



November 2018

TRIBAL BROADBAND

FCC Should Undertake Efforts to Better Promote Tribal Access to Spectrum

Accessible Version

Why GAO Did This Study

In 2018, FCC estimated that 35 percent of Americans living on tribal lands lack broadband service compared to 8 percent of Americans overall. Broadband service can be delivered through wireless technologies using radio frequency spectrum. According to FCC, increasing tribal access to spectrum would help expand broadband service on tribal lands. GAO was asked to review spectrum use by tribal entities—tribal governments and tribally owned telecommunications providers.

This report examines (1) tribal entities' ability to obtain and access spectrum to provide broadband services and the reported barriers that may exist, and (2) the extent to which FCC promotes and supports tribal efforts to obtain and access spectrum. GAO interviewed 16 tribal entities that were using wireless technologies. Selected entities varied geographically, among other characteristics. GAO analyzed FCC's license and auction data as of September 2018, reviewed FCC's rulemakings on spectrum for broadband services, and interviewed other tribal and industry stakeholders and FCC officials. The information presented is not generalizable to all tribes or industry participants.

What GAO Recommends

FCC should (1) collect data on tribal access to spectrum; (2) analyze unused licensed spectrum over tribal lands; and (3) make information available in a more accessible manner that would promote tribes' ability to purchase or lease spectrum licenses over their lands from other providers. FCC agreed with the recommendations.

View [GAO-19-75](#). For more information, contact Mark Goldstein at (202) 512-2834 or goldsteinm@gao.gov.

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FCC Should Undertake Efforts to Better Promote Tribal Access to Spectrum

What GAO Found

The tribal entities GAO contacted cited various barriers to obtaining spectrum licenses in bands that can be used to provide broadband services. According to its analysis of data from the Federal Communications Commission (FCC), GAO identified 18 tribal entities that held active spectrum licenses in such bands. For example, of these 18 tribal entities, 4 obtained licenses through secondary market transactions—that is, they bought or leased the license from another provider, and 2 obtained a license through an FCC spectrum auction. Licensed spectrum is generally preferred because it offers better quality of service compared to unlicensed spectrum; however, almost all of the tribal entities GAO contacted said that they are accessing unlicensed spectrum to provide Internet service. They identified barriers to obtaining licensed spectrum through auctions and secondary market transactions, barriers such as high costs and, in the case of secondary market transactions, a lack of information on who holds licenses over tribal lands. Because most spectrum allocated for commercial use has already been assigned, the secondary market is one of very few avenues available to tribal entities that would like to access licensed spectrum.

FCC has taken steps to promote and support tribal access to spectrum. For example, FCC issued proposed rulemakings in 2011 and 2018 that sought comment on tribal-specific proposals, such as establishing tribal-licensing priorities and initiating processes to transfer unused spectrum licenses to tribal entities. However, FCC has not finalized these rules and is in the process of responding to comments to the 2018 rulemaking. Also, while FCC has made additional spectrum available for broadband use in recent years, tribal stakeholders cited limitations with the spectrum FCC has made available. For example, FCC allows broadband providers to operate in unused television broadcast bands on an unlicensed basis. While stakeholders GAO interviewed cited some advantages of these bands, such as being useful to reach remote customers, they also noted technical and cost limitations that reduced the potential to improve tribal access to spectrum. FCC stated that it is implementing spectrum initiatives and recognizes the importance of promoting a robust secondary market to improve communications throughout the United States, including tribal lands. However, GAO found that FCC has not collected data related to tribal access to spectrum, analyzed unused licensed spectrum that exists over tribal lands, or made data available to tribal entities in an accessible and easy manner that could be beneficial in their efforts to obtain spectrum licenses from other providers. By collecting data on the extent that tribal entities are obtaining and accessing spectrum, FCC could better understand tribal spectrum issues and use this information as it implements ongoing spectrum initiatives. Further, given that the secondary market is one of few ways for tribal entities to access licensed spectrum to be able to provide Internet service, FCC could promote a more robust secondary market by analyzing unused licensed spectrum over tribal lands and using that information to inform FCC's oversight of the secondary market. Additionally, by making information available on who holds spectrum licenses over tribal lands, FCC could remove a barrier tribes may face in attempting to obtain spectrum through the secondary market.

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Abbreviations

AWS	Advanced Wireless Services
CBRS	Citizens Broadband Radio Service
FCC	Federal Communications Commission
GHz	gigahertz
Mbps	megabits per second
MHz	megahertz
NPRM	Notice of Proposed Rulemaking
ONAP	Office of Native Affairs and Policy
PCS	Personal Communications Service
WCS	Wireless Communication Services

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November 14, 2018

The Honorable John Hoeven
Chairman
The Honorable Tom Udall
Vice Chairman
Committee on Indian Affairs
United States Senate

The Honorable John Barrasso
The Honorable Maria Cantwell
The Honorable Steve Daines
The Honorable Martin Heinrich
The Honorable Heidi Heitkamp
The Honorable Brian Schatz
The Honorable Jon Tester
United States Senate

Broadband service is viewed as vital to economic growth and improved quality of life across the country. In 2018, the Federal Communications Commission (FCC) reported that an estimated 35 percent of Americans living on tribal lands lack access to broadband services, compared to 8 percent of all Americans.¹ Furthermore, the gap in broadband access between rural areas and rural tribal lands is even larger. In particular, FCC reported in 2018 that nearly 60 percent of Americans living on rural tribal lands nationwide lack broadband access, compared to about 31

¹*In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, 2018 Broadband Deployment Report, 33 FCC Rcd 1660 (2018). As of September 24, 2018, there were 573 federally recognized Indian tribes. Federally recognized tribes have a government-to-government relationship with the United States and are eligible to receive certain protections, services, and benefits by virtue of their status as Indian tribes. In this report, the term “tribal lands” refers to any federally recognized Indian tribe’s reservation, off-reservation trust lands, pueblo, or colony; land held in trust by the federal government for Indian(s); and Alaska Native regions established pursuant to the Alaska Native Claims Settlement Act, but do not include Oklahoma Tribal Statistical Areas.

percent of rural Americans overall.² We have previously reported that tribal lands can have challenging terrain and low population densities that increase the cost and reduce business incentives for high-speed Internet deployment.³ According to FCC, this lack of service on tribal lands could impede efforts by Indian tribes to achieve self-governance and promote economic opportunity, education, public safety, and cultural preservation. Broadband service can be delivered through wireless technologies using radio frequency spectrum.⁴ According to FCC, wireless technologies are cost-effective for some remote and sparsely populated areas compared to wireline broadband technologies, such as buried fiber optic or copper cables, which can be costly to install where there is challenging terrain.⁵

According to FCC's 2010 *National Broadband Plan*, some tribes have successfully used wireless technologies to deliver Internet access, and increasing tribal access to and use of spectrum would create additional opportunities to expand broadband service on tribal lands.⁶ Congress has delegated responsibility for regulating commercial and other nonfederal spectrum use to FCC, and as part of its responsibilities, FCC assigns spectrum licenses through auctions and other mechanisms; oversees secondary market transactions, such as leasing a spectrum license;⁷ and promulgates regulations for the use of licensed and unlicensed

²Levels of broadband access may vary between specific tribal lands, which may not be reflected in these nationwide figures. We previously reported that FCC's broadband data overstate broadband access on tribal lands. As such, it is possible that the percentage of Americans living on tribal lands that lack broadband access is higher than reported. See GAO, *Broadband Internet: FCC's Data Overstate Access Tribal Lands*, [GAO-18-630](#) (Washington, D.C.: Sept. 7, 2018).

³GAO, *Telecommunications: Additional Coordination and Performance Measurement Needed for High-Speed Internet Access Programs on Tribal Lands*, [GAO-16-222](#) (Washington, D.C.: Jan. 29, 2016).

⁴Spectrum is the part of the natural spectrum of electromagnetic radiation lying between the frequencies of 3 kilohertz and 300 gigahertz.

⁵For additional information on the types of broadband technologies, see, <https://www.fcc.gov/general/types-broadband-connections>.

⁶In March 2010, an FCC task force issued the *National Broadband Plan* that included a centralized vision for achieving affordability and maximizing use of high-speed broadband. See FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010).

⁷FCC promulgates regulations for the secondary market, and its rules permit licensees to lease portions of the licensed spectrum rights to others.

spectrum.⁸ FCC has asserted that its authority to regulate nonfederal spectrum use applies to the spectrum over tribal lands. In FCC's 2000 policy statement on establishing its relationship with tribes, FCC stated that it recognizes that the federal government has a fiduciary responsibility in its dealings with tribes and has a longstanding policy of promoting tribal self-sufficiency and economic development.⁹ As a result, FCC has recognized its own general responsibility to tribes.

You asked us to review issues related to spectrum use by tribal entities—tribal governments and telecommunications providers owned by tribes. This report examines (1) tribal entities' ability to obtain and access spectrum to provide broadband services on tribal lands and the reported barriers that may exist, and (2) the extent to which FCC promotes and supports tribal efforts to obtain and access spectrum for broadband services.

