

Joint Commission on Technology and Science

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Legislative Mandate

§ 2.2-225 (Secretary of Technology) – Monitor the trends in the availability and deployment of an access to broadband communications services, which include, but are not limited to, competitively priced, high-speed data services and internet access services of general application, throughout the Commonwealth and advancements in communications technology for deployment potential. The Secretary shall report annually by December 1 to the Governor and General Assembly on those trends.

§ 2.2-2699.4. (Broadband Advisory Council) The Council shall have duty to annually report to the Governor and the Joint Commission on Technology and Science on the progress towards the goal of universal access for businesses and on the assessment of Commonwealth broadband infrastructure investments and utilization of Council-supported resources to promote broadband access.

Executive Summary

The Commonwealth of Virginia released a detailed broadband availability map in July 2011. A new interactive health information technology (IT) map was released in the fall, as well as maps displaying e-commerce activities around the state. National Telecommunications and Information Administration's grants are being used to improve the broadband infrastructure in underserved communities in the Appalachian region and Eastern Virginia.

Despite these successes, we have not reached our goal of providing affordable, high-speed internet access to all Virginians. It is essential for people in the Commonwealth to have access to reliable broadband services to participate in distance learning, teleworking, telemedicine and other activities that will revolutionize the way people are educated, work, and receive healthcare. Broadband ensures that all citizens will have the opportunity to participate in the global economy.

The Commonwealth of Virginia and its partners are committed to bring affordable broadband to all Virginians. The report highlights the initiatives and activities that have occurred in the past year.

Broadband Advisory Council

The Broadband Advisory Council was established to help determine the Commonwealth's goals for broadband and how best to achieve them. The council was created from a recommendation from the Broadband Roundtable (established by Governor Kaine in 2007) to accelerate the deployment of affordable broadband connectivity. The council was codified during the 2009 legislative session (HB2423).

The council is comprised of eleven members: four legislators, two ex-officio members, five citizen members, the Secretary of Technology, and the Secretary of Commerce and Trade. The council members are:

Delegate Kathy Byron
Delegate Bud Phillips
Delegate Joe May
Senator Phillip Puckett
Secretary Jim Duffey
Secretary Jim Cheng
Ray LaMura, President of the Virginia Telecommunications Association
R. Bryan David, Executive Director of Virginia's Region 2000 Partnership
Gary P. Schwartz, Director of Telecommunications for the Rappahannock Electric Cooperative
Duront Walton, Executive Director of the Virginia Telecommunications Industry Association
Sandie Terry, Information Technology (IT) Director in Franklin County, Virginia

Staff: Caroline Stolle (Center for Innovative Technology) and Karen Jackson, Deputy Secretary of Technology

The Broadband Advisory Council met on May 11, 2011in Blacksburg, Virginia. Liz Povar, Director of Business Development at the Virginia Economic Development Partnership spoke about the organization's use of broadband technologies in economic development. Virginia Information Technology Agency and Virginia Tech presented the new broadband availability map and spoke about the organization's role in its creation. Karen Jackson updated the council on the state's telework centers.

The Council held another meeting on October 27, 2011 in Richmond, Virginia. Derek Murphy from Strategic Networks Group (SNG) presented on e-commerce benchmarking activities in the Commonwealth, while Kirby Farrell and Andy Archer from Broad Axe Technology Partners updated the Council on the results of the 2010 Health Information Technology (IT) assessment and the status of the current assessment. Jean Plymale, Seth Perry and Peter Sforza from Accelerate Virginia updated the council on the speed test campaign. The meeting closed with Delegate May being nominated as Vice Chairperson.

Virginia Activities and Standings

Business – The data from the e-commerce survey, conducted by SNG and CIT was used to create an e-commerce/broadband map. More details will be given later in the report. SNG created a dashboard with the data which makes it easier to separate the results based on the regions in Virginia. CIT is identifying key economic development groups in the state that the data can best serve.

Education – On July 14, 2011, Secretary of Technology Jim Duffey and then Secretary of Education Gerald Robinson announced a new round of Internet speed tests for K-12 schools in the Commonwealth. The eCorridors program at Virginia Tech developed the test. The information collected will be used to determine connectivity and identify sites that need additional resources. Plans are now being made to move beyond K-12 schools and begin speed tests for community colleges and other educational institutions in the Commonwealth.

Library Speed Test – The eCorridors program at Virginia Tech conducted speed tests for public libraries across the state. In 2011, 191 libraries took the test. That was approximately 51.90% of the libraries in the state. The average download and upload speed was 0.01 megabits per second (mbps). For more information on the speed test results, visit the following website: http://www.ecorridors.vt.edu/maps/libbroadband/summary.php.

Healthcare – The Commonwealth's first interactive health information technology (IT) and e-commerce maps were developed and released in October 2011. More information on this map will be given later in the report.

Reports –

The National Telecommunications and Information Administration (NTIA) released *Exploring the Digital Nation- Computer and Internet Use at Home* on November 9, 2011. The report examines internet usage across the United States and reported the following:

- 69.5% of Virginia households have adopted broadband, which is slightly higher than the national average of 68%.
- 72.9% of households in urban areas use broadband compared to only 48.5% of households in rural areas of the Commonwealth. [1]

The report can be read by visiting the following website:
http://www.ntia.doc.gov/report/2011/exploring-digital-nation-computer-and-internet-use-home

[1] See:
http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf

Chmura Economics and Analytics published a report in November 2011 about the economic impact of broadband in Virginia. This report was a collaboration between Chmura and the Thomas Jefferson Institute for Public Policy. The report found the following:

- Virginia is doing "very well" in the provision of basic coverage. 89% percent of the state had access to fixed-line and mobile broadband.
- Virginia could gain close to 13,000 jobs and retain 50,000 jobs due to broadband expansion in the next five years.
- Additional tax revenue estimates due to broadband expansion have ranged from $73 to $110 million.

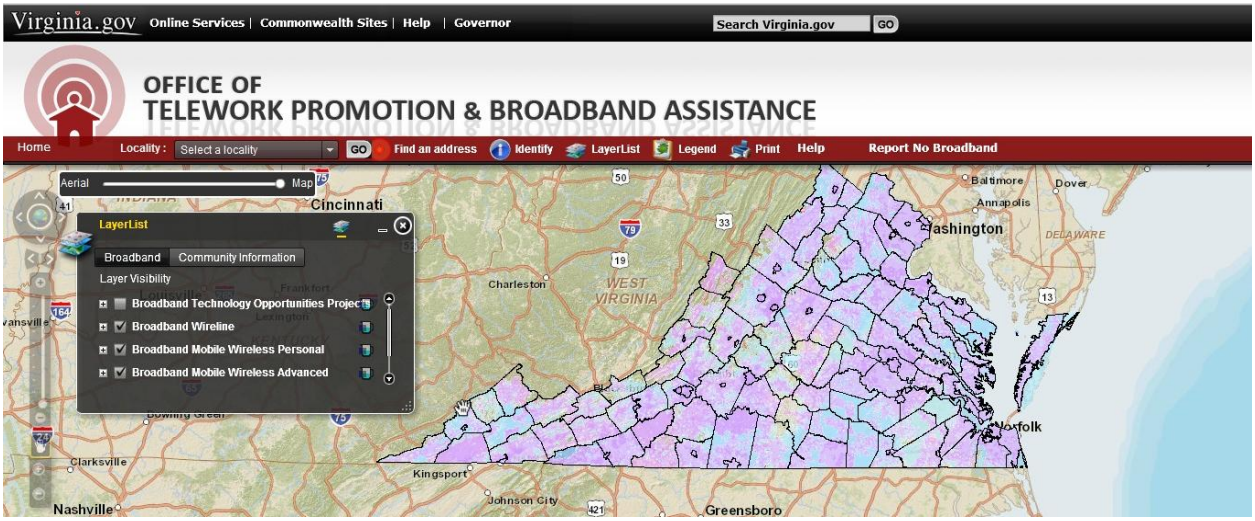
To read the report visit to the following link:
http://www.chmuraecon.com/pdfs/Connecting%20Virginia.pdf.

Virginia Mapping and Planning Program

Mapping

In July 2011, the Commonwealth of Virginia released a second edition of its broadband availability map. The creation of the map was a collaborative effort between the Center for Innovative Technology (CIT),the Virginia Information Technology Agency (VITA)'s Virginia Geographic Information Network (VGIN), and Virginia Tech's eCorridors program. Unlike the previous version of the map, it allows users to search by address and view a list of providers available in that particular location. A link to the map can be found on the Office of Telework Promotion and Broadband Assistance's website: http://mapping.vita.virginia.gov/broadband/. Below is a screenshot of the new map:

Figure 1: Screenshot of Virginia Broadband Availability Map



E-Commerce Maps

In March 2010, the state of Virginia contracted with Strategic Network Groups (SNG) to collect data on e-commerce activities and broadband availability in the Commonwealth. With results from 2,014 businesses and organizations and 738 households, SNG was able to collect information on access technology, speed of service, cost, satisfaction with services, and other pertinent pieces of information on broadband availability in the Commonwealth. SNG also collected data on how businesses, organizations and households use high-speed internet access.

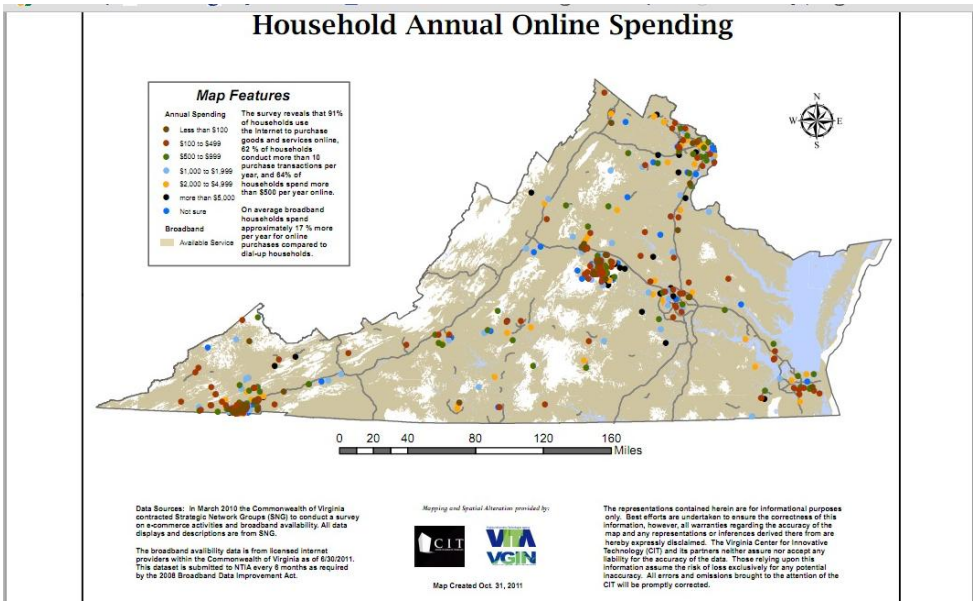
Due to the complexity and amount of data collected by SNG, the information was condensed into six maps. Posted as PDF files on the website of the Office of Telework Promotion and Broadband Assistance, each of the maps display the following information:

- E-commerce uses by businesses and organizations
- E-process uses by businesses and organizations
- Whether households used the internet for online transactions
- Annual online spending by households
- Households participating in telework
- Households with home-based businesses

The maps allow users to visualize how broadband technologies are used across the Commonwealth and what impact broadband availability has on the use of these particular technologies. You can find PDFs of the maps at the following website:

http://www.wired.virginia.gov/broadband_ecommerce.shtml.

