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Broadband Data and Mapping: Background and Issues for the 117th Congress

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Access to high-speed internet service, also known as broadband, is increasingly important in the 21st century, as more aspects of everyday life, such as job applications, bank transactions, and homework assignments, are completed online. Broadband is provided by a variety of technologies (e.g., cable, telephone wire, fiber, satellite, and mobile and fixed wireless) that give users the ability to send and receive data at volumes and speeds that support data-intensive activities such as voice communications, streaming audio and video, telemedicine, distance education, and telework.

Broadband technologies are currently being deployed, primarily by the private sector, throughout the United States. Some areas of the United States—particularly rural and tribal areas, but also some urban areas—have limited or no access to broadband due to geographic and socio-economic factors. The gap between those who have access to broadband and those who do not is referred to as the *digital divide*. Some policymakers, believing that disparities in broadband access across American society could have adverse economic and social consequences on those left behind, assert that the federal government should play a more active role to address the digital divide in broadband access, particularly in light of the Coronavirus Disease 2019 (COVID-19) pandemic, which further revealed discrepancies in broadband availability and accessibility.

Since 2018, the FCC has had the primary responsibility for developing a comprehensive map of broadband access in the United States. The data available to determine where to invest resources may be incomplete or inaccurate. For example, the FCC's current methodology considers a census block served if at least one home or business in that census block has broadband access. In addition, the data is self-reported by broadband service providers. Though the main responsibility for mapping broadband availability lies with the FCC, Congress has provided funding to the National Telecommunications and Information Administration (NTIA) to develop a National Broadband Availability Map to help augment the FCC's mapping data. As of May 11, 2021, the National Broadband Availability Map includes 36 states (data from June 2020).

There is sustained congressional interest in increasing the accuracy of broadband data and mapping. Accurate maps help policymakers to make informed decisions about where federal funds should be directed and enable federal agencies to fulfill certain statutory requirements, such as the FCC's annual "reasonable and timely deployment" determination, as required by the Telecommunications Act of 1996 (P.L. 104-104). In response to congressional interest, the FCC adopted a *Report and Order* in August 2019 introducing a new process for collecting fixed broadband data, called the Digital Opportunity Data Collection (DODC). On March 23, 2020, Congress enacted the Broadband Deployment Accuracy and Technological Availability Act or the Broadband DATA Act (P.L. 116-130), which requires the FCC to change the way broadband data is collected, verified, and reported, and codifies many components of the FCC's DODC.

As the FCC implements the Broadband DATA Act, Congress has a wide variety of options for oversight and legislation. For example, Congress may continue to consider issues such as the optimal level of data granularity and whether the incorporation of additional variables into the map may be beneficial for policymakers. To assist with future federal action, Congress may take into consideration state broadband mapping efforts, which could provide additional insight into models that could be replicated on a national scale.

Congress may consider whether federal funding for broadband expansion should be withheld until new maps are established, or whether to continue addressing the digital divide—especially in light of the COVID-19 pandemic—using current maps while more accurate ones are being developed. Congress may also consider whether the FCC's Fixed Broadband Deployment Map should be updated more frequently than every six months so that data reflects continuing network changes and, if so, whether that would impose a significant reporting burden on broadband service providers. As the new data collection efforts progress, Congress may consider how much in additional appropriations might be required to establish the maps and sustain the mapping efforts annually.

Bills addressing some of these broadband mapping issues have been introduced in the 117th Congress, including the Broadband—Measuring Availability and Aligning Policies Task Force Act (H.R. 1044), introduced in the House on February 15, 2021, and the Data Mapping to Save Moms' Lives Act (S. 198/H.R. 1218), introduced in the Senate on February 3, 2021, and in the House on February 23, 2021.

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Introduction

Mapping broadband availability,¹ which means graphically displaying where broadband is and is not available on a map, is complex and depends on data—with the accuracy of the map depending on the accuracy of the data used to compose the map. Congress has an interest in accurate broadband mapping data, because accurate data can help ensure that federal programs that finance broadband deployment target areas of the country that are most in need of assistance. The Telecommunications Act of 1996 (P.L. 104-104) requires the Federal Communications Commission (FCC) to determine annually whether broadband is being deployed to all Americans on a timely basis, and the FCC relies on broadband mapping data to make this determination. Additionally, the FCC uses broadband mapping data to direct billions of dollars per year to deploy broadband in unserved or underserved areas. Congress has also taken an interest in broadband mapping due to concerns from constituents that certain areas, especially rural areas, remain underserved or unserved.

Pinpointing where broadband is and is not available in the United States has been an ongoing challenge. Current data on broadband availability is provided by private telecommunications providers, collected by the FCC, and displayed on the FCC’s Fixed Broadband Deployment Map.² Difficulty in accurately mapping broadband availability has been attributed to a number of factors, including the potential inadequacy of census block data, the lack of independent data validation outside the FCC, and the absence of a challenge process for consumers and other entities that believe the Fixed Broadband Deployment Map may overstate availability in their areas. In early 2019, it came to the FCC’s attention that inaccuracies in the Fixed Broadband Deployment Map’s data may cause broadband deployment to be overstated, possibly indicating that areas have access to broadband when, in reality, they do not. Inaccurate data on broadband deployment could lead to overbuilding in areas that currently have broadband while leaving other areas underserved or unserved.

On March 23, 2020, the Broadband Deployment Accuracy and Technological Availability Act or Broadband DATA Act (P.L. 116-130) was enacted, which requires the FCC to change the way broadband data is collected, verified, and reported. Congress may consider oversight of FCC efforts to implement the provisions of the Broadband DATA Act and whether additional legislative actions related to broadband mapping might be necessary.