To address these objectives, we reviewed relevant statutes and regulations,¹⁰ FCC documents, including FCC's *Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes*,¹¹ the *National Broadband Plan*,¹² FCC's current strategic plan,¹³ and academic and government publications identified through a literature search of spectrum-related issues on tribal lands.

To obtain information on tribal entities' ability to obtain and access spectrum, we identified tribal entities that have applied to participate in FCC's spectrum auctions or that have obtained spectrum licenses for frequency bands that can be used for broadband services by analyzing FCC data on (1) the participants in all relevant auctions, and (2) spectrum

⁸FCC implements its policy initiatives through a process known as rulemaking, which is the government-wide process for creating rules or regulations that implement, interpret, or prescribe law or policy. 5 U.S.C. § 551(4), (5).

⁹*Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes*, Policy Statement, 16 FCC Rcd 4078 (2000).

¹⁰Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (1934), as amended by *Telecommunications Act of 1996*, Pub. L. No. 104-104, § 706, 110 Stat. 53, 153 (1996) (codified as amended at 47 U.S.C. § 151).

¹¹16 FCC Rcd 4078 (2000).

¹²FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010).

¹³FCC, *Strategic Plan 2018—2022* (Washington, D.C.).

license holders that were active as of September 6, 2018—the date that FCC downloaded this data for our review. To identify tribal entities in these data, we reviewed the list of federally recognized tribes and identified search terms related to these tribes. We then identified partial matches between the identified search terms and the FCC data on auction applicants and license holders, and manually reviewed these matches based on information from interviews, Internet research, and professional judgment. Because tribal entities may have applied to participate in a spectrum auction or may hold spectrum licenses under names that did not include the search terms we identified based on the names of federally recognized tribes, there may be additional tribal entities that we did not include in our analysis. We also analyzed FCC’s license data to determine how tribal entities obtained these licenses, including through an FCC auction, administrative assignment, or a secondary market transaction. To assess the reliability of FCC’s data, we manually reviewed the data and interviewed FCC officials. Based on the results of our analysis, we determined the data to be reliable for our purpose to describe the extent that tribal entities have participated in auctions and obtained spectrum licenses; however, our analysis does not capture the extent that tribal entities may have obtained a license that is no longer active. In addition, we obtained stakeholder views on the barriers that tribal entities may face in obtaining spectrum licenses by interviewing 24 tribal entities, 3 tribal associations, 7 private providers that deliver Internet services over tribal lands, 3 industry associations that represent rural and urban telecommunications providers, 3 regional consortia, 3 companies that work with tribal entities, and 1 academic group. Of the 24 tribal entities we selected to interview, 16 were using wireless technologies to provide Internet service.¹⁴ We selected tribal entities to have variation in geographic location, level of broadband deployment, population size and density, and urban or rural distinction. We selected other stakeholders to represent a range of views and those with experience working with Indian tribes and broadband service. The views presented in our report are not generalizable to those of all stakeholders.

¹⁴While FCC defines broadband as Internet connection speeds of a certain threshold, we were not able to identify many tribal entities that were able to provide services at that speed. FCC, in its 2018 *Broadband Deployment Report*, sets a benchmark speed for wireline data rates of 25 megabits per second (Mbps) download and 3 Mbps upload, but does not have a similar benchmark for mobile broadband services. Mbps is a measure of the network’s data transfer rate (speed) and refers to the number of bits per second that travel to a user’s device (the download speed) and from a user’s device (the upload speed). 33 FCC Rcd 1660 (2018).

To determine the extent that FCC promotes and supports tribal entities' efforts to obtain and access spectrum, we reviewed relevant FCC rulemaking proceedings. We summarized stakeholder perspectives on these rulemakings by interviewing the tribal entities, tribal associations, regional consortia, industry associations, and private providers noted above, and by reviewing public comments submitted by private providers, industry and tribal associations, and tribal governments and providers. We identified FCC's efforts to provide tribal entities with spectrum-related assistance and communications by interviewing FCC officials and reviewing documentation, such as presentations provided at FCC-led tribal training workshops, e-mail communications with tribal entities, and public notices related to spectrum use over tribal lands. We also interviewed FCC officials on the information that they collect, analyze, and report related to tribal use of spectrum and reviewed related documentation, including the FCC Office of Native Affairs and Policy's 2012 Annual Report and FCC's license and auction data.¹⁵ We compared FCC's efforts to increase tribal entities' abilities to obtain and access spectrum against recommendations made in FCC's *National Broadband Plan*,¹⁶ FCC's current strategic plan,¹⁷ and *Standards for Internal Control in the Federal Government* related to using quality information.¹⁸ Appendix I describes our scope and methodology in greater detail.

We conducted this performance audit from November 2017 to November 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

¹⁵FCC's Office of Native Affairs and Policy, *2012 Annual Report*, (Washington, D.C.). This is the only report that the Office of Native Affairs and Policy has issued on tribal issues.

¹⁶FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010).

¹⁷FCC, *Strategic Plan 2018-2022* (Washington, D.C.).

¹⁸GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

Background

The federal government has recognized 573 Indian tribes as distinct, independent political communities with certain powers of sovereignty and self-government, including some power to manage the use of their territory and resources and control economic activity within their jurisdiction.¹⁹ Some tribal lands include reservations—land set aside by treaty or other agreement with the United States, executive order, or federal statute or administrative action for the residence or use of an Indian tribe.²⁰ Some tribal lands include parcels with different ownership; for example, parcels may be held in trust by the federal government for the benefit of a tribe or an individual tribal citizen. Trust and restricted lands can affect a tribe’s ability to use their land as collateral to obtain a loan. Tribal lands vary in size, demographics, and location. For example, the smallest in size are less than one square mile, and the largest, the Navajo Nation, is more than 24,000 square miles (the size of West Virginia). Tribal land locations can range from extremely remote, rural locations to urban areas. Indian tribes may form governments and subsidiaries to help manage tribal affairs including schools, housing, health, and economic enterprises.

Internet access in the United States is generally privately financed. Broadband providers build infrastructure and sell broadband services to individual consumers. We previously reported that tribal lands can have conditions that increase the cost of broadband deployment, such as remote areas with challenging terrain, which increases construction costs, as well as relatively low population densities and incomes that make it difficult to recoup deployment costs.²¹ These conditions may make it less likely that a service provider will build or maintain a network. Some tribal governments provide Internet access to their members, through an information-technology or utility department, and others have created their own telecommunications companies to provide services. FCC has

¹⁹See e.g. *New Mexico v. Mescalero Apache Tribe*, 462 U.S. 324, 335 (1983) (citing *Merrion v. Jucarilla Apache Tribe*, 455 U.S. 130, 137 (1982); see *Montana v. United States*, 450 U.S. 544 (1981).

²⁰The land within the reservation may include a mixture (or checkerboard) of tribal trust land, individual Indian trust land, and non-Indian land.

²¹GAO, *Telecommunications: Challenges to Assessing and Improving Telecommunications for Native Americans on Tribal Lands*, [GAO-06-189](#) (Washington, D.C.: Jan. 11, 2006) and [GAO-16-222](#).