Figure 2: Example of E-commerce Map



A screenshot of the new maps can be found on this page.

Health Information Technology Map

The Commonwealth of Virginia developed an interactive health IT map with the same functionality as the broadband availability map. The map is based on data collected from Broad Axe's 2010 assessment of health care institutions in the Commonwealth. The health IT data is displayed on one interactive map. Each layer offers the user the following information:

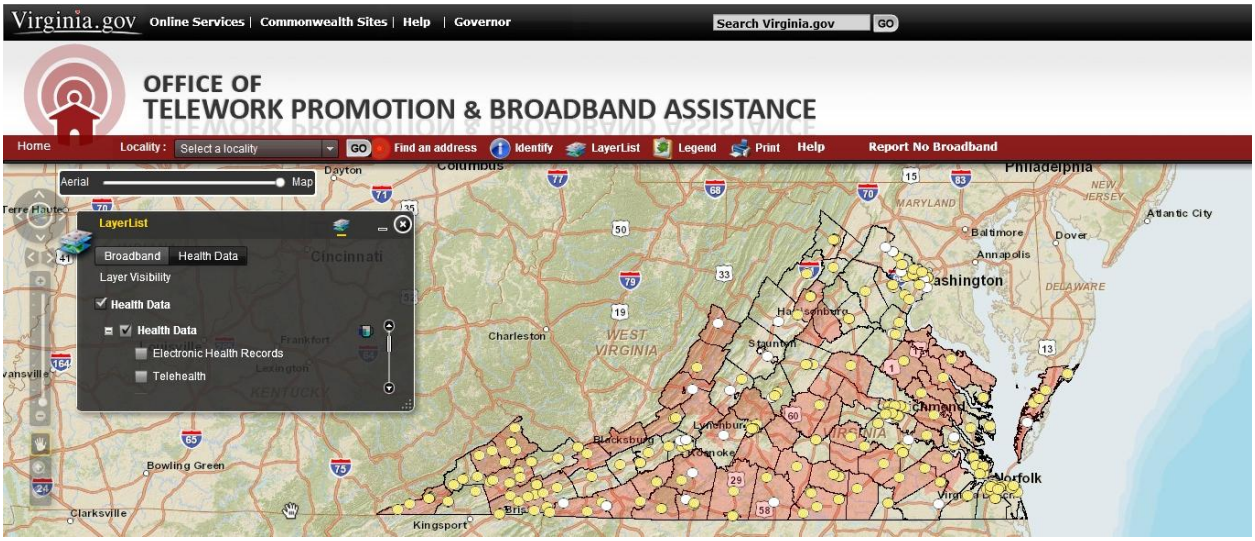
- A map of broadband availability in the Commonwealth.
- All health facilities in the Commonwealth.
- Health professional shortage areas based on data from the federal government.
- Type of broadband service used.

- Identifies which facilities utilize electronic health records.
- Identifies which facilities utilize telemedicine.
- Focuses on the health information exchange.

The map examines how hospitals and other institutions around the Commonwealth use healthcare technologies. The map allows the user to see the relationship between the availability of broadband and the health information technologies. To view the health IT map, visit: http://mapping.vita.virginia.gov/healthbroadband/.

A screenshot of the new map can be found below.

Figure 3: Screenshot of Health IT map



Additional Broadband Activities

Capacity Building

In September 2011, Broad Axe Technology Partners released the 2011 version of its healthcare broadband assessment. Like the previous assessment, it will examine the relationship between broadband connectivity and health information technologies used by healthcare facilities. The information collected from the survey will be used to update the current health IT map and assist the Commonwealth in assessing gaps in coverage to support health IT initiatives.

SNG developed an interactive dashboard to display the 2010 e-solutions data. Users of the dashboard have the ability to view region and county-level data. In December 2011, SNG released the eStrategy Report describing how businesses, organizations, and households use the Internet and strategies to address any gaps. Key community economic development organizations are being identified to discover ways this data could best be utilized to spur economic development in the Commonwealth.

Technical Assistance (Broadband Awareness and Adoption)

The technical assistance project will begin in January 2012. SNG will develop a Broadband Awareness and Adoption Plan which will outline potential demand for broadband in "unserved" and "underserved" areas. SNG will then work with broadband providers on approaches that provide new investments in broadband infrastructure.

Broad Axe will research existing broadband/digital literacy training programs in the Commonwealth in order to develop an inventory of resources.

Based on the Broadband Awareness and Adoption Plan and the inventory of resources, CIT will develop and conduct six workshops that will provide education and outreach regarding programs, mapping, and digital literacy training opportunities.

BARC Electric Cooperative Project

Located in Millboro, Virginia, the BARC Electric Cooperative serves over 12,500 customers in Rockbridge, Alleghany, Highland and Augusta counties. The cooperative is interested in bringing Smart Grid technologies to its users. Smart Grids electronically gathers, processes, and sends information on energy to promote the efficient use of energy and save money. The cooperative is also interested in providing their customers with prepaid metering and home energy management solutions.

To implement these technologies, users must have access to high-speed Internet. BARC partnered with Virginia Tech's eCorridors program to conduct speed tests. These speed tests will collect information on the download and upload of their customers. It will eventually be used to

determine if the area has the broadband infrastructure to offer smart grid technologies. BARC customers will be encouraged to conduct the speed tests in BARC's January 2012 newsletter.

Accelerate Virginia

Adding Value to the Virginia Broadband Mapping Initiative

As a partner in the Virginia broadband mapping initiative, Virginia Tech's eCorridors program, through the University's Center for Geospatial Information Technology, is responsible for collecting and analyzing data on the quality of residential Internet connections in Virginia. In October 2010, eCorridors launched a new statewide effort – called *Accelerate Virginia* - to engage and educate the public and raise awareness about the current status of broadband availability throughout the Commonwealth.

Accelerate Virginia is an enhanced version of the original eCorridors Community Broadband Access map, which was developed in 2006. *Accelerate Virginia* consists of a new web portal (www.acceleratevirginia.org), which features an enhanced Internet speed testing application designed to aggregate Internet service details such as connection speed, availability, affordability, and quality of service.

To promote this initiative, *Accelerate Virginia* conducts targeted outreach campaigns - coordinating efforts in small geographic regions, such as counties. *Accelerate Virginia* engages regional leaders, requesting their support in promoting this effort to accurately map current broadband availability across the state. We ask county officials to request citizens to participate by running an *Accelerate Virgini*a Internet speed test using their home Internet connection.

By participating in regional speed testing campaigns, end-users receive real-time information about the quality of their Internet connection, a summary of what others in the locality are reporting, on average, including provider names, connection types, speed averages and satisfaction ratings, and a table of typical online applications supported by the end-user's measured download speed.[2]

These service details are important for consumers, helping them to make informed choices regarding Internet services available in their communities, and driving demand for improved broadband services. Consumers also gain awareness of the connection speeds needed to access the content and services they need or want.

Counties benefit from initiating campaigns, by gaining access to verifiable data on Internet connectivity in their area. *Accelerate Virginia* provides each participating county an analysis of the data generated through the campaign. The state also benefits, by collecting data that they can use to verify provider coverage claims, and cross-reference the state broadband map.

Accelerate Virginia enhances the effectiveness of the Virginia broadband mapping initiative, serving as a conduit for user feedback regarding Internet connectivity throughout the state. Stakeholders who become aware of an *Accelerate Virginia* campaign in their locality often call or email the eCorridors office to report a lack of broadband service in their area (whether real or perceived). In response, Jean Plymale consults the Virginia broadband map and informs the user of the providers who claim to offer service to the users address, along with a link to the Virginia

[2] See: http://www.ecorridors.vt.edu/maps/broadbandmap/includes/printableresults.php?id=6881

broadband map. When the available information is found to be in error, Jean notifies the state for future validation purposes. Through *Accelerate Virginia*, the public learns about the statewide broadband mapping initiative, increasing awareness, utilization, and the accuracy of the Virginia broadband map.

Since October 2010, *Accelerate Virginia* has formally engaged eighteen (18) counties and collected over 5600 new data points. Counties that have launched *Accelerate Virginia* campaigns include Appomattox, Bland, Campbell, Charles City, Charlotte, Culpeper, Cumberland, Fauquier, Franklin, Frederick, Goochland, Madison, Nelson, Pittsylvania, Powhatan, Rappahannock, Rockingham, and Stafford.

The goal of *Accelerate Virginia* is to collect a sufficient amount of data from all counties to enable analysis of the patterns of Internet use and performance across the Commonwealth. If sufficient end-user data is collected and combined with other data sources, Virginia will gain a better understanding of the availability and quality of broadband services in Virginia. The *Accelerate Virginia* project is highly complementary to Virginia's NTIA-funded broadband mapping program (SBDD). Virginia's SBDD program focuses on the advertised service areas and speeds of ISPs, capturing the "supply side" of Internet availability – the *Accelerate Virginia* program aims to measure Internet speeds realized by individual Internet subscribers, thereby illuminating the "demand side".

In addition to serving as a data collection point for analysis of broadband in Virginia, *Accelerate Virginia* performs a useful education role. By engaging the public in measuring and benchmarking their connection's performance, *Accelerate Virginia* helps citizens become more aware of the significant variability that exists among commodity Internet connections which can vary by distance, providers, pricing plans, connection types, and even time of day. The result is a better sense of how the Internet can enable productive applications to be leveraged in the home or business.

Many thanks for the information you've shared and for your quick response…this is perhaps the first automated v-mail I've received that I was glad to get! Many thanks to you, the State, and Fauquier County for pursuing this valuable initiative.

- Troy E. Cowan, Principal, Vision Based Consulting, LLC

Virginia Tech is also engaged in a similar effort to measure Internet performance at Community Anchor Institutions – the schools, libraries, and other facilities with Internet requirements that differ from those of small business and residential user. Community anchor institutions require greater capacity and performance from their Internet connections. Virginia Tech has developed custom web-based speed testing and mapping applications tailored for each type of community anchor institution, and has led campaigns to test (and re-test) these institutions' Internet speeds. This effort was launched in 2009, and continues through the present day. By establishing a time series of data, year-over-year comparisons can be made against a baseline, and increases or decreases in measured performance can be monitored at the level of the institution, district, or region.

Fifty-three percent of the 2366 K-12 schools in Virginia tested their speed in 2009; to date, 19% have re-tested in 2011. One hundred percent of the 368 Libraries across Virginia tested their speed in 2009, and to date, 51% have re-tested in 2011.

From this sample, we have observed that the statewide average across all schools and libraries tested so far reveals a significant increase in download speeds over the 2009-2011 interval, but the gains are not evenly distributed across counties. A fuller analysis is pending, as more data points are collected.

For 2011, Virginia Tech has expanded its Community Anchor Institution Internet performance benchmarking efforts to include Virginia's Cooperative Extension offices, and is in the process of developing a campaign to test Internet speeds at Community Colleges. Once a regular pattern of repeated testing is established for these facilities, region-wide comparisons can be made at a single point in time, and multiyear comparisons can be made for the same region or location.

By delivering additional insights into the nuanced and diverse issues that surround the task of efficiently delivering Internet access to homes, businesses, and anchor institutions across Virginia, the university's efforts add considerable value to the work already completed by state government in mapping out Virginia's broadband landscape.