Broadband Defined

The term *broadband* commonly refers to high-speed internet access that is faster than dial-up access. Broadband includes several high-speed transmission technologies, such as:

- digital subscriber line (DSL),
- cable modem,
- fiber,
- wireless,
- satellite, and

¹ *Broadband availability* refers to whether or not broadband service is offered, while *broadband adoption* refers to the extent to which American households actually subscribe to and use broadband.

² Federal Communications Commission, *Fixed Broadband Deployment*, available at <https://broadbandmap.fcc.gov/>.

- broadband over power lines (BPL).³

The internet became publicly available in the 1990s and has evolved since that time as more information has become digital (e.g., many job applications and government forms have moved online). However, not all Americans currently have access to broadband.

As methods to access the internet have evolved, so have speeds, with the FCC’s current broadband benchmark speed set at 25 megabits per second (Mbps) download and 3 Mbps upload (25/3). **Table 1** shows how the FCC’s broadband definition has changed from what was initially adopted in 1996 to its current definition, which was adopted in 2015.

Table 1. FCC Broadband Definitions over Time

Year Adopted	Minimum Download	Minimum Upload
1996	200 Kbps	200 Kbps
2010	4 Mbps	1 Mbps
2015	25 Mbps	3 Mbps

Source: Jameson Zimmer, “FCC Broadband Definition Has Changed Before and Will Change Again,” *BroadbandNow*, February 10, 2018, available at <https://broadbandnow.com/report/fcc-broadband-definition/>.

Notes: *Mbps* means megabits per second and *Kbps* means kilobits per second.

The Urban/Rural Digital Divide

The term *digital divide* refers to a gap between those Americans who use or have access to telecommunications and information technologies and those who do not.⁴ While broadband service providers continue to make progress in expanding high-speed broadband service, according to the FCC the rate of broadband deployment in urban areas has outpaced deployment in rural and tribal areas.⁵ Broadband is deployed primarily by the private sector. The comparatively lower population density of rural and tribal areas and, in some cases, difficult topography contributes to lower broadband penetration rates relative to more highly populated urban and suburban areas. Particularly for wireline broadband technologies—such as cable modem and fiber optic cable—greater geographical distance between customers in sparsely populated areas results in the inability to spread infrastructure costs over a larger subscriber base. Thus, there is often less incentive for companies to invest in broadband in rural areas than in urban areas. The primary goal of broadband mapping is to identify areas without access to broadband so that policymakers can make informed decisions on policies to address the urban/rural digital divide.

³ DSL uses copper telephone wires. Cable modem uses coaxial cables—the same used for cable television. Fiber uses pulses of light shot by lasers through thin strands of glass. Wireless uses a radio connection between the consumer and the service provider’s terrestrial antennae. Satellite uses a radio connection to a space-based antenna. BPL uses power lines to deliver broadband to consumers. For further information, see Federal Communications Commission, *Types of Broadband Connections*, June 23, 2014, available at <https://www.fcc.gov/general/types-broadband-connections>.

⁴ For more information on the digital divide, see CRS Report R46613, *The Digital Divide: What Is It, Where Is It, and Federal Assistance Programs*, by Colby Leigh Rachfal.

⁵ Federal Communications Commission, *Fourteenth Broadband Deployment Report*, January 19, 2021, p. 4, available at <https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf>.

Federal Agency Roles in Broadband Mapping

The major federal agencies involved in broadband mapping are the U.S. Department of Agriculture (USDA), the National Telecommunications and Information Administration (NTIA) in the Department of Commerce, and the FCC. Though the main responsibility for mapping broadband availability lies with the FCC, Congress has provided funding to NTIA to help augment the FCC's data in identifying regions with insufficient broadband service. Additionally, the USDA manages multiple maps that depict eligibility for their federal broadband programs to help determine where to direct federal resources.

U.S. Department of Agriculture

USDA's Rural Utilities Service (RUS) oversees federal programs that fund the deployment of broadband infrastructure. To help determine where to direct federal resources, RUS manages multiple maps that show data related to RUS broadband program eligibility. For example, RUS' Broadband Program Mapping Tool is used by:

- existing borrowers or those interested in applying for funding under the Infrastructure Loan Program, Broadband Access Loan and Loan Guarantee Program, or Community Connect Grant Program, enabling them to draw existing or proposed service area maps;
- RUS to post Public Notices of proposed funded service areas for pending loan applications, as well as by existing service providers to submit information on their service offerings;
- other entities that wish to upload an authenticated map of existing broadband services.⁶

RUS' other mapping tools show the locations of RUS-financed broadband projects.⁷ For example, RUS developed the ReConnect Program Eligibility Area Map to assist in the determination of service area eligibility for the ReConnect Program across the United States. Congress established the ReConnect Program—which provides loan and grant funding to eligible entities to deploy broadband internet service in eligible rural areas—under the Consolidated Appropriations Act, 2018 (P.L. 115-141).⁸ The ReConnect Program Eligibility Area Map displays categories of data including the FCC's Connect America Fund winners, nonrural areas, pending applications, and protected broadband borrower service areas.⁹

⁶ U.S. Department of Agriculture, *Broadband Program Mapping Tool*, available at <https://broadbandsearch.sc.egov.usda.gov/>.

⁷ See U.S. Department of Agriculture, *Telecom Maps*, available at <https://www.rd.usda.gov/programs-services/all-programs/telecommunications-programs/telecom-maps>; U.S. Department of Agriculture, *ReConnect Program Eligibility Area Map*, available at <https://www.usda.gov/reconnect>.

⁸ For more information on the ReConnect Program, see CRS In Focus IF11262, *USDA's ReConnect Broadband Pilot Program*, by Alyssa R. Casey.