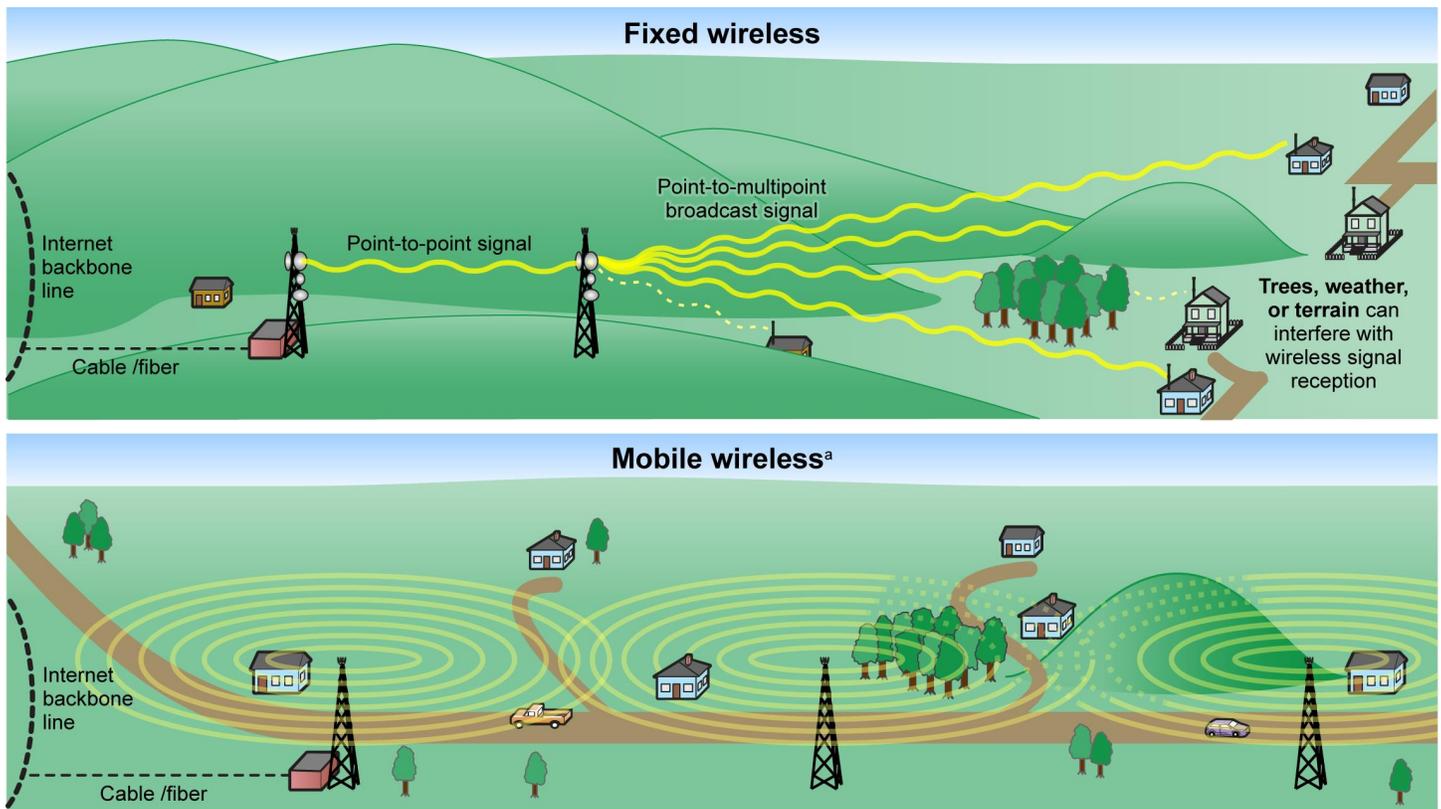
reported that in many instances, tribal governments must build and pay for their own communications infrastructure to ensure Internet access will be “delivered across Indian Country.”²²

The term “broadband” commonly refers to Internet access that is high speed and provides an “always-on” connection, so users do not have to reestablish a connection each time they access the Internet.

Telecommunications providers use a range of technologies to provide broadband service, including cable, fiber, satellite, and wireless. Wireless broadband connects users to the Internet using spectrum to transmit data between the customer’s location and the service provider’s facility, and can be transmitted using fixed wireless and mobile technologies, as shown in figure 1.

²²FCC’s Office of Native Affairs and Policy, *2012 Annual Report* (Washington, D.C.). The term “Indian country” refers to all land within the limits of any Indian reservation under the jurisdiction of the U.S. government, all dependent Indian communities within U.S. borders, and all Indian allotments, the Indian titles to which have not been extinguished including any rights-of-way running through an allotment. See 18 U.S.C. § 1151.

Figure 1: Fixed and Mobile Wireless Broadband



Source: GAO. | GAO-19-75

^aSatellite communication is also a wireless technology that exchanges data using a satellite in the sky and a dish on earth.

Fixed wireless broadband technologies establish an Internet connection between fixed points, such as from a radio or antenna that may be mounted on a tower, to a stationary wireless device located at a home. This technology generally requires a direct line of sight, and can be delivered two ways: (1) as a point-to-point transmission—between two fixed points—or (2) as a point-to-multipoint transmission—from one point to multiple users. Mobile wireless broadband technologies also establish a connection to the Internet that requires the installation of antennas, but this technology provides connectivity to customers wherever they are covered by service, including while on the move, such as with a cell phone.

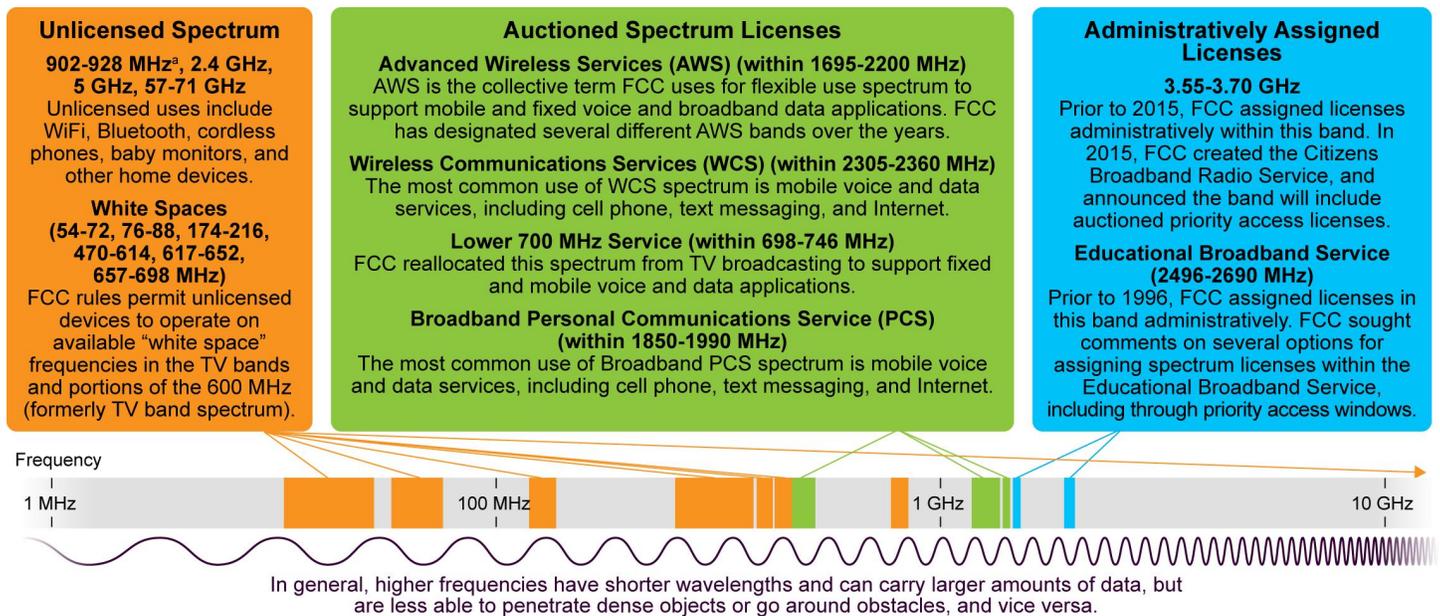
Spectrum is the resource that makes wireless broadband connections possible. Spectrum frequency bands each have different characteristics

that result in different levels of ability to cover distances, penetrate physical objects, and carry large amounts of information. For example, lower frequency bands are able to transmit signals that travel greater distances, thus requiring the use of fewer antennas, and are able to penetrate solid objects. Higher frequency bands are able to transmit more data, but are more easily obstructed.

FCC administers spectrum for nonfederal users—such as state, local government, and commercial entities—through a system of frequency allocation and assignment.²³ Allocation involves segmenting the radio spectrum into bands of frequencies designated for use by particular types of radio services or classes of users, such as commercial and nonfederal broadband services. Examples of some of the frequency bands that can be used by commercial and nonfederal entities for broadband services are shown in figure 2. Appendix II presents a full list of the auctioned licensed frequency bands that FCC told us could be used to provide broadband services.

²³The Department of Commerce's National Telecommunications and Information Administration (NTIA) is responsible for managing the federal government's use of spectrum. FCC and NTIA jointly determine the amount of spectrum allocated for federal, nonfederal, and shared use. FCC and NTIA also specify service rules, which outline the technical and operating requirements for stations using specific frequency bands.

Figure 2: Examples of Spectrum Frequency Bands Available for Commercial Broadband Services



Source: GAO analysis of Federal Communications Commission (FCC) data. | GAO-19-75

^aRadio frequencies are measured in units of Hertz, or cycles per second. The term megahertz (MHz) refers to millions of Hertz and gigahertz (GHz) to billions of Hertz.

The frequency bands that can be used for broadband services are either licensed or unlicensed. For licensed spectrum, FCC can assign licenses through auctions, in which prospective users bid for the exclusive rights to transmit on a specific frequency band within geographic areas, ensuring that interference does not occur. License holders may sell or lease their license, in whole or in part, to another provider, a process that is known as a secondary market transaction, with FCC's approval. FCC requires license holders to meet specified buildout requirements within a specified amount of time or face penalties, typically termination of all or part of the license.²⁴ These buildout requirements are designed to ensure that

²⁴47 C.F.R § 1.946(c).

licensees put spectrum to use within a specific period rather than let it sit idle and vary based on the type of license.²⁵

FCC has also assigned licenses administratively in two frequency bands that can be used for broadband services. Specifically, prior to 1996 FCC assigned geographic licenses for exclusive use in the Educational Broadband Service (2496-2690 megahertz (MHz)),²⁶ and from 2005 to 2015, FCC assigned non-exclusive nationwide licenses in the 3650-3700 MHz band, where use of the band may be shared by other license holders.²⁷ FCC also authorizes the use of some spectrum for broadband services without a license on a non-exclusive basis. With unlicensed spectrum, an unlimited number of users can share frequencies using wireless equipment certified by FCC, such as wireless microphones, baby monitors, and garage door openers. In contrast to users of licensed spectrum, unlicensed users have no regulatory protection from interference by other licensed or unlicensed users in the bands.²⁸ If multiple users are operating simultaneously on the same frequency band, the transmissions may be susceptible to interference, which reduces the quality of service.