Broadband Infrastructure Deployment

Broadband providers from across the Commonwealth garnered approximately $155 million (total) from the Broadband Initiatives Program (BIP) and Broadband Technology Opportunities Program (BTOP) programs. Excerpts from the 2011 quarterly report outlining each organization's individual achievements can be found below:

Grantee	**Achievements Reported in 2011 Second Quarterly Report**
Bristol Utilities Board Total Awarded: $22,698,010 The Southwest Virginia Middle Mile Project will add 388 miles of fiber to its existing network, bringing serve to rural, economically depressed localities.	*"During Q2-2011, BVU Authority continued with building out routes for the project, which included construction and engineering activities, as well as receiving and deploying materials. Both engineering and construction are progressing well, with only slight lingering setbacks due to severe spring weather and materials shipment delays.* *Currently, BVU Authority and construction contractor, Edwards Telecommunications, Inc., have finished 2 routes and are working on an additional 5 routes, while engineering firm Thompson & Litton continues engineering on approximately 10 more route sections. As of the end of the quarter, approximately 70.7 miles were constructed.* *BVU and Thompson & Litton have begun working with USDA Forest Service to complete necessary work on National Forest build permits (during the growing season). This work is anticipated to be finished by the end of Q3-2011. BVU has also made some project modifications which require additional EA consult, which is underway and progressing well and will be completed early in Q3-2011."*[3]
Buggs Island Telephone Cooperative Total Awarded: $18,983,648 The BIT Wireless Broadband Initiative seeks to bring affordable broadband services to underserved communities in Virginia.	*"The April 1, 2011 to June 30, 2011 quarter project accomplishments completed during this quarter include: 1) Buggs Island Telephone Cooperative received a Finding of No Significant Impact following the submission of the Environmental Assessment; 2) Continuing biweekly calls between National Telecommunications and Information Administration and Buggs Island Telephone Cooperative; 3)Buggs Island Telephone Cooperative selected a vendor to purchase a Brocade 10 gigabit Core Ring for the core network equipment through their procurement process; 4) Buggs Island Telephone Cooperative is continuing the process of negotiating tower leases; 5)Buggs Island Telephone Cooperative made their second draw down from the grant funds to pay for engineering services provided; 6)Buggs Island Telephone Cooperative selected Airspan as the primary vendor for the WiMax Equipment to be used for the project and signed a contract for the equipment and services."*[4]

[3] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570066_ppr2011_q2.pdf
[4] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570093ppr_2011_q2.pdf

Citizens Telephone Co-Operative *Total Awarded:* $9,237,760 The New River Valley Regional Open Access Network seeks to improve the accessibility of high-speed, affordable broadband for community anchor institutions.	*"Correspondence continued through the 4th quarter with the various environmental agencies, NRVPDC, Citizens, and the NTIA Environmental Compliance Team on completing the Environmental Assessment (EA) for the 186 mile broadband project. Citizens received verbal notification on June 30, 2011 that the assessment had completed the final approval and that the FONSI would be issued in a few days. The only outstanding issue in the EA process is final response from two or three of the TPHO's. All of these agencies have been contacted by Citizens, NRVPDC, and NTIA.* *Citizens (CTC) and Thompson & Litton, Inc. (T&L) engineering staff completed field engineering design and staking on the proposed project routes on April 15, 2011. CTC and T&L decided to split the 186 mile project into 4 separate smaller construction contracts to help expedite the process and to attract a wider range of contractors. Three bid packages were sent out through the Citizens web site on April 27, 2011 for Contract I, II, and III. Contract IV will be sent out later in the fall. Bids were due on May 12, 2011 and six contractors submitted bids by the 4:00 pm deadline. CTC and T&L evaluated the bids and selected the low bidders on May 17, 2011. The winning bidders were notified by phone on May 17, 2011 of their successful bid. Notice of Award letters were sent to the winning contractors on May 27, 2011 which included authorization to the contractor to proceed with ordering fiber cable for the project. The Outside Plant Construction Contract for Contract III was signed with Lambert's Cable Splicing on June 21, 2011 and Contract II was signed with Lambert's Cable Splicing on July 5, 2011. Contract I is currently in the signing process with Nichols Construction Company.* *The Joint Permit Application (JPA) with Virginia Marine Resources Commission (VMRC), Department of Environmental Quality (DEQ), and the Army Corp of Engineers to cover stream/river and wetland crossing was approved by the three agencies. A public hearing was scheduled on Tuesday, May 24, 2011 at Newport News, Virginia for the Commission to hear final comments and continue with the final approval process. Citizens received notification that the JPA was approved in mid June and that the final permit documents will be mailed by early July for signing and fee processing. Citizens has completed specifications for the two telecommunication shelters that are proposed for the project.* *Citizens completed negotiations with VFP, Inc. to manufacture the shelters and will place purchase orders by mid July.* *The Activity Agreements with Norfolk and Southern Railroad were completed on June 1, 2011. These Agreements are for all 15 proposed railroad crossing that are required in the project.* *The Memorandum of Understanding Agreement (MOU) with the Virginia Department of Transportation (VDOT) was completed with a new amendment to cover the 186 mile proposed BTOP project. The Amendment was signed on May 14, 2011. VDOT issued the*

	Project Land Use Permit for the Salem District on May 18, 2011 and issued the Project permit for the Bristol District on June 3, 2011. *Joint use agreements and joint use make ready is on going with American Electric Power, Verizon, and City of Radford Electric. The City of Salem Electric has completed all make ready on their portion of the proposed route."*[5]
County of Rockbridge *Total Awarded:* $6,993,399 The Rockbridge Broadband Initiative seeks to construct 134 miles of new fiber in Central Virginia to improve services to community anchor institutions.	*"Project has not entered the construction period; therefore, the project activities have focused heavily on project management, route engineering, and environmental assessment work. Project management duties have included route and network design, compliance and reporting documentation, Rockbridge Area Network Authority (RANA) board meetings, development of an Operations guide, and the continued development of an interested vendor list. A GIS-based fiber-management tracking tool was built and became operational. A Request for Proposals (RFP) for the data center design/bid was issued and a contract awarded to Hoch Associates. Hoch held a program design session with project stakeholders and began design work of the site plan and building layout. Site surveying on the data center was completed. Survey work on fiber routes, including evaluating alternative routes, aerial pole conditions, and bridge/stream crossings has been completed. Route engineering continues. The environmental assessment (EA) work has continued in preparation for final submittal. An archaeological firm has reviewed the project as part of the EA requirements."*[6]

[5] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570093ppr_2011_q2.pdf
[6] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570129ppr_2011_q2.pdf

Mid-Atlantic Broadband Cooperative *Total Awarded:* $10,023,247 The Middle Mile Expansion for Eastern Virginia infrastructure development focuses on Franklin, Southampton, Isle of Wight, Surrey, and Suffolk.	*"The engineering design work is 100% completed. The final route through Franklin, VA and Suffolk, VA were determined and approved by the respective cities. This had been a hold-up for the SHPO report, the EA and the VMRC/USACE permits. The SHPO review has been started and is approximately 70% complete. The cable requirements for this project were determined and ordered this quarter.* *A portion of the transport equipment was ordered and received this quarter. An Easement agreement and a co-location agreement with the town of Surry have been finalized this quarter. Three of the four hut site have been finalized and are in the process of being approved by the proper government entities. All VDOT permits have been prepared. Eighty percent of the pole permits and make ready requests have been prepared. The RFP for construction is being prepared and the final engineering prints are being Quality Controlled. No construction has started. Most of the project activity this quarter has been in Suffolk County. An inspector was hired for this project."*[7]
Mid-Atlantic Broadband Cooperative – Southern Virginia *Total Awarded:* $16,044,290 The Middle Mile Expansion for Southern Virginia infrastructure development focuses on un-served and under-served communities in Southern Virginia.	*"The permits from VMRC were approved during this quarter. A portion of the transport equipment was ordered and received. The remaining fiber optic cable was ordered from an alternate supplier after our current supplier increased shipping intervals by five to six months. The design engineering for the Petersburg re-route is 50% complete and, for the Halifax re-route, it is 100% complete. All other design work and permitting has been completed. Co-coordinating meetings were held with the VDOT, our construction vendor, and MBC on the portion of the reroute that is on I85, I95, and I295. The SHPO review for the reroutes has been completed. The RFP for the site work and placement of the huts was issued, the bids reviewed, and a vendor selected for the work. A pre-construction meeting was held for hut construction. A milestone was celebrated this quarter with the first school, Cumberland High School (Cumberland County), receiving service. Service was also established to 3 schools in Franklin County and 3 in Lunenburg County as a result of this project. 38% or 158 miles of construction has been completed. Most of the activity this quarter has been in Franklin County, Virginia."*[8]

[7] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570087ppr_2011_q2.pdf
[8] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570019ppr_2011_q2.pdf

Nelson County of Virginia *Total Awarded:* $1,826,646 The Nelson County Virginia Broadband Project seeks to improve service in Nelson County Virginia. The project will build 31 new miles of fiber, as well as four new wireless towers.	*"FONSI received for EA. Afton and Avon tower applications submitted through FCC e106 process and approved. Review of Massies Mill tower site, costs for electric too expensive from utility, looking for additional sites. Completed agreement with VDOT for limited access ROW approval. Design complete pending VDOT approval and agreement with utility for make ready. Performed pole loading calculations using utility methodology for continued make ready discussions. Completed RFP and proposal review for construction contractor and began negotiations with top two respondents. Ordered fiber for project. Finalizing agreements with property owners for tower site lease in advance of local permitting. Entered into discussions with wholesale carrier to lease fiber or conduit access. Continued discussions with candidates for network operation."*[9]
Page County Broadband Authority *Total Awarded:* $1,648,941 The 39-mile fiber network will enhance services in the four key towns in Page County Virginia.	*"Point of presence locations and lease terms finalized, began developing final lease documents and drawings. A preliminary design was completed and make ready discussions commenced with the electric utility and local telephone company for aerial attachments. Permit applications for right of way access submitted to Virginia DOT and VA Marine Resources Commission, and railroad crossing permits submitted. The electric utility returned their make ready assessment and costs to complete the work, which was far in excess of the contractor's assessment. The contractor began a reassessment process to adjust design to bypass costs. Postponed invitations and plans for August 11, 2011 public kick off event; continued twice monthly technical meetings with contractor to review progress. Met with anchor institutions to confirm connectivity and bandwidth needs as well as fiber drop locations."*[10]
Virginia Tech Foundation, Inc. *Total Awarded:* $5,540,000 The Allegheny Fiber Project will build a 110-mile open access fiber-optic network between	*"The State Historic Preservation Officer (SHPO) consultation report was approved on 4-8-11 and the Environment Assessment (EA) was approved and the Finding of No Significant Impact (FONSI) was issued on 5-17-11. THE National Forest Service (NFS) permit has not been received, but we were assured it is being prepared. We received a partial shipment of the network transport equipment.* *All pole permits have been applied for, and responses received, however the make-ready work continues to be done by various utilities. The contracts for the site work and placement of the interconnection huts (2) was completed, the Request for Proposal (RFP) issued, and the successful bidder selected and awarded the*

[9] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570049ppr_2011_q2.pdf
[10] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570054ppr_2011_q2.pdf

Blacksburg and Bedford City.	*contract. A pre-construction meeting was held for huts construction. Outside Plant construction activities started on 5-23-11. Approximately 15 miles or 16% had been placed by the end of the quarter."* [11]

[11] See: http://www2.ntia.doc.gov/files/grantees/nt10bix5570016ppr_2011_q2.pdf

Broadband-Related Activities at the Federal Level

The National Broadband Map

In February 2011, the United States released the national broadband map. The National Telecommunications and Information Administration (NTIA) collaborated with Federal Communications Commission (FCC) and the fifty states, five territories and the District of Columbia to produce the map. [12] The map was created using a searchable database of over 20 million records and data from 1,731 broadband providers. The map is updated twice a year with data provided from the states. The last update took place in September 2011.[13] A copy of the map can be found at the following website: http://broadbandmap.gov/

Connect to Compete

Connect to Compete is a public-private initiative lead by the FCC to bring low-cost computers and high-speed Internet access and computers to low-income students and their families. The project began in November of this year. Details of the project can be found below:

- Families with a child eligible for the National School Lunch Program can get broadband service for two years for $9.95 a month (plus taxes).
- These same families can purchase a refurbished laptop or desktop for $150 (plus taxes) from Redemtech. Microsoft will begin offering computers to the same demographic computers for $250 loaded with Windows and Office. Morgan Stanley is working on a microcredit program to assist families in financing new computers.
- A number of for- and non-profit organizations have committed themselves to publicizing the efforts including the National Urban League, National Council of La Raza, the National Association for the Advancement of Colored People, and United Way Worldwide.[14]

The project was developed to meet the objectives outlined in the National Broadband Plan. More information on the project can be found at www.connect2compete.org.