⁹ Rural Utilities Service, *Broadband Pilot (ReConnect) Program*, 84 *Federal Register* 14911, April 12, 2019, available at <https://www.federalregister.gov/documents/2019/04/12/2019-07345/broadband-pilot-reconnect-program>.

National Telecommunications and Information Administration

The Broadband Data Improvement Act (P.L. 110-385), enacted on October 10, 2008, directed the Department of Commerce to establish a state broadband data and development grant program.¹⁰ This program, known as the State Broadband Initiative (SBI), was administered by NTIA, an agency in the Department of Commerce, and funded under the American Recovery and Reinvestment Act of 2009 (P.L. 111-5). One of the purposes of the program was to assist states in gathering data twice a year on the availability, speed, and location of broadband service as well as on the broadband services used by community institutions, such as schools, libraries, and hospitals. This data was used to establish the National Broadband Map, the first public, searchable, nationwide map of broadband availability, which was launched in 2011.¹¹

Through the SBI program, NTIA awarded a total of \$293 million to 56 grantees—one from each of the 50 states, five territories, and the District of Columbia. The grantees were required to use the funds to promote broadband adoption and access tailored to their local needs and to collect broadband-related data and provide it to NTIA. The SBI program collected its final data as of June 30, 2014, and in 2015, the program ended.

In the Consolidated Appropriations Act of 2018 (P.L. 115-141), Congress provided \$7.5 million to NTIA to develop a National Broadband Availability Map. Specifically, Congress directed NTIA to acquire and display available third-party data sets to augment data from the FCC, other federal government agencies, state governments, and the private sector. The stated objective of this funding was “to help identify regions with insufficient service, especially in rural areas.”¹²

In response, NTIA announced in February 2019 it had partnered with eight states—California, Maine, Massachusetts, Minnesota, North Carolina, Tennessee, Utah, and West Virginia—for a pilot to improve the FCC’s Fixed Broadband Deployment Map. The first phase of NTIA’s new National Broadband Availability Map was published in October 2019. It is available only to state and federal partners due to the inclusion of nonpublic data, which may be business sensitive or have other restrictions that prevent public disclosure.¹³ As of May 11, 2021, the National Broadband Availability Map includes 36 states.¹⁴

¹⁰ P.L. 110-385 directed, but did not authorize appropriations for, the establishment of a state broadband data and development grant program.

¹¹ National Telecommunications and Information Administration, *State Broadband Initiative*, available at <https://www2.ntia.doc.gov/SBDD>.

¹² “Joint Explanatory Statement,” *Congressional Record*, vol. 164, part 50—Book II (March 22, 2018), pp. H2084-H2085.

¹³ National Telecommunications and Information Administration, *National Broadband Availability Map*, October 2, 2019, available at <https://broadbandusa.ntia.doc.gov/map>.

¹⁴ These states include Alaska, Arizona, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Kansas, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Mexico, New York, North Carolina, Oklahoma, Oregon, South Dakota, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. For more information see BroadbandUSA, *NTIA’s NBAM Reaches 36 State Milestone*, May 11, 2021, available at <https://broadbandusa.ntia.doc.gov/node/7413>.

Federal Communications Commission

In 2000, the FCC established the Form 477 Data Program to collect from providers “data regarding broadband services, local telephone service competition, and mobile telephony services on a single form and in a standardized manner.”¹⁵

The FCC collects data on both fixed and mobile broadband availability through Form 477. It does not combine the two sets of data into a single map; rather, it uses the fixed data to create the Fixed Deployment Broadband Map, and it has used the mobile broadband data to determine which areas were eligible for the Mobility Fund Phase II program (see “Directing Federal Assistance” below).

Form 477 Fixed Broadband Data Methodology

Every six months, all facilities-based providers¹⁶ of fixed broadband are required to submit a list of all census blocks where they provide, or could provide, fixed broadband service to at least one location. For each census block, the provider is required to submit data specifying the last-mile technology used;¹⁷ whether the provider can or does offer consumer, mass market, or residential service; the maximum advertised download and upload speeds for consumer service; and whether the service is also available for business, enterprise, or government customers.¹⁸

In 2017, the FCC acknowledged some shortcomings of this methodology:

Facilities-based providers of fixed broadband must provide in their Form 477 submissions a list of all census blocks where they make broadband connections available to end-user premises, along with the last-mile technology or technologies used. These deployment data represent the areas where a provider does, or could, without an extraordinary commitment of resources, provide service. Thus, the meaning of “availability” in each listed census block can be multifaceted, even within the data of a single filer. In a particular listed block, the provider may have subscribers or it may not. At the same time, the provider may be able to take on additional subscribers or it may not. The various combinations have varying implications that make it difficult to understand availability. Specifically, if a block was listed by a provider, it is impossible to tell whether residents of that block seeking service could turn to that provider for service or whether the provider would be unable or unwilling to take on additional subscribers. This may limit the value of these data to inform our policymaking and as a tool for consumers and businesses to determine the universe of potential broadband service providers at their location.¹⁹

¹⁵ Federal Communications Commission, *In the Matter of Modernizing the FCC Form 477 Data Program*, June 27, 2013, p. 3, available at <https://docs.fcc.gov/public/attachments/FCC-13-87A1.doc>.

¹⁶ A facilities-based provider is a provider that owns (as opposed to leases) networks used to provide telecommunications services.

¹⁷ *Last mile* refers to the type of connection between a broadband service provider and the consumer (e.g., fiber or cable).

¹⁸ For a more detailed list of the data elements required, see Federal Communications Commission, *Explanation of Broadband Deployment Data*, May 1, 2019, available at <https://www.fcc.gov/general/explanation-broadband-deployment-data>.