FCC's rulemaking process includes multiple steps as outlined by law with opportunities for the public to participate during each step.²⁹ In general,

²⁵For example, as of January 2014, FCC's buildout requirements for Broadband PCS licenses require licensees to provide service to at least one-third of the population in the licensed area within 5 years of initial license grant, and two-thirds of the population within 10 years of initial license grant. Alternatively, licensees may provide substantial service to their licensed area within the appropriate 5- and 10-year benchmarks. For entities that hold 39 GHz licenses, FCC requires that substantial service must be provided within the license area within 10 years of the initial license grant.

²⁶FCC suspended the processing of Educational Broadband Service applications in 1993 and only twice since then opened filing windows—the last one in 1996. Since then, FCC has granted a number of requests for waiver and special temporary authority to permit use of these frequencies.

²⁷In June 2018, FCC made the 37-38.6 GHz band, also known as the Lower 37 GHz band, available to nonfederal users for broadband services on a non-exclusive basis, but is licensed by rule. *In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Third Report and Order 32 FCC Rcd 10988 (2018).

²⁸While there are no regulatory protections against interference for users of unlicensed spectrum, FCC has certification rules and standardized protocols that help to mitigate interference and users must accept any interference caused by all compliant devices in these bands.

²⁹See 5 U.S.C. § 553.

FCC initiates a rulemaking in response to statutes, petitions for rulemaking, or its own initiative, and releases a Notice of Proposed Rulemaking (NPRM) to propose new rules or to change existing rules.³⁰ Any interested person may submit comments as part of the public record through electronic filings and meetings with FCC officials. Following internal analysis of the public record, FCC staff may propose actions for consideration for a vote, such as adopting final rules, amending existing rules, or stating that there will be no changes. All of FCC's sitting commissioners vote on these items.

The American Recovery and Reinvestment Act of 2009 directed FCC to develop a plan to ensure every American had access to high-speed Internet.³¹ In March 2010, an FCC task force issued the *National Broadband Plan* that included a centralized vision for achieving affordability and maximizing use of high-speed Internet.³² The plan made many recommendations to FCC, including that FCC should take into account the unique spectrum needs of tribal communities when implementing spectrum policies and evaluate its policies and rules to address obstacles to spectrum access by tribal communities. With regard to tribal lands, the plan recommended that FCC increase its commitment to government-to-government consultation with tribal leaders and consider increasing tribal representation in telecommunications planning. FCC established the Office of Native Affairs and Policy (ONAP) in July 2010 to promote the deployment and adoption of communication services and technologies to all native communities, by, among other things, ensuring consultation with tribal governments pursuant to FCC policy.

³⁰47 C.F.R. § 1.412.

³¹American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat 115 (2009).

³²FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010).

Selected Tribal Entities Reported Barriers to Obtaining Licensed Spectrum

Few Tribal Entities Have Obtained Spectrum Licenses, Although Representatives from Selected Tribal Entities Emphasized the Importance of Licensed Spectrum

Through our analysis of FCC license data as of September 2018, we identified 18 tribal entities that held active spectrum licenses in bands that can be used to provide broadband services.³³ Because tribal entities may hold licenses using entity names that do not include the search terms we identified in our review of the list of tribes in the *Federal Register*, there may be additional tribal entities that we have not identified. We found that most of the tribal entities obtained the licenses through FCC administrative assignment rather than through an FCC spectrum auction or secondary market transaction.

Thirteen of the tribal entities we identified in FCC's license data held administratively assigned licenses, and these licenses are subject to certain limitations and were only available to applicants for limited time periods.³⁴ Eleven of these administratively assigned licenses are non-exclusive nationwide licenses in the 3.65 GHz frequency band (3550-3700 MHz) and were available between 2005 and 2015, when FCC issued a new rule for this band and stopped accepting new applications for these licenses. Two of the tribal entities we identified held administratively assigned Educational Broadband Service licenses in the 2.5 GHz frequency band (2496-2690 MHz). These licenses allow for the transmission of educational materials by accredited educational institutions and government organizations, including tribes, engaged in formal education and require that licensees use the spectrum for educational purposes for a certain amount of time each week. Both of

³³As of September 2018, there were over 27,000 active spectrum licenses held by over 4,400 licensees.

³⁴One of these thirteen tribal entities also held a license obtained through a secondary market transaction.

these tribal entities obtained these licenses after the last filing window closed in 1996 through a waiver and special temporary authority permit.³⁵

Four tribal entities we identified in FCC's license data held a total of 13 active licenses obtained through secondary market transactions, such as leases and sales of portions of partitioned licenses.³⁶ Of these 13 secondary market transactions, 2 involved nationwide providers.

Two of the tribal entities we identified held active licenses in bands available for broadband deployment that they obtained through an FCC spectrum auction. One of these tribal entities won with a winning bid of over \$800,000 in a 2015 auction, and the other won two licenses with winning bids of under \$50,000 in a 2002 auction. This second tribal entity also qualified for but did not win a 2003 auction. In addition to these two tribal entities, we identified the following four tribal entities that had applied to participate in auctions with varying results but did not hold active licenses in frequency bands available for broadband deployment as of September 2018:³⁷

- Two tribal entities each won a single spectrum license. The first won its license, which has since expired, in 2000, and the second won its license, which it has since been transferred to a nationwide provider through a secondary market transaction, in 2003. The first tribal entity also applied but did not qualify to participate in a 2001 auction.³⁸
- One tribal entity qualified to participate but did not win in a 2003 auction, and another tribal entity applied but did not qualify to participate in a 2008 auction.

In addition, representatives from 2 of the 16 tribal entities we interviewed that were using wireless technologies told us that they use licensed spectrum that is owned by a private provider through a partnership

³⁵FCC has granted a number of requests for waiver and special temporary authority to permit use of Educational Broadband Service frequencies.

³⁶One of these four tribal entities also held an administratively assigned license.

³⁷As with our analysis of FCC license data, there may be additional tribal entities that applied to participate in FCC spectrum auctions not reflected in our report if the applicant name used did not include a search term we identified in our review of the list of federally recognized tribes in the *Federal Register*.

³⁸Requirements to qualify for auctions may include limits on combined total assets and combined gross revenues in a certain number of years preceding the auction.

relationship. We have previously reported that some tribes have formed partnership arrangements with other entities to increase broadband access on tribal lands.³⁹

Most (14 of 16) of the tribal entities we contacted that were using wireless technologies told us that they are accessing various unlicensed bands, such as the 2.4 GHz and 5 GHz bands, to provide service. Representatives from eight of these tribal entities reported using only unlicensed spectrum for their fixed wireless networks. Representatives from 13 tribal entities told us that unlicensed spectrum had the advantage of being free, and representatives from one tribal entity told us that the equipment needed to access these spectrum bands is less expensive than equipment for accessing other spectrum bands. Representatives from some tribal entities reported success in using unlicensed spectrum in certain circumstances. For example, one tribal entity reported using unlicensed spectrum for homes in remote areas where the only potential signal degradation is from trees as well as to set up local hot spots that can serve 5 to 10 users at a time. Another tribal entity reported using primarily unlicensed spectrum to carry signals to end users together with non-exclusive licensed spectrum (3.65 GHz band) for locations where there is congestion in the unlicensed bands.

However, representatives from the tribal entities we contacted that were using wireless technologies emphasized the advantages of licensed spectrum and discussed their experiences with the limitations of unlicensed spectrum. As described earlier, exclusive-use spectrum licenses protect license holders from interference from other users, whereas unlicensed spectrum provides no protection against interference. Representatives from 13 of 16 tribal entities identified the fact that unlicensed spectrum is available at no cost as an advantage of this type of spectrum. However, representatives from 15 of the 16 tribal entities identified limitations associated with unlicensed spectrum, such as interference, as described in table 1.

³⁹GAO, *Tribal Broadband: Few Partnerships Exist and the Rural Utilities Service Needs to Identify and Address Any Funding Barriers Tribes Face*, [GAO-18-682](#) (Washington, D.C.: Sept. 28, 2018).