[12] See: http://www.broadbandmap.gov/about
[13] See: http://www.broadbandmap.gov/blog/2664/the-national-broadband-map-gets-an-update/
[14] See: http://blog.broadband.gov/?entryId=1596428

Commonwealth Programs and Resources

The resources available to Virginians to improve broadband access in the state remain the same from the last report. They include:

- **Department of Housing and Community Development** funds to support the housing and implementation of telecommunications projects
- **Virginia Community Development Block Grant Program**'s Telecommunications Planning Grants offers up to $25,000 for system development and implementation.
- **The Department of Public Rail and Transportation's Telework!VA** offers employers in the Commonwealth up to $50,000 in tax credits to assist in the creation or expansion of a telework program.
- **The Tobacco Indemnification and Community Revitalization Fund's** Reserve Fund was utilized to provide financial resources to organizations working to improve the broadband infrastructure in Southside Virginia. One of these organizations is the Mid-Atlantic Broadband Cooperative (MBC). MBC's annual report highlights the addition of 420 new miles of open-access fiber in fifteen counties. This improved network will serve 58,000 students in 120 K-12 schools in the area. The group estimated that 99 jobs were created as well due to the group's effort.[15]

  Other grants of note approved by the Commission in 2011 for Fiscal Year 2012 include the following:

Table 1: Grants Approved by the Tobacco Commission

Organization Name	Project Title	Allocation Amount
City of Danville	Center for Applied High Performance Computing	$1,400,000 will be allocated over FY2012 and FY2013.[16]
Region 2000 Research Institute	Expansion of CAER Capability to Support Development of 4G LTE Wireless Technology	$348,000 was distributed to the Institute as a Fiscal Year 2012 Special Project Grant.[17]

[15] See: http://www.mbc-va.com/media_center/downloads/MBC_2011_Annual_Report.pdf
[16] See: http://www.tic.virginia.gov/pdfs/grantfunding/SSED/2011/FY11%202nd%20Round/SSED%20FY11%202nd%20Round%20Approvals%205-26-11.pdf
[17] See: http://www.tic.virginia.gov/pdfs/grantfunding/Special%20Projects/2012/FY12%20Special%20Projects%20Awards%209-29-11.pdf

Recent Legislation

Only one bill was passed during the 2011 legislative session that impacts broadband adoption in the Commonwealth. A brief description of the piece of legislation concerning health information technologies can be found below:

HB2292: Health records; electronic access. *Provides that health records, disclosure of which has been authorized by a patient or as otherwise allowed by state law, shall be made available electronically but only to the extent and in the manner authorized by federal law, except that a health care entity shall not be obligated to provide records in the electronic format requested if (i) the electronic format is not reasonably available without additional cost to the health care entity, (ii) the records would be subject to modification in the format requested, or (iii) the health care entity determines that the integrity of the records could be compromised in the electronic format requested.*

Appendix A:
Population Analysis of Broadband Coverage

Executive Summary

The Center for Geospatial Information Technology has performed a spatial analysis to estimate the percentage of the Virginia population falling into certain broadband internet service availability categories. They discovered 89.2% of the population lives in a geographic area with access has fixed-line or mobile broadband coverage.

79.84% of the population claims they have access to the Internet, whether in their home or elsewhere, ranking the state 31st in the United States. This is less than a percentage point lower than the national average of 80.23%. The state was also compared to others in the region, which included Maryland, North Carolina, Kentucky, Tennessee, and West Virginia. Virginia ranked second in the regional rankings measuring claims to Internet access by citizens.

There were 1,161 citizen-reported dead zones, although many of these zones are within areas where service providers claim that there is wired or wireless broadband coverage. The counties with the most reported dead zones are Pittsylvania, Franklin, Bedford, Stafford, Rappahannock, Loudon, and Fauquier. The analysis found that nearly 36% of the geocoded FCC reported dead zones were located in an area that reportedly had wired broadband access. Additionally, when analyzing the FCC reported dead zones against the reported mobile broadband coverage area, over 86% of dead zones are located in an area that is identified as having broadband access.

There are several limitations to the data used in this dead-zone analysis. The FCC-reported dead zones are not all-inclusive, and are simply the dead zones that individuals have taken the effort to report. This is a function of civic engagement, interest, and awareness.

Acknowledgements

This report was created by the Center for Geospatial Information Technology at Virginia Tech and the Office of Telework Promotion and Broadband Assistance at the Center for Innovative Technology (CIT). Funding for the report was provided by the National Telecommunications and Information Administration (NTIA).

Broadband Coverage in the Commonwealth of Virginia

The Center for Geospatial Information Technology has performed a spatial analysis to estimate the percentage of the Virginia population falling into certain broadband internet service availability categories. The analysis was based on the subset of the fixed-line service provider map data which was provided in the form of census block polygons,[18] as well as the mobile wireless provider data provided in the form of polygons. Year 2010 census block data was used as the source for the population totals. Note that service availability is separate and distinct from the question of actual service subscriptions; this analysis is concerned only with the estimated populations for whom service is available, and does not make any statement regarding the actual number of individuals subscribed to such services.

The analysis does not account for all of the service provider coverage data: not included in this analysis is certain fixed-line service data that was provided in the form of address points and/or road centerlines, as well as stationary wireless service that is available in some regions. Were this data to be included, the total number of people for whom broadband service is available would increase. However, the results derived from the data that is included in this analysis may already be an overestimate of the total population covered, due the generalizations that occur when service providers delineate coverage at a census block level.

Table 2: Percentage of Virginia Population With Broadband Coverage

Broadband Availability	Estimated Population	% of VA Population
Fixed-line and Mobile Broadband	7,140,251	89.2%
Fixed-line Broadband Only	58,848	0.7%
Mobile Broadband Only	71,4015	8.9%
None of the above	87,910	1.1%
Total VA Population (2010 census)	8,001,024	100%

These broadband categories are exclusive; as such, the total number of people with access to fixed-line broadband is equal to the number of people with "Fixed-line Broadband Only" + "Fixed-line and Mobile Broadband", and the total number of people with access to mobile broadband is equal to the number of people with "Mobile Broadband Only" + "Fixed-line and Mobile Broadband".

[18] Polygons are a geographic information system data structure used to represent areas with common properties. In this case, these areas are the census block, the smallest geographic unit utilized by the Census Bureau.

Table 3: Mobile Broadband Availability (Maximum Advertised Speeds)			
Speed Tier	**Description**	**Estimated Population**	**% of Mobile Broadband Population**
3	768 kbps to 1.5 mbps	22,955	0.3%
4	1.5 mbps to 3 mbps	2,536,136	32.3%
5	3 mbps to 6 mbps	7,485	0.1%
6	6 mbps to 10 mbps	146,082	1.9%
7	10 mbps to 25 mbps	5,141,609	65.5%
	Total Mobile Broadband Population	7,854,266	100%

There is some uncertainty in these estimates (associated with data quality and timeliness), and this uncertainty has not yet been quantified. It would be misleading to use the estimated population totals for any purpose, because they imply individual-level precision that simply does not exist. Instead of discussing exact populations, it would be preferable to discuss the percent of VA population in each category.

Over the coming months, this analysis may be revised to reflect the other forms of provider data, and this may increase the number of people for whom service is available. In addition, the analysis may be refined to consider other sources of data (reported dead zones, household distribution within census blocks, etc), and this may decrease the estimated number of people for whom service is available.

This analysis was referenced in a policy paper by The Thomas Jefferson Institute for Public Policy entitled "Connecting Virginia: The economic benefits to expanding advanced broadband internet access." The November 2011 report is available on-line at http://www.thomasjeffersoninst.org/files/3/Connecting%20Virginia%20Policy.pdf

Source and Disclaimer

This analysis is based in part on data provided as part of the National Telecommunications and Information Administration (NTIA) Broadband Mapping Initiative. The Center for Innovative Technology, The Virginia Information Technologies Agency's Virginia Geographic Information Network (VGIN), and Virginia Tech's Center for Geospatial Information Technology are partners on the Virginia portion of this initiative. The following disclaimer applies to the broadband service coverage data collected as part of this initiative:

"The representations contained herein are for informational purposes only. Best efforts are undertaken to ensure the correctness of this information, however, all warranties regarding the accuracy of the map and any representations or inferences derived there from are hereby expressly disclaimed. The Virginia Center for Innovative Technology (CIT) and its partners neither assure nor accept any liability for the accuracy of the data. Those relying upon this information assume the risk of loss

exclusively for any potential inaccuracy. All errors and omissions brought to the attention of the CIT will be promptly corrected."[19]

[19] As displayed in the Virginia Broadband Viewer map at http://mapping.vita.virginia.gov/broadband/

Internet Usage Rankings

The Statistical Abstract from the U.S Census Bureau reports information about internet usage on a statewide basis.[20] This report shows Virginia's relative ranking to the other states (and the District of Columbia) and the U.S. national average. The Census Bureau reports internet usage on five different categories.

- Percent of Population with Access to Internet Service In-Home or Elsewhere (Dial up & Broadband)
- Percent of Population with Internet Service in Home (Dial up & Broadband)
- Percent of Population with Dial up Internet Service in Home
- Percent of Population with Broadband Internet Service in Home
- Percent of Population with No Access to Internet Service In Home or Elsewhere (Dial up & Broadband)

Additionally, we completed a regional analysis of the same data for the states of Virginia, North Carolina, Tennessee, Kentucky, West Virginia and Maryland.

The results of the national and regional analysis are below.

National Ranking

Percent of Population with Internet Service (Home or Elsewhere)

Virginia ranks 31st with 79.84% of the population claiming access to internet service, whether in their home or elsewhere. This is slightly below the average in the United States of 80.23%. A list of the top 5 states is listed below.

Table 4: Percent of Population with Internet Service (Home or Elsewhere)

Ranking	State	Percentage
1	Utah	90.10%
2	Alaska	88.64%
3	Washington	88.37%
4	New Hampshire	86.35%
5	Oregon	86.18%
31	Virginia	79.84%
	United States	80.23%

[20] See: http://www.census.gov/compendia/statab/

Percent of Population with Internet Service in Home (Dial up & Broadband)

Virginia ranks 23rd with 72.99% of the population claiming internet service, either dial up or broadband, in their home. This is above the average in the United States of 71.06%. A list of the top 5 states is listed below.