¹⁹ Federal Communications Commission, *FCC Proposes Improvements to Broadband/Voice Services Data Collection*, pp. 11-12, available at <https://www.fcc.gov/document/fcc-proposes-improvements-broadbandvoice-services-data-collection-0>.

Form 477 Mobile Broadband Data Methodology

The collection of accurate and reliable mobile broadband data is particularly challenging because a user's mobile wireless experience varies and is affected by factors such as terrain, user location, weather, network congestion, and the type of connected service. Under Form 477 filing rules, facilities-based providers of mobile broadband service are required to submit and certify, for each technology and frequency band employed, polygons in shapefiles²⁰ that digitally represent the geographic areas in which a customer could expect to receive at least the minimum speed the provider advertises for that area. Additionally, mobile broadband providers must report the census tracts in which their service is advertised and available to potential customers.²¹

Digital Opportunity Data Collection and the Broadband DATA Act

In August 2019, the FCC adopted a *Report and Order* introducing the Digital Opportunity Data Collection (DODC), which is intended to address many of the issues that currently lead to inaccurate broadband mapping data.²² On March 23, 2020, the Broadband Deployment Accuracy and Technological Availability Act or Broadband DATA Act (P.L. 116-130) was enacted. This law requires the FCC to change the way it collects, verifies, and reports broadband data. Specifically, the act directs the FCC to:

- Collect and disseminate granular broadband service availability data from wired, fixed-wireless, satellite, and mobile broadband providers. To do this, the FCC is required to establish the Broadband Serviceable Location Fabric (a dataset of geocoded information for all broadband service locations, atop which broadband maps are overlaid) as the vehicle for reporting broadband service availability data.
- Put forth specified requirements for service availability data collected from broadband providers, and create a process to enable the submission of independent data to challenge the accuracy of FCC broadband maps.
- Conduct regular audits of information submitted by telecommunications providers, and develop a process whereby entities or individuals may submit information about the deployment and availability of broadband service to verify and supplement information submitted by providers.
- Provide data collection and submission assistance to Indian tribes; small service providers; consumers; and state, local, and tribal governments.

The Broadband DATA Act codifies many—but not all—aspects of the DODC. For example, the DODC proposed to have the Universal Service Administrative Company (USAC)²³ create and manage a challenge portal that will allow individual consumers, as well as state, local, and tribal

²⁰ Shapefiles are a data storage format for recording data associated with particular geographic locations. A polygon in a shapefile indicates the boundaries of the geographical area to which a particular set of data applies. For more information on how the FCC uses polygons in shapefiles for mobile broadband mapping, see Federal Communications Commission, *Mobile Broadband Deployment*, June 23, 2014, available at https://transition.fcc.gov/form477/MBD/definitions_mbd.pdf.

²¹ Federal Communications Commission, *FCC Proposes Improvements to Broadband/Voice Services Data Collection*, August 4, 2017, p. 2, available at <https://www.fcc.gov/document/fcc-proposes-improvements-broadbandvoice-services-data-collection-0>.

²² Federal Communications Commission, *Digital Opportunity Data Collection (DODC)*, available at <https://www.fcc.gov/digital-opportunity-data-collection-dodc>. See also “Broadband Mapping Challenges and Criticisms” section in this report.

²³ USAC is an independent not-for-profit designated by the FCC to administer the Universal Service Fund.

government entities to submit input on the accuracy of the data on the public fixed broadband availability map. The act prohibits the FCC from delegating mapping responsibilities to USAC.

In a July 16, 2020, statement, FCC Chairman Ajit Pai stated that funding from Congress is needed to implement requirements in the Broadband DATA Act.²⁴ On December 27, 2020, the Consolidated Appropriations Act, 2021 (CAA 2021; P.L. 116-260), appropriated \$98 million for this purpose.

Implementation of the Broadband DATA Act

With the appropriation of funds in the CAA 2021, the FCC has moved forward with preliminary initiatives to implement the provisions within the act. Some of these initiatives include:

- On January 13, 2021, the FCC adopted rules to specify which fixed and mobile broadband service providers are required to report availability and/or coverage data; requirements for reporting speed and latency for fixed technologies; and a requirement for fixed broadband providers to report whether broadband services are offered to residential and/or business customers.²⁵
- On February 17, 2021, the FCC announced the establishment of a Broadband Data Task Force dedicated to implementing improvements to the broadband data and mapping tools.²⁶
- On March 8, 2021, the FCC issued a Request for Information to start the contracting process for the creation of the Broadband Serviceable Location Fabric.²⁷
- On March 22, 2021, the FCC announced a new outreach effort to collect consumer broadband availability experiences.²⁸

In the FCC February 2021 Open Commission Meeting, the FCC indicated the new broadband maps may not be ready until 2022.²⁹

Why Broadband Mapping Accuracy Matters

Accurate broadband data and mapping helps policymakers to make informed decisions about where federal funding should be directed—such as with Phase II of the FCC’s Rural Digital Opportunity Fund and 5G for Rural America Fund—and enables federal agencies to fulfill certain

²⁴ Federal Communications Commission, *Pai Statement: FCC Improves Broadband Data and Maps to Bridge the Digital Divide*, press release, July 16, 2020, available at <https://www.fcc.gov/document/fcc-improves-broadband-data-and-maps-bridge-digital-divide/pai-statement>.

²⁵ Federal Communications Commission, *FCC Takes Next Step to Collect More Precise Broadband Mapping Data*, January 19, 2021, available at <https://www.fcc.gov/document/fcc-takes-next-step-collect-more-precise-broadband-mapping-data>.