Table 1: Limitations of Unlicensed Spectrum Identified by Tribal Entities

Limitation of unlicensed spectrum	Number of tribal entities that identified this limitation ^a	Examples of tribal entities' experiences with this limitation
Interference	11	Representatives reported that users experience interference from a variety of devices that use unlicensed spectrum such as Bluetooth devices, baby monitors, remote controls, cordless phones, smart televisions, and highway signage.
Speed or capacity	12	<p>Representatives from one tribal entity reported that there is insufficient unlicensed bandwidth available to provide high-speed Internet for a whole town. The entity is currently able to offer 25 megabits download speed, but as it gets more subscribers, it will be unable to maintain this speed.</p> <p>Representatives from another tribal entity indicated that unlicensed spectrum lacks the capacity and speed to provide residential broadband.</p>

Source: GAO analysis of information provided by tribal entities. | GAO-19-75

^aTribal entities may have identified more than one limitation of licensed spectrum.

Tribal associations, an academic group, a tribal consortium, and FCC have all highlighted the importance of exclusive-use licensed spectrum for tribal entities. Specifically, both a tribal association and an academic group we contacted discussed interference and other challenges of unlicensed spectrum. Representatives from one tribal association pointed out that unlicensed spectrum might not be available in the future if it is allocated for other purposes. Representatives from a tribal consortium we contacted told us that they are already using all of the available unlicensed spectrum for providing Internet access and that they cannot expand service without encountering interference and capacity limitations. Lastly, ONAP reported in 2012 that unlicensed spectrum is not an option across all tribal lands and that tribal access to robust licensed spectrum is a critical need.⁴⁰

Representatives from the stakeholders we interviewed told us that there are also non-technological benefits for tribal entities to obtain greater access to licensed spectrum. For example:

- Enhanced ability to deliver additional Internet service.**
 Representatives from one of the tribal associations, an academic group, and six of the tribal entities said that increased access to licensed spectrum would enable them to deliver their own Internet services and bridge service gaps, thus improving Internet access to their members. For example, representatives from three of these tribal

⁴⁰FCC's Office of Native Affairs and Policy, *2012 Annual Report*, (Washington, D.C.).

entities said that such access would enable them to deploy in areas where providers that currently hold licenses were not willing to deliver services. In addition, representatives from another tribal entity said that having access to licensed spectrum is one factor that would enable the tribe to establish its own telecommunications company.

- **Ability to sell or lease spectrum for profit.** Representatives from one tribal association, an academic group, and two tribal entities told us that holding spectrum licenses would enable tribal governments to sell or lease their licenses. For example, we heard from one of these tribal entities that it was able to sell portions of its license that did not cover tribal lands and to use the profits from the sale to invest in its own network infrastructure.
- **Opportunities for federal funding.** Access to licensed spectrum may also provide tribal entities with more opportunity to obtain federal funding, specifically through two Universal Service Fund programs—the Mobility Fund and the Tribal Mobility Fund. These programs provide funding to broadband service providers to expand service in areas where it is not available, including tribal lands. However, service providers must hold, lease, or show they have access to licensed spectrum to participate in these programs, among other requirements.⁴¹ For example, the National Congress of American Indians stated that two tribal entities submitted applications to participate in the Mobility Fund program but were not eligible to participate in part because they did not hold a spectrum license. Moreover, representatives from two of the tribal entities we interviewed told us that they considered applying for one of these programs but realized they were ineligible because they did not have access to licensed spectrum.

Furthermore, representatives from one of the tribal associations, an academic group, and seven of the tribal entities told us that having access to licensed spectrum would enable tribes to exercise their rights to sovereignty and self-determination. Representatives from three of the tribal entities we contacted said that they view spectrum as a natural resource that should be managed by the tribe.⁴² FCC officials, however,

⁴¹In order to apply to participate in the Mobility Fund program, an applicant must be designated as an eligible telecommunications carrier, with one narrow exception for tribally owned or controlled entities. To qualify, a tribally owned or controlled entity may have an application pending for eligible telecommunications carrier designation. FCC allowed this exception to afford tribes an increased opportunity to participate at auction.

⁴²We did not analyze this issue as it was outside the scope of the report.

told us that spectrum is not considered a reserved right under treaties with Indian tribes, as it is not explicitly stated. In addition, representatives from four of the tribal entities told us that having access to licensed spectrum would ensure that spectrum is being used in a way that aligns with tribal goals and community needs, further supporting their rights to self-determination.

Representatives from Selected Tribal Entities Reported Cost and Other Barriers to Accessing Licensed Spectrum

Representatives from the tribal entities we contacted identified several barriers to accessing licensed spectrum through spectrum auctions and secondary market transactions.⁴³ Regarding spectrum auctions, representatives from tribal entities that provide wireless Internet service most frequently (13 of 16) indicated that spectrum licenses are too expensive for tribal entities. For example, over 60 percent (983 of 1,611) of the winning bids from a 2015 spectrum auction, including bids for spectrum over non-tribal lands, were over \$1 million. Representatives from one tribal entity explained that auction licenses are often too expensive for tribal entities because these licenses cover large geographic areas that may include non-tribal urban areas as well as rural tribal areas. Moreover, representatives from eight tribal entities stated that they are unable to obtain financing to participate in auctions because tribal governments cannot use tribal lands as collateral to obtain loans. In addition, representatives from eight tribal entities mentioned that participating in spectrum auctions requires auction-specific expertise that tribal entities may not have.

Tribal entities also face barriers obtaining spectrum through secondary market transactions. Most of the spectrum allocated for commercial use has already been assigned through spectrum auctions and other mechanisms to private providers, including licensees that may not be providing service on tribal lands. In a single geographic area, several

⁴³In addition, representatives from six tribal entities identified barriers to accessing licenses in the 3.65 GHz band and in the Educational Broadband Service band, both of which are administratively assigned licenses. For example, representatives from two tribal entities told us that accessing spectrum in the Educational Broadband Service band was challenging because most licenses are held by other providers. In addition, representatives from two tribal entities stated that the equipment required to deploy wireless services in the 3.65 GHz band is more expensive than equipment for unlicensed spectrum and was not widely available. Representatives from two of the tribal entities we contacted were unaware that these licenses were available.

frequency bands could be used to deploy broadband services, as shown in figure 2, and licenses for these various frequency bands may be held by different providers. There may be tribal areas where providers hold licenses for bands but are not using the spectrum to provide Internet access. In other tribal areas, services may be offered using one or two of the spectrum licenses with the other licenses in the area remaining fallow and inaccessible to tribal entities. All three of the tribal associations we contacted confirmed that there are unused spectrum licenses over tribal lands, and representatives from a nationwide provider indicated that they only deploy services if there is a business case to support doing so.⁴⁴ Accordingly, the secondary market is one of few avenues available to tribal entities that would like to access licensed spectrum. However, representatives from tribal entities we contacted identified the following challenges related to participating in the secondary market:

- **Lack of willing sellers.** Representatives from eight of the tribal entities, one of the tribal representative groups, and an industry association we contacted indicated that spectrum license holders are often unwilling to participate in secondary market transactions, citing a variety of reasons. For example, representatives from one tribal entity stated that large carriers have no business incentive to negotiate secondary market agreements with tribal entities and that tribal entities do not have the resources to make such transactions sufficiently lucrative for license holders. Representatives from another tribal entity stated that license holders may lack knowledge about the areas covered by their licenses, including tribal areas, and therefore may be unwilling to consider secondary market transactions. Representatives from a tribal representative group told us that license holders may be unwilling to consider secondary market transactions with tribal entities because spectrum is a valuable resource that may become even more valuable over time, and a representative from an industry association indicated that transaction costs such as legal fees outweigh any potential income from such transactions. None of the private providers we contacted reported entering into a secondary market transaction with tribal entities, but one of these providers stated that it had never been approached by a tribal entity interested

⁴⁴As described above, FCC uses buildout requirements to ensure that spectrum is put to use. However, representatives from one of the tribal associations we interviewed told us that because the geographic size of licenses are often very large, providers are able to meet their buildout requirements without delivering services across tribal lands by targeting their deployment in larger, urban areas.

in a secondary market transaction and was unaware of challenges that are unique to tribal entities.

- **License holders unknown.** Representatives from eight of the tribal entities we contacted stated that it is difficult to determine who holds spectrum licenses. For example, two tribal entities had to hire consultants to identify who held licenses for spectrum over the tribes' lands, and another tribal entity relied on the expertise of its non-tribal partner to identify the license holders.
- **Unaware of secondary market transactions.** Representatives from six of the tribal entities we contacted were unaware of the possibility of accessing licensed spectrum through a secondary market transaction prior to our contacting them.

Accordingly, secondary market transactions involving tribal entities are rare. As discussed above, our analysis of FCC license data identified four tribal entities that have successfully accessed licensed spectrum in this manner. Regarding one of these tribal entities' experiences with the secondary market, the tribal representative we contacted stated that an Indian-owned telecommunications consulting company was pivotal in identifying the license holder and facilitating the transaction and that the transaction would not have happened without the consulting company. Representatives from this company told us that they conducted an analysis to identify unused spectrum licenses over the tribe's land. The company identified three providers holding such licenses, but only one of those providers was willing to participate in a secondary market transaction. Representatives from another of the tribal entities that accessed licensed spectrum through the secondary market told us that they relied on the expertise of their non-tribal partner to facilitate these transactions.