Table 5: Percent of Population with Internet Service in Home (Dial up or Broadband)

Ranking	State	Percentage
1	Utah	82.31%
2	New Hampshire	80.98%
3	Washington	79.70%
4	Alaska	78.67%
5	Oregon	78.31%
23	Virginia	72.99%
	United States	71.06%

Percent of Population with Dial-Up Internet Service in Home (Lower % is Better)

Virginia ranks 33rd with 3.47% of the population claiming dial up internet service in their home. This is above the average in the United States of 2.82%. For this analysis, a lower percent of population was regarded as better, due to the idea that the fewer people claiming dial up service results in more of the population having broadband internet service. A list of the top 5 states is listed below.

Table 6: Percent of Population with Dial-Up Internet Service in Home
Lower Percentage is Preferred

Ranking	State	Percentage
1	Arizona	1.30%
2	Rhode Island	1.33%
3	Wyoming	1.46%
4	New Jersey	1.49%
5	Massachusetts	1.64%
33	Virginia	3.47%
	United States	2.82%

Percent of Population with Broadband Internet Service in Home

Virginia ranks 23rd with 69.51% of the population claiming broadband internet service in their home. This is above the average in the United States of 68.24%. A list of the top 5 states is listed below.

Table 7: Percent of Population with Broadband Internet Service in Home		
Ranking	**State**	**Percentage**
1	Utah	79.67%
2	New Hampshire	77.82%
3	Washington	76.70%
4	Massachusetts	75.89%
5	Connecticut	74.84%
23	Virginia	69.51%
	United States	68.24%

Percent of Population without Internet Service Anywhere

Virginia ranks 31st with 20.16% of the population claiming that they do not have access to the internet, dial up or broadband, anywhere. This is above the average in the United States of 19.77%. A list of the top 5 states is listed below.

Table 8: Percent of Population without Internet Service Anywhere		
Ranking	**State**	**Percentage**
1	Utah	9.90%
2	Alaska	11.36%
3	Washington	11.63%
4	New Hampshire	13.65%
5	Oregon	13.82%
31	Virginia	20.16%
	United States	19.77%

Regional Ranking

Percent of Population with Internet Service (Home or Elsewhere)

Virginia ranks 2nd with 79.84% of the population claiming access to internet service, whether in their home or elsewhere. This is above the regional average of 76.12%. The ranking for all the states in the region is listed below:

Table 9: Percent of Population with Internet Service (Home or Elsewhere)		
Ranking	**State**	**Percentage**
1	Maryland	83.25%
2	**Virginia**	**79.84%**
3	North Carolina	76.53%
4	West Virginia	72.87%
5	Tennessee	72.20%
6	Kentucky	72.02%

Percent of Population with Internet Service in Home (Dial up & Broadband)

Virginia ranks 2nd with 72.99% of the population claiming internet service, either dial up or broadband, in their home. This is above the regional average of 67.91%. The ranking for all the states in the region is listed below.

Table 10: Percent of Population with Internet Service in Home		
Ranking	**State**	**Percentage**
1	Maryland	76.34%
2	**Virginia**	**72.99%**
3	North Carolina	68.42%
4	West Virginia	65.12%
5	Tennessee	63.295%
6	Kentucky	61.275%

Percent of Population with Dial-Up Internet Service in Home (Lower % is Better)

Virginia ranks 3rd with 3.47% of the population claiming dial up internet service in their home. This is below the regional average of 3.72%. For this analysis, a lower percent of population was regarded as better, due to the idea that the fewer people claiming dial up service results in more of the population having broadband internet service. The ranking for all the states in the region is listed below.

Table 11: Percent of Population with Dial-Up Internet Service in Home Lower Percentage is Preferred		
Ranking	**State**	**Percentage**
1	Maryland	2.23%
2	North Carolina	3.29%
3	**Virginia**	**3.47%**
4	Kentucky	3.52%
5	Tennessee	3.80%
6	West Virginia	5.98%

Percent of Population with Broadband Internet Service in Home

Virginia ranks 2nd with 69.51% of the population claiming access to broadband internet service in their home. This is above the regional average of 64.19%. The ranking for all the states in the region is listed below.

Table 12: Percent of Population with Broadband Internet Service in Home

Ranking	State	Percentage
1	Maryland	74.11%
2	**Virginia**	**69.51%**
3	North Carolina	65.14%
4	Tennessee	59.49%
5	West Virginia	59.13%
6	Kentucky	57.75%

Percent of Population without Internet Service Anywhere

Virginia ranks 2nd with 20.16% of the population claiming that they do not have access to the internet, dial up or broadband, anywhere. This is below the average of 23.88% in the region. The ranking for all the states in the region is listed below.

Table 13: Percent of Population Without Internet Service Anywhere

Ranking	State	Percentage
1	Maryland	16.75%
2	**Virginia**	**20.16%**
3	North Carolina	23.47%
4	West Virginia	27.13%
5	Tennessee	27.80%
6	Kentucky	27.98%

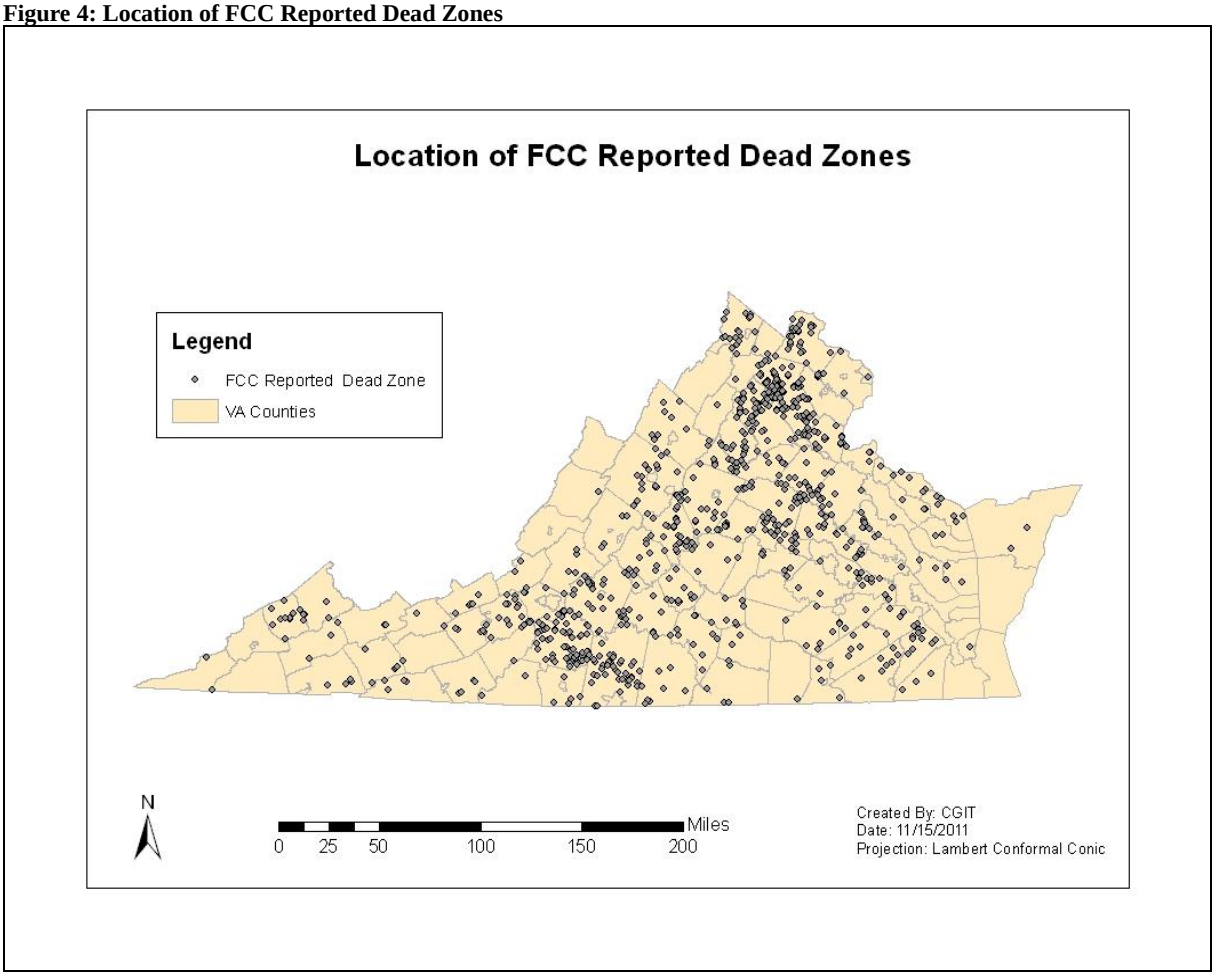
FCC-Reported Dead Zone Analysis for Virginia

This report analyzes the geographic location of the reported dead zones in Virginia, comparing them to several measures of broadband service, as well as locations that have been reported to have broadband access. The analysis presented in this report is based on the dead zone database maintained by the FCC. The FCC created the Dead Zone Registry to allow anyone without access to broadband internet to report their address as a dead zone. The "Broadband Dead Zone Reporting Form" can be completed at www.broadband.gov/qualitytest/deadzone. The FCC describes the Dead Zone Reporting Form as an "opportunity to voluntarily participate in the FCC's effort to pinpoint areas in the United States where Americans are unserved or underserved by broadband access" (Broadband.gov).

It should be noted that the points identified in this analysis do not necessarily represent a complete list of dead zones within the state, and some may not be true dead zones.

FCC-Reported Dead Zones

Figure 4: Location of FCC Reported Dead Zones



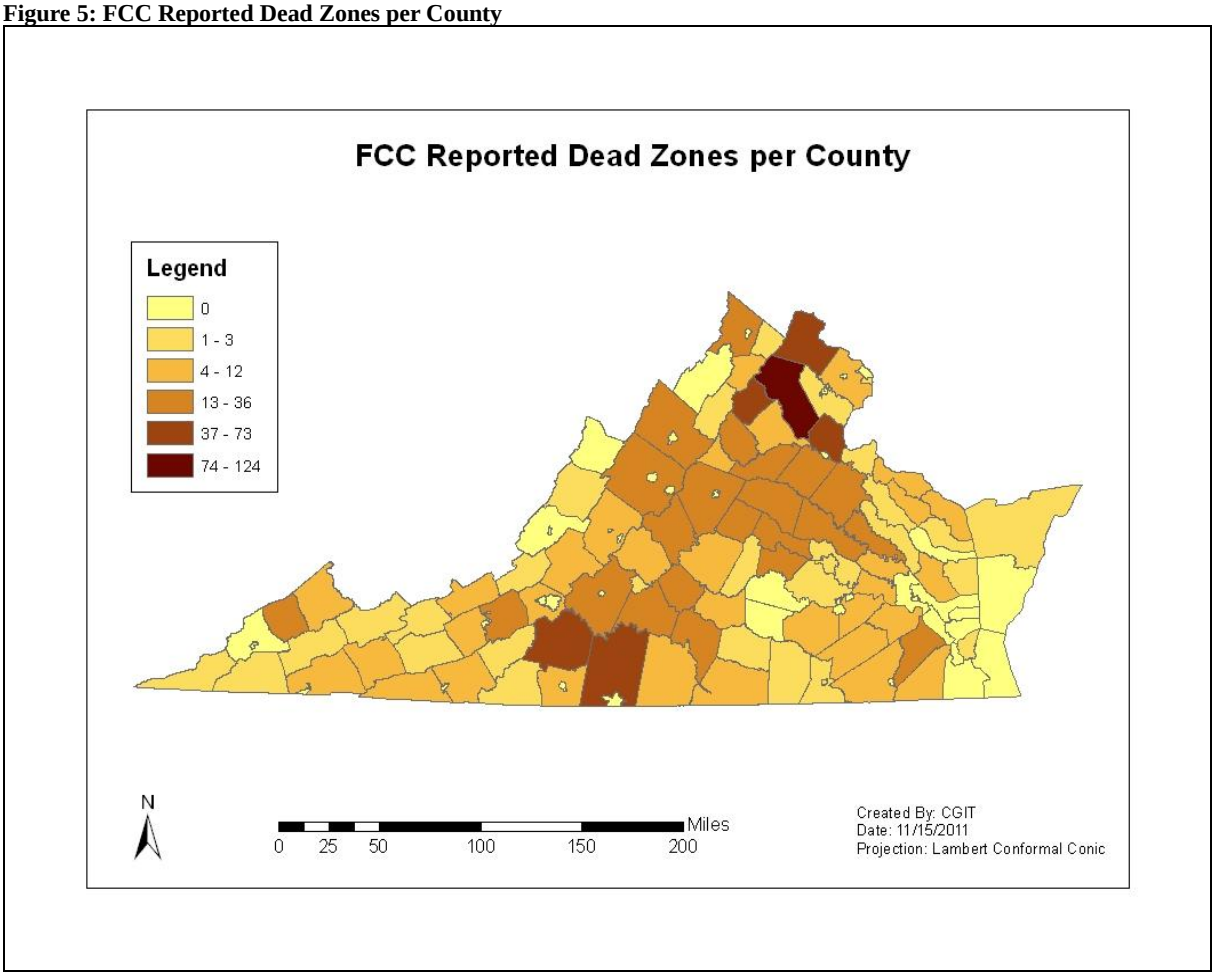
Total Dead Zones Reported	Dead Zones With No ISP	Geocoded Dead Zones	Percent Geocoded (Dead Zones With No ISP)
1,292	1,161	1,077	93%