²⁶ Federal Communications Commission, *Rosenworcel Establishes Broadband Data Task Force*, February 17, 2021, available at <https://www.fcc.gov/document/rosenworcel-establishes-broadband-data-task-force>.

²⁷ Federal Communications Commission, *A Running Start on New Broadband Maps*, March 16, 2021, available at <https://www.fcc.gov/news-events/notes/2021/03/16/running-start-new-broadband-maps>.

²⁸ Federal Communications Commission, *FCC Announces New Outreach To Collect Consumer Broadband Availability Experiences*, March 22, 2021, available at <https://docs.fcc.gov/public/attachments/DOC-370978A1.pdf>.

²⁹ Federal Communications Commission, *February 2021 Open Commission Meeting*, February 17, 2021, available at <https://www.fcc.gov/news-events/events/2021/02/february-2021-open-commission-meeting>.

statutory requirements, such as the FCC’s annual “reasonable and timely deployment” determination.

Directing Federal Assistance

Accurate maps are important in federal funding decisions designed to target areas where broadband is needed the most. Without accurate data, maps may not be reliable indicators of need, and federal assistance may be provided to areas that already have adequate broadband services. This may result in overbuild in some areas and neglect of other areas, further widening the disparities between areas that are served and those that are not.

Whether the current FCC broadband map was granular enough to direct federal assistance was an issue of disagreement between FCC Commissioners for the FCC’s Rural Digital Opportunity Fund (RDOF).³⁰ Through RDOF, the FCC plans to commit \$20.4 billion to bring high-speed fixed broadband service to rural homes and small businesses in two phases. For Phase I, the FCC used its current, less granular broadband map data to determine the wholly unserved areas eligible for the auction.³¹ In the January 30, 2020, RDOF Report and Order, former FCC Commissioner and current FCC Acting Chairwoman Jessica Rosenworcel stated,

We need maps before money and data before deployment. With today’s decision we commit the vast majority of universal service funds—\$16 billion!—for the next ten years without first doing anything to improve our maps, survey service accurately, or fix the data disaster we have about the state of service today. That means if your home is marked as served by the FCC’s maps today and it is not, then for the next decade you are on your own. Good luck. It means millions of Americans will slip deeper into the digital divide.³²

Upon adoption of new rules for the DODC on July 16, 2020, FCC Commissioner Brendan Carr stated

On the bright side, our Form 477 data are good at identifying areas that are completely unserved. And that’s why I am glad the FCC is moving ahead with Phase I of the Rural Digital Opportunity Fund, which can ensure that Americans living in those unserved areas need not wait any longer than necessary to receive high-speed service.³³

The Phase I auction began on October 29, 2020, and the FCC announced the results on December 7, 2020—180 bidders won \$9.2 billion to deploy high-speed broadband to over 5.2 million unserved homes and businesses.³⁴ On May 6, 2021, the advocacy group Competitive Carriers Association (CCA) submitted a letter to the FCC regarding an analysis CCA conducted that found RDOF awards may go to areas that already have broadband service. CCA stated,

The premise of RDOF Phase I was to target areas that the Commission “knew with certainty” were “currently unserved,” so the proceeding therefore did not need to await a

³⁰ For more information on RDOF see CRS Report R46501, *Rural Digital Opportunity Fund: Requirements and Selected Policy Issues*, by Colby Leigh Rachfal.

³¹ For Phase II of RDOF, the FCC plans to use broadband mapping data from the maps required to be established under the Broadband Deployment Accuracy and Technological Availability Act (P.L. 116-130).

³² Federal Communications Commission, *Statement of Commissioner Jessica Rosenworcel*, January 30, 2020, p. 2, available at <https://docs.fcc.gov/public/attachments/FCC-20-5A5.pdf>.

³³ Federal Communications Commission, *Statement of Commissioner Brendan Carr*, Re: Establishing the Digital Opportunity Data Collection, available at <https://docs.fcc.gov/public/attachments/FCC-20-94A4.pdf>.

³⁴ Federal Communications Commission, *Successful Rural Digital Opportunity Fund Auction To Expand Broadband To Over 10 Million Rural Americans*, December 7, 2020, available at <https://docs.fcc.gov/public/attachments/DOC-368588A1.pdf>.

new data collection process to produce updated broadband maps. But the premise is incorrect; deficient mapping means that instead of supporting areas that lack service, the Commission's RDOF program will subsidize broadband deployment in areas that obviously are served—including some of the nation's wealthiest, most densely populated areas.³⁵

An example of how inaccurate data has affected eligibility for federal assistance occurred in the FCC's Mobility Fund II (MF-II) program, which would have made up to \$4.53 billion in support available over 10 years to primarily rural areas that lacked unsubsidized 4G Long Term Evolution (LTE) service. The FCC published initial eligibility maps for MF-II in August 2018 and in December 2018, the FCC announced it would launch an investigation into whether one or more major carriers violated the Mobility Fund reverse auction's mapping rules and submitted incorrect coverage maps.³⁶ In December 2019, the FCC released *MF-II Coverage Maps Investigation Staff Report*, which found that the coverage data submitted by three providers likely overstated actual coverage in many instances.³⁷ The FCC proposed to both terminate the MF-II challenge process and replace MF-II with the 5G Fund for Rural America, which plans to distribute \$9 billion over the next decade to bring 5G wireless broadband connectivity to rural America. The 5G Fund will use improved mobile broadband coverage data gathered in the FCC's Digital Opportunity Data Collection proceeding.³⁸

Reasonable and Timely Deployment Determination

The Telecommunications Act of 1996 (P.L. 104-104) requires the FCC to “initiate a notice of inquiry concerning the availability of advanced telecommunications capability to all Americans.” In conducting this inquiry, the FCC must “determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.” If that determination is negative, the commission “shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”³⁹

Using data from Form 477, the FCC develops an annual Broadband Deployment Report, also referred to as the Section 706 Report, in which the FCC evaluates the availability of fixed and mobile broadband services. In its 2021 analysis, the FCC made a Section 706 finding that advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. This finding was supported by Commissioner Brendan Carr, with Commissioners Jessica Rosenworcel and Geoffrey Starks dissenting.⁴⁰ The 2021 report noted, “While some ...