FCC Has Some Efforts to Enhance Tribal Access to Spectrum, but FCC Does Not Collect or Communicate Key Information to Tribal Entities

FCC Has Taken Steps to Promote and Support Tribal Entities' Ability to Obtain Spectrum, However These Efforts Are Not Likely to Address Tribal Spectrum Needs

We found that FCC has taken the following actions to increase tribal access to and use of spectrum: (1) initiated proposed rulemakings on promoting tribal access to spectrum, (2) adopted rules to increase spectrum available for broadband use, and (3) conducted outreach and training for tribal entities on spectrum-related issues.

Initiated Proposed Rulemakings on Promoting Tribal Access to Spectrum

FCC issued two NPRMs—one in March 2011 and one in May 2018—that included policy options intended to enhance tribal access to spectrum. At the time of our report, FCC had not adopted new rules or taken further action on the 2011 rulemaking,⁴⁵ and FCC had not taken further actions since the comments period ended on September 7, 2018, on the May 2018 rulemaking.⁴⁶ According to FCC officials, the 2011 NPRM addressed several recommendations made in the *National Broadband Plan* to promote the greater use of spectrum over tribal lands.⁴⁷ Among other things, the 2011 NPRM sought comments on three proposals to create new spectrum access opportunities for tribal entities (see fig. 3).⁴⁸

⁴⁵*In the Matter of Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum over Tribal Lands*, Notice of Proposed Rulemaking 26 FCC Rcd 2623 (2011).

⁴⁶*In the Matter of Transforming the 2.5 GHz Band*, Notice of Proposed Rulemaking, WT Docket No. 18-120 (2018).

⁴⁷FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010).

⁴⁸The 2011 NPRM included other proposals not related to enhancing tribal access to spectrum, but rather to incentivize build-out in tribal areas by license holders, such as making modifications to the Tribal Lands Bidding Credit Program and creating Construction Safe Harbor provisions.

FCC officials told us that they have reviewed public comments to the proposed rulemaking, but have no current plans to take further actions.

Figure 3: Proposals Made in Federal Communications Commission’s (FCC) 2011 Notice of Proposed Rulemaking (NPRM) to Promote Tribal Access to Spectrum

Proposal	Description
<p>Tribal licensing priority</p> 	<p>Establish a licensing priority for tribal entities to obtain not-yet-assigned licenses, such as at future auctions for fixed and mobile wireless services, for unserved or underserved tribal lands. The NPRM proposed two ways to provide tribal entities with priority access, including (1) provide a tribal priority application window after FCC has announced a spectrum auction but before the window for filling auction applications opens or (2) provide a tribal priority application window before FCC has announced a spectrum auction.</p>
<p>Good faith negotiations</p> 	<p>Establish a process to help tribal entities secure access to spectrum over tribal lands through secondary market opportunities. The NPRM proposed creating a formal negotiation process that would enable a tribal entity to require a licensee holder to enter into good faith negotiations regarding a secondary market transaction for any geographic portion of the license that is covered by unserved or underserved tribal lands.</p>
<p>Build-or-divest process</p> 	<p>Establish a process where a tribal entity could require a licensee to build or divest a geographic area covering unserved or underserved tribal lands within its license area. The NPRM proposed initiating such a process where an existing licensee has satisfied the applicable construction requirements for the license yet tribal land areas remain unserved or underserved.</p>

Source: GAO analysis of FCC information. | GAO-19-75

We reviewed the public comments FCC received that pertained to the three proposals, which included comments from tribal associations, tribal governments, rural and nationwide industry associations, and tribal and private providers.⁴⁹ Based on our analysis of the comments that included positions on the proposal for a tribal licensing priority, eight stakeholders—including industry associations, private providers, and a tribal government—were supportive of this proposal.⁵⁰ However, we found that stakeholder views differed on implementing good faith negotiations and on the build-or-divest processes. In general, the tribal stakeholders indicated that they were supportive of these proposals, while the industry associations and private providers were not. In addition to reviewing the public comments, we asked representatives from the tribal and industry associations and private providers that we interviewed about their views

⁴⁹We identified 16 stakeholders that provided public comments on these proposals, including 3 tribal associations, 2 rural industry associations, 4 nationwide associations, 4 private providers, 1 rural non-tribal provider, 1 tribal provider, and 1 tribal government. Not all stakeholders provided comments on each proposal.

⁵⁰Stakeholders’ views differed on how the tribal licensing priority provision should be structured.

of these proposals.⁵¹ Representatives from the three tribal associations and two rural industry associations were generally supportive of all three of the proposals, while representatives from one of the private providers that we interviewed told us they did not support any of the three proposals, because, for example, they said that there are more effective ways to increase broadband service over tribal lands.⁵² Representatives from another private provider said that they supported the tribal priority process but did not indicate their views on the other two proposals.⁵³ Representatives from six tribal entities and a representative from a tribal consortium told us that these types of proposals would help them obtain spectrum.

In May 2018, FCC issued an NPRM that sought comments on establishing a tribal priority window for tribal nations located in rural areas as part of a process to re-license the Educational Broadband Service spectrum band.⁵⁴ As described above, FCC originally allocated this band to qualifying educational institutions and government organizations for the transmission of educational materials. While FCC permitted licensees to lease their excess capacity to commercial providers, FCC reported that significant portions of this band were not being used, primarily in rural areas. In an effort to make additional spectrum available for broadband use, FCC issued this NPRM seeking comments on options to promote the use of this spectrum over tribal lands. One of the options included implementing a local priority filing window so that tribal entities could get access to unassigned spectrum prior to an FCC auction. In a June 2018 order, FCC extended the comment deadline for the NPRM to August 8, 2018, partly in response to a request for a deadline extension. As a result, FCC also extended the deadline to respond to those comments to September 7, 2018. Because FCC was in the process of responding to

⁵¹Representatives from the nationwide industry association that we contacted referred us to the comments they submitted to the 2011 NPRM, which indicated their support for the implementation of a tribal priority process, but not for the implementation of a good faith negotiation process or the build-or-divest proposal.

⁵²Representatives from the rural industry associations both supported the tribal priority process and the build-or-divest process but differed in their support on the good faith negotiations process; however both agreed that some of the proposals should be expanded to include non-tribal rural providers.

⁵³Representatives from the other private provider did not indicate their position on any of the proposals.

⁵⁴*In the Matter of Transforming the 2.5 GHz Band*, Notice of Proposed Rulemaking, DA 18-394 (2018).

these comments at the time of our review, we did not analyze these comments.

Adopted Rules to Allocate Additional Spectrum for Broadband Use

FCC has made additional unlicensed and licensed spectrum available for broadband use and has implemented rules that according to FCC, may make it easier for rural providers to obtain licenses.⁵⁵ However, these efforts were not targeted to tribal entities, and according to ONAP's 2012 report, allocating additional unlicensed spectrum may not be a technically feasible solution for all tribal entities, and such spectrum may not have the necessary capacity to handle an increase in users.⁵⁶ In addition, representatives from the tribal associations and entities we contacted told us that there are limitations to the extent that these efforts can address the spectrum needs of tribal entities. In particular, they discussed the effect of FCC's changes to the rules on the use of TV white space spectrum and the Citizens Broadband Radio Service spectrum:

- *TV white space spectrum:* In 2010, FCC made additional unlicensed spectrum available for broadband use by allowing providers to operate in the TV bands at locations where those frequencies were not in use, known as TV white space,⁵⁷ but none of the tribal entities we interviewed was using this spectrum. A representative from a tribal consortium said that it used TV white space spectrum, and representatives from three of the tribal entities said that they were considering using it in the future because TV white space spectrum can better pass through some environmental barriers, such as trees, reaching more remote customers. However, representatives from five

⁵⁵FCC has issued two NPRMs on making spectrum in certain bands above 95 GHz and between 3.7 GHz and 4.2 GHz available for broadband services on an unlicensed basis. See, *In the Matter of Spectrum Horizons*, Notice of Proposed Rulemaking and Order, 33 FCC Rcd 2438 (2018) and *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Notice of Proposed Rulemaking, 2018 LEXIS 1827 (2018).

⁵⁶FCC's Office of Native Affairs and Policy, *2012 Annual Report*, (Washington, D.C.).