The map displays the geocoded locations of FCC reported dead zones in Virginia. The above dataset consists of the total number of reported dead zones, minus those reported dead zones that did identify service providers in their area. There were 1292 reported dead zones in the data released on

October 31, 2011. After removing the reported dead zones that listed a service provider in the area, there were 1,161 dead zones that did not identify any service providers in the area. Geocoding the addresses listed in the reported dead zones resulted in 1,077 dead zone addresses matched and displayed on the map.

Dead Zones Per County

Figure 5: FCC Reported Dead Zones per County

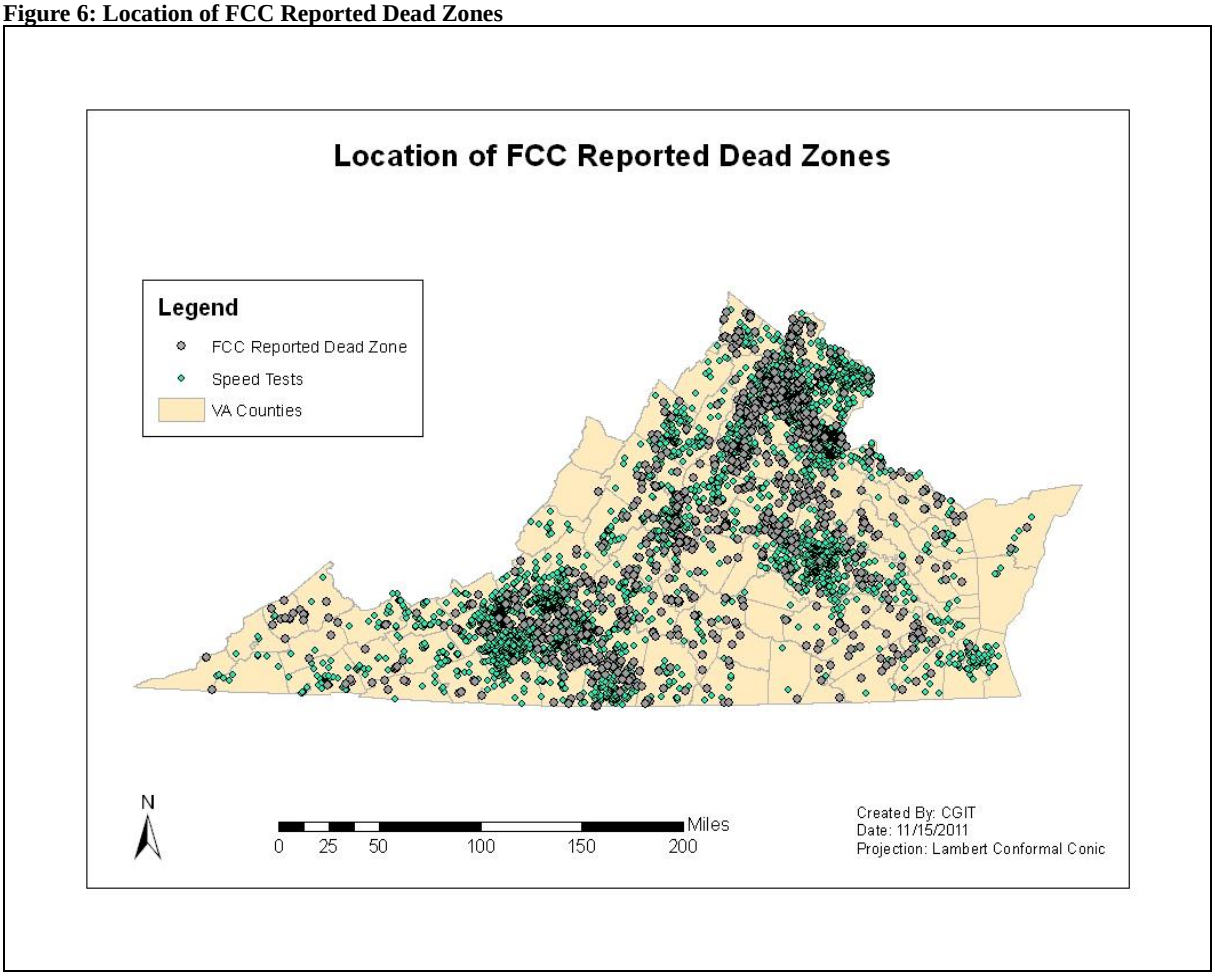


This map represents total number of FCC dead zones reported and geocoded, and is not normalized across population, total number of speed tests, or any other measure. The number of dead zone points per county is a measure of dead zone *reports* received by the FCC, which is determined to some extent by the level of engagement and awareness on the part of the public. The counties with the most reported dead zones are Pittsylvania, Franklin, Bedford, Stafford, Rappahannock, Loudon, and Fauquier.

Note: Accelerate Virginia has partnered with the following counties on speed test programs : Appomattox, Bland, Campbell, Charles City, Charlotte, Floyd, Fauquier, Franklin, Frederick, Goochland, Madison, Montgomery, Nelson, Pittsylvania, Powhatan, Rappahannock, Roanoke, Roanoke City, Rockingham, and Stafford.

Location of FCC-Reported Dead Zones

Figure 6: Location of FCC Reported Dead Zones

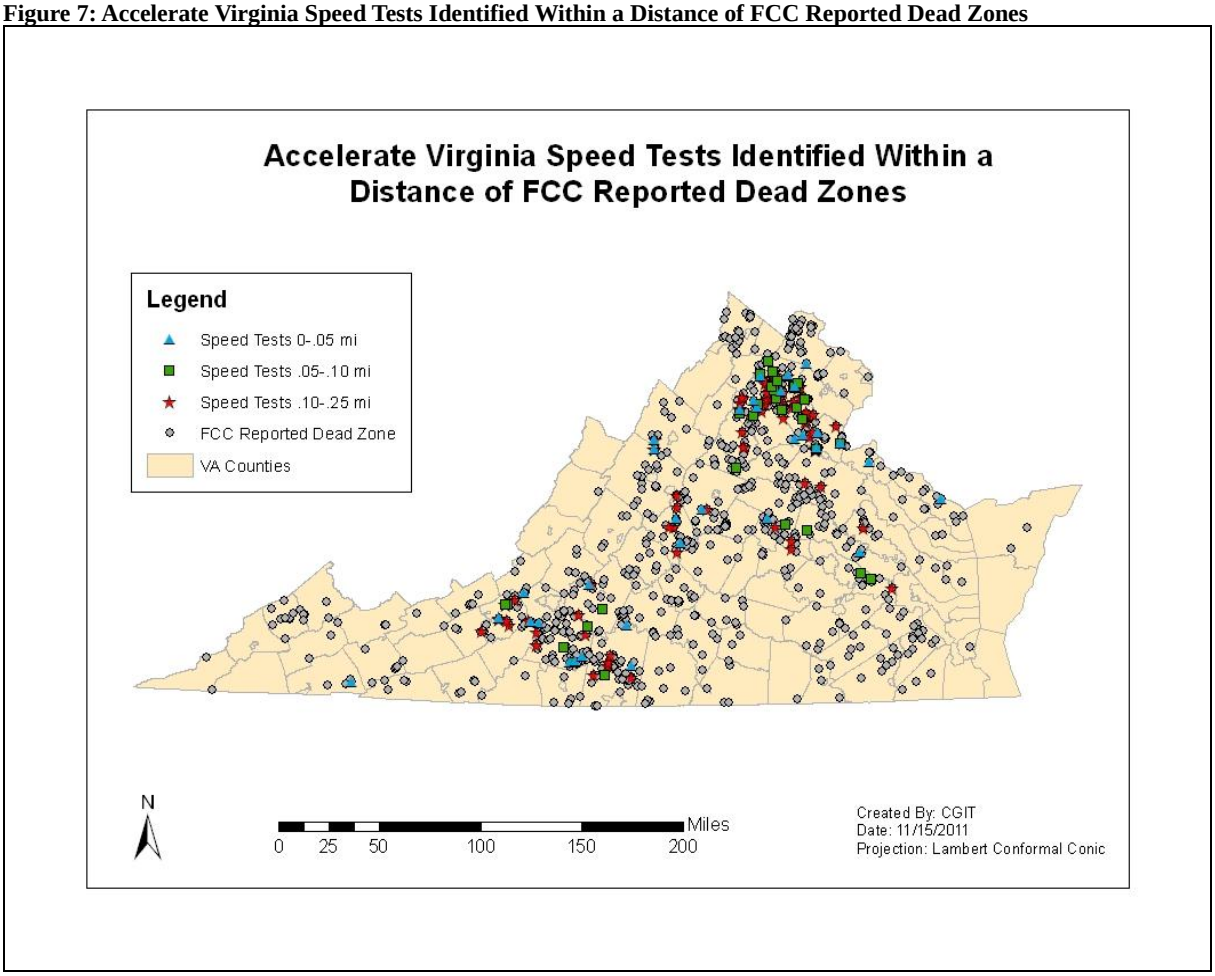


In an attempt to verify the reported dead zones, an analysis was completed to identify any user-initiated speed tests within a specified distance of a reported dead zone. The above map shows the location of all speed tests completed by Accelerate Virginia and the location of the FCC Reported Dead Zones. This is a potential method for validating dead zones due to the assumption that dead zones are less likely to be located near areas that have several reported speed tests. However, as mentioned previously, not all dead zone reports represent a truly "unserved" area; for example, someone may incorrectly report a dead zone due to a lack of knowledge of service or inability to afford internet service.

The map below expands on this analysis to identify the number of speed tests within a predetermined distance of any FCC reported dead zone.