³⁵ Competitive Carriers Association, Re: Establishing the Digital Opportunity Data Collection, WC Docket No. 19-195; Modernizing the FCC Form 477 Data Program, WC Docket No. 11-10; Rural Digital Opportunity Fund (Auction 904), AU Docket No. 20-34; Rural Digital Opportunity Fund, WC Docket No. 19-126; Connect America Fund, WC Docket No. 10-90; Telecommunications Carriers Eligible to Receive Universal Service Support, WC Docket No. 09-197, May 6, 2021, p. 1, available at <https://irp.cdn-website.com/cd1ed710/files/uploaded/6%20May%202021%20CCA%20Ex%20Parte%20%26%20White%20Paper.pdf>.

³⁶ Tina Pelkey, *FCC Launches Investigation into Potential Violations of Mobility Fund Phase II Mapping Rules*, December 7, 2018, available at <https://docs.fcc.gov/public/attachments/DOC-355447A1.pdf>.

³⁷ Federal Communications Commission, *Mobility Fund Phase II (MF-II)*, May 18, 2020, available at <https://www.fcc.gov/mobility-fund-phase-ii-mf-ii>.

³⁸ Federal Communications Commission, *FCC Establishes 5G Fund for Rural America*, October 27, 2020, available at <https://docs.fcc.gov/public/attachments/DOC-367778A1.pdf>.

³⁹ 47 U.S.C. §1302(b).

⁴⁰ FCC, *Fourteenth Broadband Deployment Report*, January 19, 2021, pp. 288-290, available at <https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf>.

have criticized the FCC Form 477 data for overstating deployment ... the degree of overstatement is proportionately inconsequential to the broader conclusions and trends.”⁴¹

Broadband Mapping Challenges and Criticisms

The FCC’s difficulty mapping broadband availability has been attributed to a number of factors, including data granularity, overstated availability, lack of a validation and challenge process, and the difficulty of keeping up with real-time deployments.

Data Granularity

The FCC requires each broadband service provider to submit information on the services it offers at the census block level. Census blocks are the smallest unit of geography defined by the Census Bureau and are “statistical areas bounded by visible features, such as streets, roads, streams, and railroad tracks, and by nonvisible boundaries, such as selected property lines and city, township, school district, and county limits and short line-of-sight extensions and roads.”⁴² Census blocks vary in size and population, and their geographical area can be especially large in some parts of the United States. For example, according to the U.S. Census Bureau, in remote areas, census blocks may encompass hundreds of square miles.⁴³

For the purposes of Form 477, the FCC considers a census block served if even one house or business in the block is served. Since some rural census blocks may encompass hundreds of square miles and include geographically dispersed communities or individual residences, the availability of service in one part of the census block is less likely to indicate general broadband availability across the block than in smaller, more densely-populated census blocks.

With the use of census blocks, areas within a large block that might otherwise be eligible for federal assistance may not be considered eligible. The Utah Governor’s Office of Economic Development told the NTIA:

Basing data collection, planning efforts, and funding decisions on census blocks is problematic, particularly in blocks which are large, remote, and include terrain that makes it difficult to install infrastructure. For example, in Utah, the largest populated census block is 947 square miles. Under the current Form 477 submission process, any census block that is partially covered would be ineligible for all federal broadband programs, even if only a small percentage of households or census block area is covered.⁴⁴

Overstated Availability

Although staff examine FCC Form 477 data for quality and consistency, the FCC acknowledges that the data may understate or overstate deployment of services to the extent that broadband

⁴¹ Ibid., p. 55.

⁴² Federal Communications Commission, *More About Census Blocks*, March 26, 2015, available at https://transition.fcc.gov/form477/Geo/more_about_census_blocks.pdf.

⁴³ U.S. Census Bureau, *Glossary*, September 16, 2019, available at <https://www.census.gov/programs-surveys/geography/about/glossary.html>.

⁴⁴ Kelleigh Cole, “Comments on (NTIA) Docket No. 180427421-8421-01, *Improving the Quality and Accuracy of Broadband Availability Data*, Utah Governor’s Office of Economic Development, June 18, 2016, pp. 1-2, available at https://www.ntia.doc.gov/files/ntia/publications/2018_ntia_mapping_comments_utah.pdf.

providers misreport or fail to report.⁴⁵ As an example, on September 2, 2020, the FCC proposed a \$163,912 fine against broadband service provider Barrier Communications Corporation for reporting inaccurate information that significantly inflated its broadband subscription numbers, failing to file required deployment data, making false statements to Commission investigators, and failing to respond to other inquiries.⁴⁶

In April 2019, Microsoft asserted that the percentage of Americans without broadband access is much higher than the figures reported by the FCC. Microsoft claimed that although the FCC indicates that 24.7 million people do not have broadband available, Microsoft's own data indicates that 162.8 million people do not use the internet at broadband speeds of 25 Mbps or more.⁴⁷ Microsoft released a map showing differences between the FCC's claimed broadband access and actual usage of broadband. NCTA—The Internet and Television Association—criticized this analysis, saying that it “conflates availability and usage” and, as a result, draws “a number of unsupportable conclusions.”⁴⁸

Lack of Validation and Challenge Process

Broadband service providers self-report information on Form 477. Although the FCC reviews the data, it is not verified independently outside of the agency. There is also no challenge process in place if a consumer, provider, or other entity identifies any of the data as potentially inaccurate.