⁵⁷*In the Matter of Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz Band*, Second Memorandum Opinion and Order, 25 FCC Rcd 18661 (2010). FCC adopted additional rules on the use of TV white space in 2012, rules that included increasing antenna height limitations to make it easier for rural providers to deploy broadband services. See, *In the Matter of Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz Band*, Third Memorandum Opinion and Order, 28 FCC Rcd 5330 (2012).

tribal entities, one tribal consortium, one academic group, and three companies that we interviewed told us about several limitations to the use of TV white space spectrum. For example:

- limited bandwidth capacity, which causes lower speeds, high latency,⁵⁸ and limits the number of households that can be served;
 - equipment needed to access TV whitespace spectrum is expensive and less available;
 - the spectrum may not always be available; and
 - similar to other unlicensed frequency bands, as described above, there is potential for interference and difficulty to pass through extreme terrain.
- *Citizens Broadband Radio Service (CBRS) Spectrum:* In 2015, FCC made additional licensed spectrum available for broadband use when it issued a new rule for the 3.65 GHz frequency band (3550-3700 MHz).⁵⁹ However the tribal entities who held licenses in this band indicated there are limitations to their ability to use this band and their future use of this spectrum remains unknown. As described earlier, FCC had allocated non-exclusive nationwide licenses in this band. In the 2015 rule, FCC created the CBRS, increased the amount of spectrum allocated for commercial broadband use, and implemented a new licensing scheme. This three-tier priority licensing scheme for spectrum sharing included auctioning exclusive-use geographic licenses and allowing non-exclusive use of the band where a license holder is not operating, an approach that is intended to provide a low-cost entry point for users, but will have no protections from interference. Representatives from four of the five tribal entities that we contacted that held licenses in this band said that there were technical advantages to using it, such as the ability for a signal to pass through dense forests. However, representatives from two tribal entities said that the high cost of the equipment needed to access this spectrum prevented them from either using the frequency band extensively or at all. In addition, representatives from two tribal entities said that they were not sure about their ability to access this band in

⁵⁸Latency refers to the amount of time it takes for data to travel from a computer to a server and back again.

⁵⁹*In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking 30 FCC Rcd 3959 (2015).

the future given the changes made in FCC's 2015 rulemaking.⁶⁰ FCC's 2015 rule also created small-sized and shorter-termed licenses, which FCC stated would decrease the costs of obtaining a license and help rural providers access it. However, FCC issued an NPRM in 2017 that sought comments on suggested changes to CBRS, including *increasing* the geographic area covered by licenses and *lengthening* the license term.⁶¹ In October 2018, FCC adopted rules that, among other changes, increased the license area from census tracts to counties and extended the license term from 3 to 10 years, which FCC officials told us were modest changes made to accomplish FCC's goals of creating incentives for investment, including in urban and rural areas, encouraging efficient spectrum use, and promoting robust network deployments.⁶²

Conducted Outreach and Training for Tribal Entities on Spectrum-Related Issues

FCC's ONAP conducts training, consultation, and outreach to tribal entities on spectrum-related issues. For example, ONAP officials told us that they have conducted 21 training and consultation workshops for tribal entities on broadband and telecom since 2012, where spectrum has been discussed in general in the introduction and has been addressed specifically in separate sessions in some of the workshops. These officials also told us that they communicate with tribal entities prior to when FCC holds auctions or when implementing regulatory actions or policies that will affect tribal governments and spectrum over their lands. While representatives from 9 of the 16 tribal entities using wireless

⁶⁰In the 2015 rules, FCC, with some exceptions allowed entities with existing licenses to continue operations until April 17, 2020 or until the expiration date of their authorization. Existing licensees whose licenses expire before April 17, 2020 are allowed to request a one-time renewal not to exceed April 17, 2020. Entities that registered their site, constructed, began operating, and were in compliance with FCC's rules prior to April 17, 2015, were granted exclusive use the band until the end of their license term.

⁶¹*In the Matter of Promoting Investment in the 3550-3700 MHz Band; Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, Notice of Proposed Rulemaking and Order Terminating Petitions, 2017 FCC LEXIS 3329 (2017).

⁶²*In the Matter of Promoting Investment in the 3550-3700 MHz Band*, Report and Order, FCC 18-149 (2018). FCC officials told us that the new rules also provided licensees with the ability to renew, new performance requirements, expanded secondary market rights, bidding credits for small and rural entities, including a tribal land bidding credit, and other changes to the technical rules and auction methodology. In addition, FCC officials said that because the new rules are intended to increase investment, the cost of equipment should decrease.

technologies told us that they had received some outreach on spectrum-related issues from FCC, representatives from 2 of these entities said that they had not.⁶³ In addition, ONAP issued a report in 2012 to provide FCC with a review of its work with tribal governments and organizations, including information on its tribal broadband efforts, priorities, and tribal consultations.⁶⁴ Among other things, the report included case-study information on tribal entities' efforts to access spectrum. Although the report stated that this would be the first of such annual reporting, this is the only report that ONAP has issued on tribal issues. According to ONAP officials, ONAP has not published subsequent reports because it provides FCC with information on its work with tribal governments and organizations, including spectrum-related matters, through more frequent informal briefings and regular updates.

FCC Does Not Collect Key Information Related to Spectrum over Tribal Lands or Communicate It to Tribal Entities

FCC has not consistently collected information related to tribal access to spectrum. For example, FCC does not collect data on whether holders of spectrum licenses or auction applicants are tribal entities even though it collects self-reported data on licensee type, such as corporation and government entity. To obtain this information, FCC could include an option for the licensee type, along with the other options, in applications for future licenses and auctions that allows an applicant to identify as a tribal government or tribally owned entity. FCC officials told us that they use information on licensee type to determine eligibility for a license. Because eligibility is not based on whether the applicant is a tribal entity, FCC officials said this information is not needed. However, without this information, FCC does not have a comprehensive understanding of the extent that tribal entities are attempting to obtain or access licensed spectrum or have been successful at obtaining and accessing it.

Additionally, FCC does not analyze information on unused licensed spectrum that exists over tribal lands, even though FCC has information—broadband availability data from providers and information

⁶³Five of the tribal entities we contacted did not provide us with responses on whether they had received outreach on spectrum-related issues from FCC.

⁶⁴FCC's Office of Native Affairs and Policy, *2012 Annual Report*, (Washington, D.C.).

on geographic areas covered by spectrum licenses—that could be used for such analysis. As we described earlier, representatives from all three of the tribal associations we contacted reported that there are unused spectrum licenses over tribal lands that could present opportunities through the secondary market for tribal entities to obtain spectrum. When we asked FCC officials why they do not analyze the extent that unused spectrum licenses exists over tribal lands, they told us that the spectrum data noted above is not specific enough to allow for a license by license analysis of unused spectrum. For example, they said that broadband availability data from providers is aggregated across wide spectrum bands to minimize reporting burdens on the wireless industry, and the data are not sufficiently detailed to identify which spectrum blocks and licenses are being used in particular areas. However, FCC could use this data to conduct, at a minimum, high-level analysis that would result in useful information on the extent to which unused spectrum exists over tribal lands. In addition, FCC officials told us that they evaluate the effectiveness of FCC’s secondary markets policies, which FCC views as a mechanism to promote the increased use of unused spectrum licenses, but this approach does not include an analysis of unused spectrum licenses as part of these efforts. As a result, FCC’s evaluations of the secondary market may not accurately reflect how these policies affect tribal access to spectrum. Because the secondary market is one of few ways for tribal entities to access licensed spectrum, an analysis of unused licensed spectrum that exists over tribal lands would enable FCC to better promote a robust secondary market that provides additional opportunities for tribes to access spectrum.

FCC’s 2010 *National Broadband Plan* stated that ongoing measurement of spectrum utilization should be developed to better understand how spectrum resources are being used because some studies indicated that spectrum goes unused in many places much of the time. The plan also stated that any spectrum utilization studies that FCC conducts should identify tribal lands as distinct entities. In FCC’s February 2018 strategic plan, FCC stated that it will implement ongoing initiatives that will assist in spectrum policy planning and decision making, promote a robust secondary market in spectrum, and improve communications services in all areas of the United States, including tribal areas. Additionally, *Standards for Internal Control in the Federal Government* state that

agencies should use quality information, including information that is complete, to inform the decision-making processes.⁶⁵

FCC also does not make information on spectrum-license holders available in an easy or accessible manner; such information could be beneficial to the tribes in their efforts to obtain spectrum in the secondary market. As described earlier, the secondary market is a significant mechanism for tribal entities to obtain spectrum licenses, but representatives from the tribal entities we interviewed reported challenges related to participating in the secondary market, such as not knowing whom to contact should they wish to engage in a secondary market transaction to obtain a spectrum license. In July 2014, FCC stopped updating its spectrum dashboard, which provided the public with a way to identify who holds licenses in what areas, including features that allowed users to identify spectrum allocated and assigned in tribal lands. ONAP stated in its 2012 report that this feature represented the first step for individual tribal entities to reach out to licensees and seek leasing, partnership, or other arrangements that could ultimately result in the provision of service over tribal lands.⁶⁶ FCC officials told us that the public may view electronic records of all wireless spectrum licenses in FCC's Universal Licensing System, using a wide range of license and geographic parameters, such as licensee names, radio services, spectrum bands, and geographic locations. However, we attempted to navigate the Universal Licensing System to determine spectrum-license holders for specific tribal lands using geographic parameters, but we were unable to successfully do so because the system is so difficult to use. Furthermore, as described above, representatives from eight of the tribal entities that we contacted stated that it is difficult to determine who holds spectrum licenses. When we asked FCC officials why they do not communicate information to tribes about spectrum-related transactions over tribal lands, FCC officials also told us that they issue public notices on applications for all proposed spectrum transactions and on the winning bidders of all auctions, but they have not made it a practice to reach out directly to tribes to make them aware of when providers have obtained spectrum licenses that cover tribal lands.