FCC-Reported Dead Zone and Accelerate Virginia Data

Figure 7: Accelerate Virginia Speed Tests Identified Within a Distance of FCC Reported Dead Zones



Distance (mi)	Dead Zones	Total Speed Tests	Number of Speed Tests Identified
0-.05	1,077	5,661	36
.05-.1	1,077	5,661	35
.1-.25	1,077	5,661	103

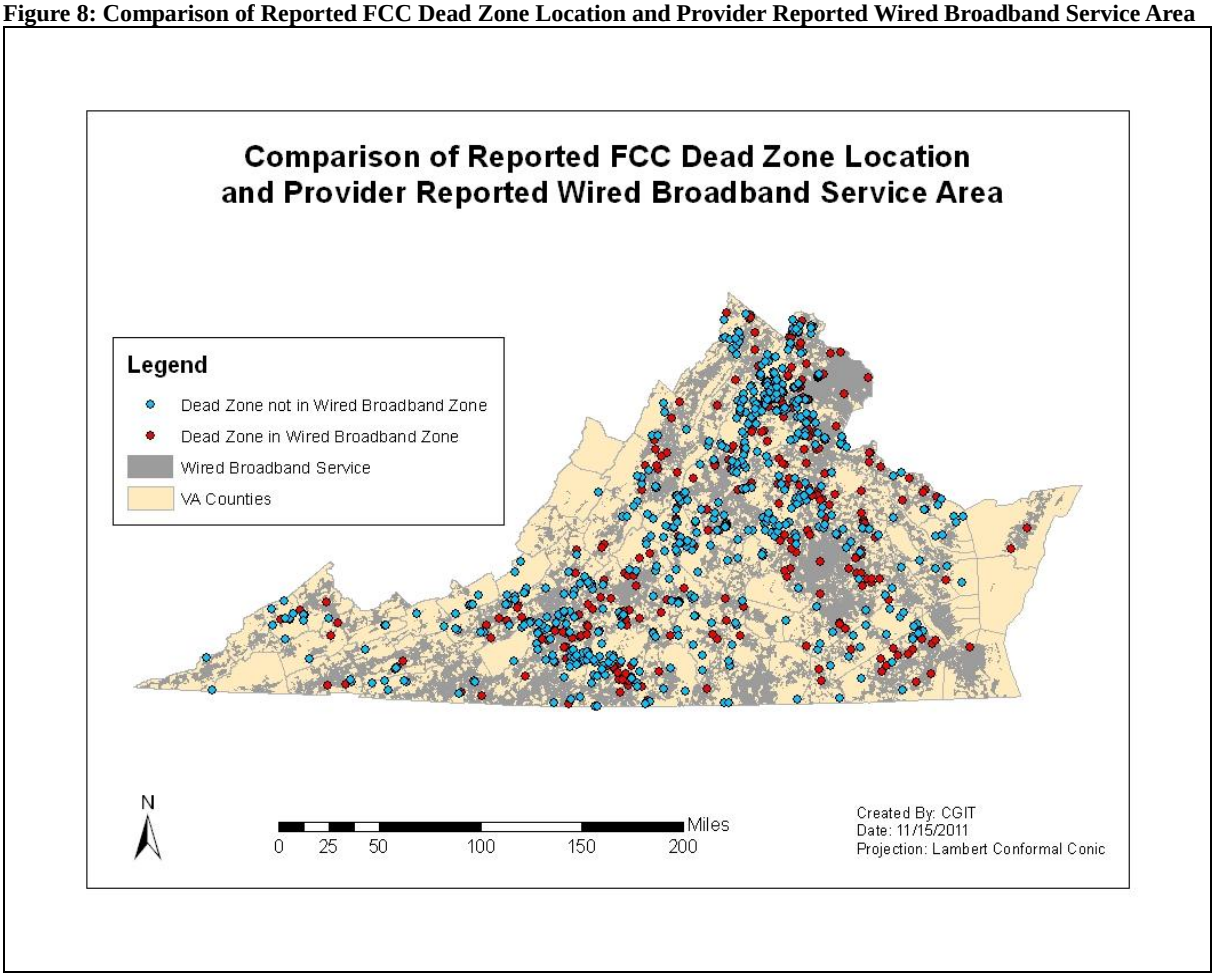
The table shows the results of the analysis. Each distance section is not cumulative. Throughout the state of Virginia we measured 36 speed tests within 1/20th of a mile of a FCC reported dead zone. These FCC reported dead zones could be considered the most uncertain, due to their relative location to reported speed tests. Overall, around 2.5% of total speed tests were within ¼ mi of a deadzone. However, this does not mean these dead zones should be ruled "untrue," but should be evaluated further to confirm whether or not it is a "true" dead zone. Because the locations of the dead zone points were obtained by geocoding physical mailing addresses, and the locations of the user-initiated speed tests were indicated by the end-user clicking on a map, there is some imprecision inherent in these locations. As such, very fine-scale comparisons (such as those mentioned above at ¼ mile and

1/20 mile) cannot be assigned a high degree of confidence due to the fact that the margin of positional error for both address geocoding and clicking on a web map may exceed these distances.

FCC-Reported Dead Zones and State Broadband Data

Wired Broadband Access

Figure 8: Comparison of Reported FCC Dead Zone Location and Provider Reported Wired Broadband Service Area



Total Dead Zones	Dead Zones Inside Reported Wired Broadband Service Area	Dead Zones Outside Reported Wired Broadband Service Area
1,077	387	690

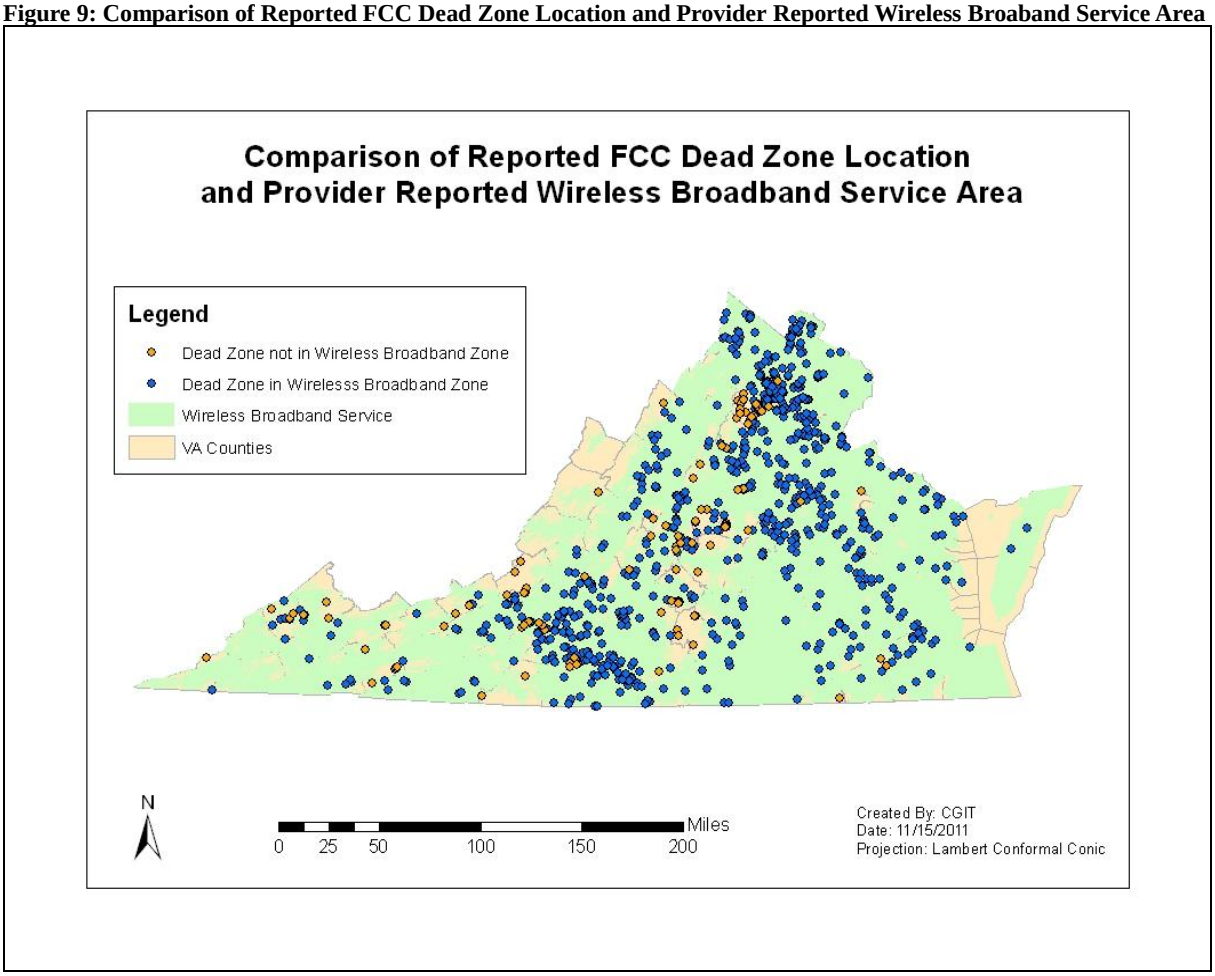
Recently, Virginia's Statewide Broadband Data Development (SBDD) project team released data identifying which census blocks currently have wired broadband service. This data was intersected with

the reported dead zones to locate and distinguish those FCC reported dead zones that are located in an area that is supposed to have wired broadband service from the FCC reported dead zones that are located in areas that do not have wired broadband service. The expectation, if both the FCC reported dead zone locations and wired broadband coverage are correct, is that there would be no overlap between the two. However, that is not the case. This analysis found 35.93% of the FCC reported dead zones in census blocks that were reported to have wired broadband service. This clearly represents an inaccuracy in one of the data sets, either the reported coverage or the FCC reported dead zones. However, 64.07% of the FCC reported dead zones were in a location that was deemed unserved, and thus can be assigned a higher degree of confidence.

There are several possible reasons why such a large percent of FCC reported dead zones fall in areas that are reportedly served by wired broadband. The SBDD data model prescribes that “served” census blocks are those that are, at a minimum, served in one location – however, the entire block need not be served to merit this designation. This may result in an overstatement of the true coverage area. Additionally, the process to geocode FCC reported dead zones may have resulted in a slight error that could inaccurately place the dead zone in an area that is identified as served with wired broadband service. Inaccurate reporting of the original FCC dead zone can also cause a reported dead zone to be located in a wired broadband zone.

Wireless Broadband Data

Figure 9: Comparison of Reported FCC Dead Zone Location and Provider Reported Wireless Broaband Service Area



Similarly, the state broadband map identifies areas of the state which had access to wireless broadband service. This data was intersected with the reported dead zones to locate and identify FCC reported dead zones that are located in an area that is supposed to have wireless broadband service, as well as those FCC reported dead zones that are located in an area that is not reported to have wireless service. This resulted in identifying 86.26% of FCC reported dead zones in an area that is reported to have access to mobile broadband.