Stakeholders who testified at an April 2019 hearing before the Senate Committee on Commerce, Science, and Transportation asserted that a challenge process is needed, citing the problems with the FCC's mobility fund auction and how it was difficult for wireless carriers to challenge mobile broadband availability data that the FCC had intended to use as a basis for awarding funding.⁴⁹

Real-Time Deployments

The telecommunications industry is fluid—broadband service providers are constantly changing (e.g., through mergers and acquisitions), building new networks, or revising older networks. The FCC currently updates the Fixed Broadband Deployment Map twice a year, but the map reflects data that is approximately a year or more behind the current date—this is likely due to the time it may take for the FCC to process the data it receives from broadband service providers. For example, as of May 2021, the map reflects June 2020 data.

⁴⁵ Federal Communications Commission, *2019 Broadband Deployment Report*, May 8, 2019, p. 12, available at <https://docs.fcc.gov/public/attachments/FCC-19-44A1.pdf>.

⁴⁶ Federal Communications Commission, *FCC Proposes to Fine Broadband Provider for Reporting Overstated Service Data to Commission*, press release, September 2, 2020, p. 1, available at <https://docs.fcc.gov/public/attachments/DOC-366634A1.pdf>.

⁴⁷ John Kahan, *It's Time for a New Approach for Mapping Broadband Data to Better Serve Americans*, Microsoft, April 8, 2019, available at <https://blogs.microsoft.com/on-the-issues/2019/04/08/its-time-for-a-new-approach-for-mapping-broadband-data-to-better-serve-americans/>.

⁴⁸ Victor Reklaitis, *It's Microsoft vs. Comcast in Infrastructure Push to Expand Rural Broadband*, Market Watch, May 20, 2019, available at <https://www.marketwatch.com/story/its-microsoft-vs-comcast-in-infrastructure-push-to-expand-rural-broadband-2019-05-06>.

⁴⁹ U.S. Congress, Senate Committee on Commerce, Science, and Transportation, *Broadband Mapping: Challenges and Solutions*, testimony of Tim Donovan, SVP, Legislative Affairs, Competitive Carriers Association, 116th Cong., April 10, 2019, available at https://www.commerce.senate.gov/public/_cache/files/335dcd54-07d6-4140-a286-0b59f6527f6b/C2717D2DE1A24F364CAC37068A0EF5CE.04-10-19donovan-testimony.pdf.

For the Digital Opportunity Data Collection, the Broadband DATA Act requires the FCC to update the broadband maps at least every six months,⁵⁰ as well as with any updates or corrections, to meet the Broadband DATA Act’s requirement to use the most recent data collected from providers. To achieve this, the FCC is to direct its Office of Economics and Analytics to update the maps as quickly as possible after the filing deadlines of March 1 and September 1 each year and to update the maps continually based on the outcomes of challenges, investigations, and inquiries, including those informed by crowdsourced data as that information becomes available.⁵¹ Using the most recent data available and updating the maps as quickly as possible may help to address the issue of older data being displayed on the map. However, the map will likely not reflect real-time broadband deployments, and the data may not be as accurate as possible, since broadband service could have been deployed or improved since the most recent data was submitted and mapped.

Policy Issues for Congress

As Congress continues to contemplate broadband mapping, it may consider:

- the optimal level of data granularity and potential inclusion of additional data variables;
- whether to withhold federal funding for broadband until the new maps are released;
- funding for sustainability of the Broadband DATA Act; and
- frequency of updates.

Granularity and Inclusion of Additional Data Variables

The Broadband DATA Act addresses the issue of granularity and requires the development and use of a Broadband Serviceable Location Fabric, which would include precise coordinates of all structures that have broadband. There are, however, additional questions Congress may consider to ensure that broadband maps are regularly produced at the appropriate granularity and include information that best inform policy decisions. Collecting and including additional data variables—for example, data on broadband adoption or broadband subscription pricing—could further assist policymakers in addressing the digital divide. As an example, the Data Mapping to Save Moms’ Lives Act (S. 198/H.R. 1218), introduced in the Senate on February 3, 2021, and in the House on February 23, 2021, would require the Federal Communications Commission to incorporate data on maternal health outcomes into its broadband health maps. Some state broadband offices collect and include variables in their maps that are not in the FCC’s Fixed Broadband Deployment Map that could serve as models for federal mapping efforts. For example:

- Kansas’ map shows service availability at the street level for broadband across the state.⁵²

⁵⁰ The FCC’s Second Report and Order and Third Further Notice of Proposed Rulemaking states, “we establish a biannual schedule for collection of broadband Internet access service availability and quality of service data. For this purpose, we establish filing deadlines of March 1 and September 1 each year.”

⁵¹ Federal Communications Commission, *Second Report and Order and Third Further Notice of Proposed Rulemaking*, July 16, 2020, p. 34, available at <https://docs.fcc.gov/public/attachments/FCC-20-94A1.pdf>.

⁵² ArcGIS, *The Kansas Broadband Map*, published July 31, 2019, available at <https://www.arcgis.com/apps/>

- North Carolina has developed multiple broadband maps; among them is a map to identify areas that are eligible for various grant programs aimed at expanding broadband access across the state.⁵³
- Hawaii’s map is populated with consumer-reported information on a home’s wired (i.e., cable, DSL, fiber) internet speeds.⁵⁴

Should Congress consider the inclusion of additional variables in the FCC’s Fixed Broadband Deployment Map, the potential benefits and burdens of gathering and providing additional data could be assessed through a targeted pilot program.

Withholding Federal Funds Until New Maps Are Released

As the FCC’s RDOF and MF-II demonstrated, there is a possibility federal funding may be misallocated to areas that already meet the 25/3 Mbps broadband service minimum using current maps, potentially limiting the ability to provide broadband to unserved and underserved communities. Using the current FCC maps may potentially limit the effectiveness of new federal broadband programs focused on addressing the digital divide that were enacted in CAA 2021 (P.L. 116-260) and the American Rescue Plan Act of 2021 (P.L. 117-2).

For example, Section 905 of CAA 2021 provided \$300 million to the National Telecommunications and Information Administration for grants to support broadband infrastructure deployment to areas lacking broadband, especially rural areas.⁵⁵ Section 905 of CAA 2021 states,

The term “eligible service area” means a census block in which broadband service is not available at 1 or more households or businesses in the census block, as determined by the Assistant Secretary on the basis of—(A) the maps created under section 802(c)(1) of the Communications Act of 1934 (47 U.S.C. 642(c)(1));⁵⁶ or (B) if the maps described in subparagraph (A) are not available, the most recent information available to the Assistant Secretary, including information provided by the Commission.

If the broadband maps required under the Broadband DATA Act are not available by the time NTIA administers this grant program, CAA 2021 directs the NTIA to use the most recent available information, including information provided by the FCC. While NTIA anticipates accepting grant applications for this program in summer 2021,⁵⁷ the FCC has indicated new maps may not be available until 2022. This may lead the NTIA to have to rely on the FCC’s current broadband mapping data to make funding decisions. A consideration for Congress is whether the need for more granular and accurate data justifies withholding federal broadband funding until better maps are available or whether the goal of closing the digital divide is so pressing that funding should proceed using currently available maps.

webappviewer/index.html?id=72ab65f4ac2c4207abd1e575fa148cb4.

⁵³ North Carolina Broadband Infrastructure Office, *Identification of Grant Eligible Locations*, available at <https://nconemap.maps.arcgis.com/apps/webappviewer/index.html?id=72f01e944bde425ca07523d06a59c232>.

⁵⁴ Department of Commerce and Consumer Affairs, *Hawaii Internet Speed Map*, available at <https://cca.hawaii.gov/broadband/speedmap/>.

⁵⁵ BroadbandUSA, *Overview of Consolidated Appropriations Act, 2021*, available at <https://broadbandusa.ntia.doc.gov/resources/grant-programs>.

⁵⁶ 47 U.S.C. 642(c)(1) refers to the broadband maps that are required to be created under the Broadband DATA Act.

⁵⁷ BroadbandUSA, *NTIA Grant Program: Broadband Infrastructure Webinar, Session 1*, available at <https://broadbandusa.ntia.doc.gov/node/7411>.

Funding for Sustainability of Broadband Mapping

The Broadband DATA Act contains specific timelines for the FCC to carry out the requirements of the act. The act requires the FCC to adopt final new mapping rules no later than September 2020—a deadline the FCC missed—which may have been due to lack of resources. Since the passage of the Broadband DATA Act, the FCC has highlighted the need for funding from Congress in order to implement the provisions within the act. According to then-FCC Chairman Ajit Pai:

At this point, it is vital for Congress to provide the FCC as soon as possible with the appropriations necessary to implement the Act. Right now, the FCC does not have the funding to carry out the Act, as we have warned for some time. And given the Act’s prohibition on the Universal Service Administrative Company performing this mapping work, if Congress does not act soon, this well-intentioned legislation will have the unfortunate effect of delaying rather than expediting the development of better broadband maps.⁵⁸

The Consolidated Appropriations Act, 2021, P.L. 116-260, provided \$98 million to implement the Broadband DATA Act. Congress may consider how much in additional appropriations might be required to establish the maps and sustain the mapping efforts annually. Additionally, Congress may debate whether to leave this task to the FCC, such as in the Broadband—Measuring Availability and Aligning Policies Task Force Act (H.R. 1044), introduced on February 15, 2021, which would require the FCC to establish a task force that oversees implementation and use of the broadband maps, including providing cost estimates for maintaining the maps.

Frequency of Updates

The FCC collects data from broadband service providers every six months through Form 477, and updates the Fixed Broadband Deployment Map twice a year. However, the Fixed Broadband Deployment Map’s data lags approximately a year and a half behind. (See the report section “Real-Time Deployments”). The Broadband DATA Act requires the Broadband Serviceable Location Fabric to be updated, at a minimum, every six months. A consideration for Congress may be whether the Fixed Broadband Deployment Map could be updated more frequently (e.g., data could be collected every month) to reflect continuing network changes and, if so, whether that would impose a significant burden on broadband service providers.

Concluding Observations

Broadband mapping has garnered congressional interest since the creation of the SBI under the Broadband Data Improvement Act (P.L. 110-385) and introduction of the NTIA’s National Broadband Map. Congressional interest in mapping accuracy remains high due to the potential misallocation of federal assistance funds using current FCC maps.

The enactment of the Broadband DATA Act is a step forward in obtaining more granular and accurate broadband mapping data. As the new collection effort unfolds, Congress may take an interest in monitoring:

- whether the FCC broadband data collection effort appears sufficient to alleviate the current broadband mapping issues,

⁵⁸ Federal Communications Commission, *Chairman Pai Statement on the Broadband DATA Act*, March 24, 2020, available <https://docs.fcc.gov/public/attachments/DOC-363267A1.pdf>.

- the balance between waiting on distribution of federal funding (e.g., new federal broadband programs established within CAA 2021 or ARPA) until the map is determined accurate versus the continuing need to address the digital divide, and
- whether additional legislative action should be taken to incorporate other variables into the data collection and mapping efforts.

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