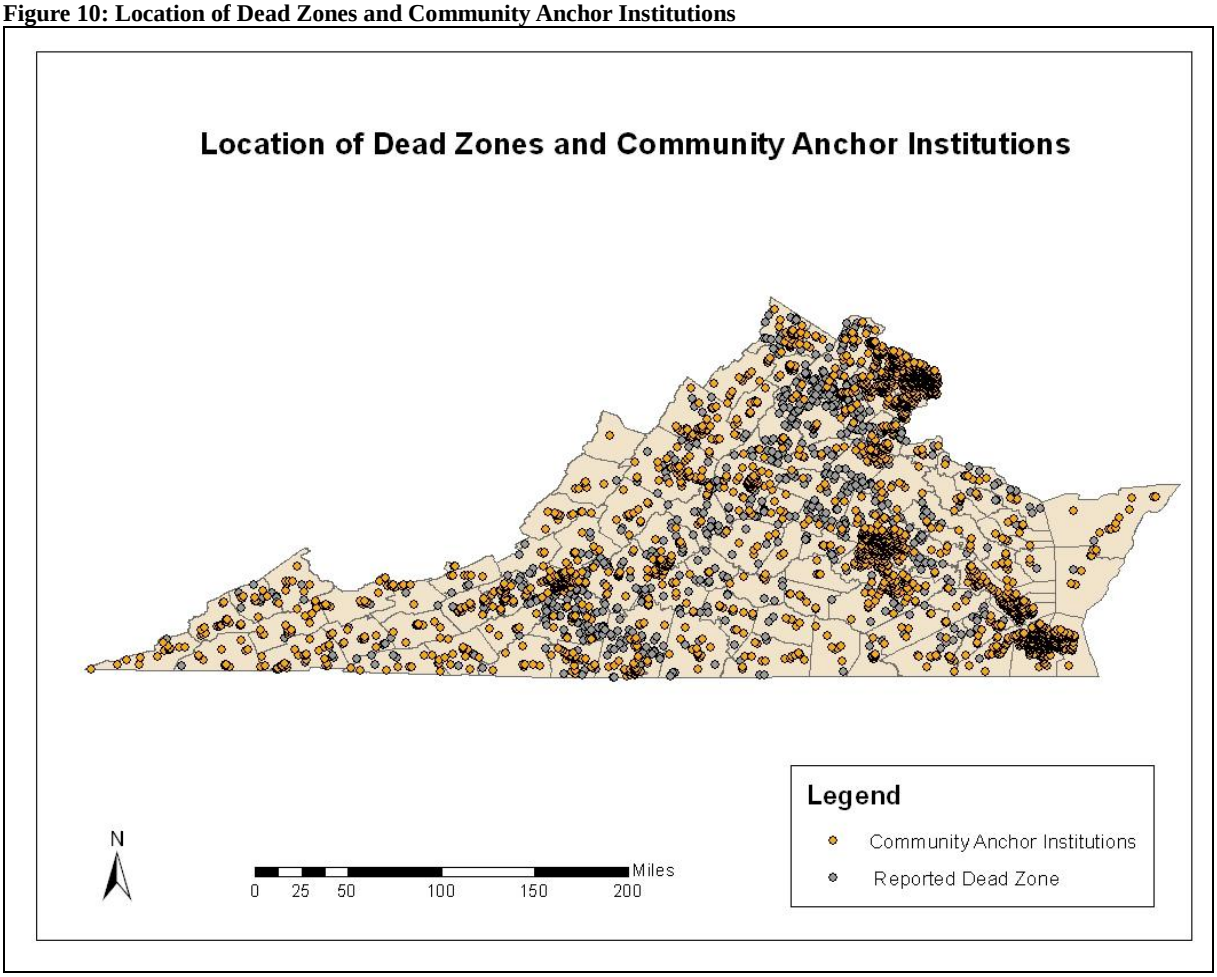
Total Dead Zones	Dead Zones Inside Reported Wireless Broadband Service Area	Dead Zones Outside Reported Wireless Broadband Service Area
1,077	929	148

The FCC Broadband Dead Zone registry asks if broadband is available at one's home. The option of mobile wireless broadband may be outside the knowledge or thought process of those who are reporting the dead zone. These people may simply be thinking of access to traditional wired broadband

at their home, not wireless broadband, which is often associated with mobile wireless. Wireless service in general is more pervasive than wired service in its geographic reach in Virginia, so the results in this sense are not surprising.

Community Anchor Institutions

Figure 10: Location of Dead Zones and Community Anchor Institutions



Distance (mi)	Total Dead Zones	Number of Dead Zones Identified	Percent of Dead Zones
0.5	1,077	8	0.74%
Distance (mi)	**Total Dead Zones**	**Number of Dead Zones Identified**	**Percent of Dead Zones**
1	1,077	47	4.36%

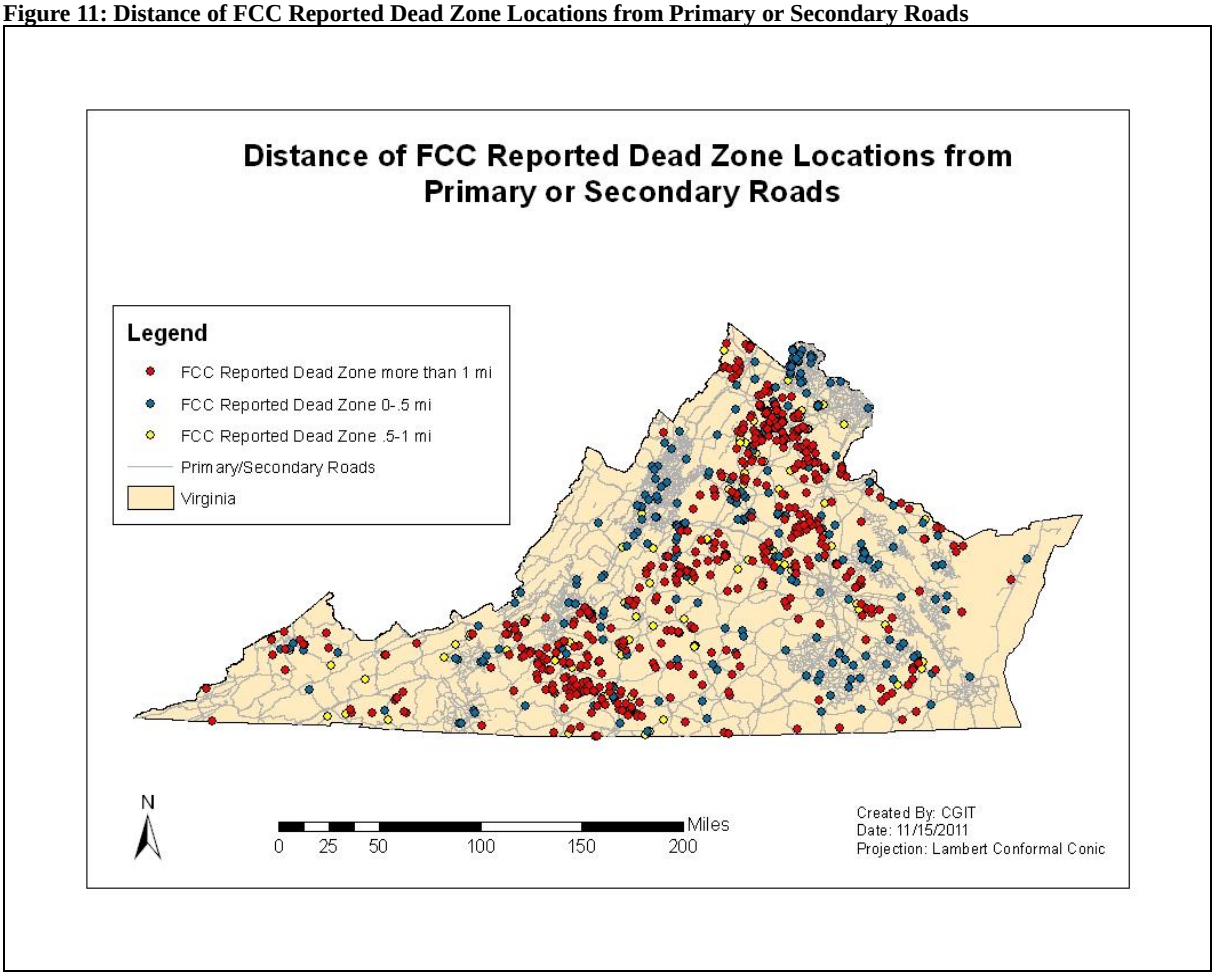
Community anchor institutions are places in the community such as schools, which have access to broadband internet. This map displays the location of community anchor institutions and reported dead zones. This analysis found that nearly 95% of all FCC reported dead zones were over one mile from the nearest community anchor institution. The analysis was completed using a buffer distance of .5 mi and

1 mi to identify any reported dead zones that were within either distance of a community anchor institution.

It is important to note that there is an inherent imprecision in the geocoding process which may affect the results from measuring distances at fine scales, as described in more detail previously in this document.

Road Infrastructure

Figure 11: Distance of FCC Reported Dead Zone Locations from Primary or Secondary Roads



Distance (mi)	Total Dead Zones	Number of Dead Zones Identified	Percent of Dead Zones
0-0.5	1,077	276	25.63%
Distance (mi)	**Total Dead Zones**	**Number of Dead Zones Identified**	**Percent of Dead Zones**
0.5-1	1,077	133	12.35%
Distance (mi)	**Total Dead Zones**	**Number of Dead Zones Identified**	**Percent of Dead Zones**
> 1	1,077	668	62.02%

Broadband infrastructure often follows other infrastructure, such as roads. This analysis compares the location of reported dead zones and their distance from the nearest primary or secondary roads as designated by the census. The analysis is the result of measuring distances between primary and secondary roads and geocoded FCC reported dead zones. Distance from roads may be interpreted as a measure of the "remoteness" of a reported dead zone.

Summary and Conclusions

This report has examined the locations of FCC reported dead zones in Virginia and compared them to measures such as data related to broadband coverage, community anchor institutions, and road infrastructure. FCC-reported dead zones are located throughout the state. The counties with the most FCC reported dead zones in Virginia are Fauquier, Pittsylvania, Franklin, Loudon, Stafford, and Rappahannock. As previously noted, this is the result of several factors beyond the actual number of dead zones, including engagement in the process and awareness of the dead zone reporting initiative.

The report also analyzed the location of FCC reported dead zones and found that only 2.5% of all speed tests were located within ¼ mi of a dead zone. This supports the idea that in general, dead zones and speed tests are not typically located in close proximity.

This report compared the location of FCC reported dead zones to reported wired broadband service and wireless broadband service. The analysis found that nearly 36% of the geocoded FCC reported dead zones were located in an area that reportedly had wired broadband access. Additionally, when analyzing the FCC reported dead zones against the reported mobile broadband coverage area, over 86% of dead zones are located in an area that is identified as having broadband access. On the surface it seems this would discredit a majority of the reported dead zones. However, a closer look at the broadband dead zone reporting form simply asks if there is access to broadband internet at one's home. Mobile wireless is most often associated with wireless broadband, and thus people may not consider wireless broadband an acceptable substitute for having wired or fixed wireless internet access at their home.

The final two analyses looked at the location of FCC reported dead zones in relation to the location of community anchor institutions and primary and secondary roads. The analysis found that around 95% of FCC reported dead zones were more than one mile away from the nearest community anchor institution. Additionally, nearly 2/3 of all dead zones were more than one mile from a primary or secondary road, which supports the theory that broadband infrastructure follows road infrastructure and dead zones are located in more remote areas.

As previously mentioned, there are several limitations to the data used in this analysis. The FCC-reported dead zones are not all-inclusive, and are simply the dead zones that individuals have taken the effort to report. This is a function of civic engagement, interest, and awareness. To place them on a map, the FCC-reported dead zones were geocoded, and there is an inherent positional imprecision within the geocoding process.

Because the NTIA-mandated data model for census-block-level broadband coverage assigns census blocks within Virginia a value of served or unserved based on a minimum threshold of one location within the census block having wired broadband access, it is likely that this dataset presents an overstatement of wired broadband coverage.