The *National Broadband Plan* stated that FCC should make data available that would promote a robust secondary market for spectrum

⁶⁵[GAO-14-704G](#).

⁶⁶FCC's Office of Native Affairs and Policy, *2012 Annual Report*, (Washington, D.C.).

licenses, such as information on how and to whom spectrum is allocated on tribal lands. Additionally, *Standards for Internal Control in the Federal Government* state the need for federal agencies to communicate with external entities and to enable these entities to provide quality information to the agency that will help it achieve its objectives.⁶⁷ Tribal governments are an example of such external entities. The ability of tribal governments to make informed spectrum planning decisions and to participate in secondary market transactions is diminished without information from FCC on the spectrum transactions that occur over tribal lands. Providing this information in a manner that is accessible and easy for tribal entities to obtain could enable them to enter into leasing, partnership, or other arrangements to obtain spectrum.

Conclusions

Broadband service on tribal lands continues to lag behind the rest of the country, especially on rural tribal lands, which could hinder tribal efforts to promote self-governance, economic opportunity, education, public safety, and cultural preservation. FCC has reported that wireless technologies that access spectrum to deliver broadband services are cost-effective for remote and sparsely populated areas, such as tribal lands. However, FCC's efforts to promote and support tribal entities' access to spectrum have done little to increase tribal use of spectrum, as only very few tribes are accessing spectrum to be able to provide Internet service. Additionally, FCC lacks information that could help inform its decision-making processes related to spectrum policy planning, which is intended to improve communications services in all areas of the United States, including tribal lands. By collecting data on the extent that tribal entities are obtaining and accessing spectrum, FCC could better understand tribal spectrum issues and use this information as it implements ongoing spectrum initiatives. Furthermore, the secondary market is one of few ways for tribal entities to access licensed spectrum to be able to provide Internet service, and FCC has recognized the importance of promoting a robust secondary market. FCC could promote a more robust secondary market by analyzing data to better understand how much unused licensed spectrum exists over tribal lands and using that information to promulgate regulations and to evaluate how FCC policies affect tribal participation in the secondary market. Additionally, by making information on who holds

⁶⁷ [GAO-14-704G](#).

spectrum licenses over tribal lands more accessible and easy to understand, FCC could remove a barrier tribes may face in attempting to obtain spectrum through the secondary market.

Recommendations for Executive Action

We are making the following three recommendations to the Chairman of FCC.

- The Chairman of FCC should collect data on the extent that tribal entities are obtaining and accessing spectrum and use this information as FCC implements ongoing spectrum initiatives. (Recommendation 1)
- The Chairman of FCC should analyze data to better understand the extent that unused spectrum licenses exist over tribal lands, such as by analyzing the data for a sample of tribal lands, and as appropriate use this information to inform its oversight of the secondary market. (Recommendation 2)
- The Chairman of FCC should make information on spectrum-license holders more accessible and easy to understand for interested parties, including tribal entities, to promote their ability to purchase or lease spectrum licenses from other providers. (Recommendation 3)

Agency Comments

We provided a draft of this report to FCC for comment. In its comments, reproduced in appendix III, FCC agreed with the recommendations. FCC also provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Chairman of FCC, and other interested parties. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or goldsteinm@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

A handwritten signature in black ink, appearing to read 'M. Goldstein', with a long horizontal flourish extending to the right.

Mark L. Goldstein
Director, Physical Infrastructure

Appendix I: Objectives, Scope, and Methodology

This report examines (1) what is known about the ability of tribal entities to obtain and access spectrum to provide broadband services on tribal lands and the reported barriers that may exist; and (2) the extent to which the Federal Communications Commission (FCC) promotes and supports tribal entities' ability to obtain and access spectrum for broadband services.

To address both objectives, we reviewed relevant statutes and regulations¹ and FCC documents, including FCC's Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes,² the *National Broadband Plan*,³ and FCC's current strategic plan.⁴ We interviewed FCC officials and representatives from 3 tribal associations, 7 private providers that deliver Internet services over tribal lands, 3 industry associations that represent rural and urban telecommunications providers, 3 regional consortia, 3 companies that work with tribal entities, and 1 academic group. In addition, we selected 24 tribal entities—13 Indian tribes and nations and 11 tribally owned providers—to interview.

To identify tribal entities that were using wireless technologies, we obtained recommendations from stakeholders, reviewed data on relevant federal grants, such as the Broadband Technology Opportunities Program, and conducted Internet research. We then selected 16 tribal entities considering (1) stakeholder suggestions, (2) population, (3) population density, and (4) urban or rural designation. We visited 7 of these tribes in Idaho, New Mexico, and Washington State. The views represented in our report are not generalizable to those of all

¹Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (1934), as amended by *Telecommunications Act of 1996*, Pub. L. No. 104-104, § 706, 110 Stat. 53, 153 (1996) (codified as amended at 47 U.S.C. § 151).

²*Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes*, Policy Statement, 16 FCC Rcd 4078 (2000).

³FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010).

⁴FCC, *Strategic Plan 2018-2022* (Washington, D.C.).

stakeholders. See table 2 for a complete listing of the entities we interviewed. We also conducted a literature review to identify relevant academic, government, and media publications that were published between January 1, 2013, and January 11, 2018, that discuss the importance of and options to enhance tribal access to spectrum.

Table 2: List of Entities Interviewed

Category	Category member
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Choctaw Nation of Oklahoma (OK)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Confederated Tribes of the Colville Reservation (WA)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Fond du Lac Band of Lake Superior Chippewa (MN)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Fort Belknap Indian Community (MT)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Gila River Telecommunications, Inc. (AZ)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Hopi Telecommunications, Inc. (AZ)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Jamestown S’Klallam Tribe (WA)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Karuk Tribe (CA)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Makah Indian Tribe (WA)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Navajo Tribal Utility Authority (AZ, NM, UT)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Nez Perce Tribe (ID)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Osage Nation (OK)

Appendix I: Objectives, Scope, and Methodology

Category	Category member
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Pueblo of Acoma (NM)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Pueblo of Pojoaque (NM)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Pueblo of San Ildefonso (NM)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Pueblo of Santa Clara (NM)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Red Spectrum Communications (ID)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Saint Regis Mohawk Tribe (NY)/Mohawk Networks, LLC
Tribal entities (tribal governments and telecommunications providers owned by tribes)	San Carlos Apache Telecommunications Utility, Inc. (AZ)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Standing Rock Telecommunications, Inc. (SD)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Spokane Tribe of Indians (WA)/Spokane Tribe Telecom Exchange
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Taos Pueblo (NM)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Warm Springs Telecommunications Co. (OR)
Tribal entities (tribal governments and telecommunications providers owned by tribes)	Yurok Tribe (CA)/Yurok Connect
Tribal associations	National Congress of American Indians
Tribal associations	National Tribal Telecommunications Association
Tribal associations	Native American Finance Officers Association (NAFOA)
Regional consortia	Middle Rio Grande Pueblo Consortium
Regional consortia	REDINet
Regional consortia	Southern California Tribal Chairmen's Association - Tribal Digital Village Network
Groups that work with tribes	Carlson Wireless Technologies

Category	Category member
Groups that work with tribes	Microsoft
Groups that work with tribes	Turtle Island Communications
Industry associations	CTIA
Industry associations	NTCA
Industry associations	Rural Wireless Association
Private providers	AT&T
Private providers	CenturyLink
Private providers	Commnet
Private providers	Frontier
Private providers	Inland Cellular
Private providers	Verizon

Source: GAO | GAO-19-75

To identify tribal entities that applied to participate in spectrum auctions or that held active spectrum licenses in bands that can be used to provide broadband service, we analyzed (1) FCC data on entities that applied to participate in auctions for spectrum in these bands and (2) FCC data on spectrum licenses in these bands that were active as of September 6, 2018. We also analyzed FCC license data, together with license information publicly available through FCC’s Universal Licensing System, to determine whether the tribal entities that held active licenses obtained those licenses through an FCC spectrum auction, administrative assignment, or the secondary market. We then reviewed the list of federally recognized tribes in the *Federal Register* and identified search terms related to these tribes. For example, we identified the following search terms based on the federally recognized tribe, Yurok Tribe of the Yurok Reservation, California, “Reservation, Tribe, and Yurok.” We then used the identified search terms to search for tribal entities in FCC’s data on auction participants and spectrum license holders. We manually reviewed these matches to identify tribal entities based on information from interviews, Internet research, and professional judgment. Because tribal entities may have applied to participate in spectrum auctions or may hold spectrum licenses under names not associated with their tribes, there may be additional tribal entities that we were unable to identify. Through interviews with FCC officials and review of related documentation, we determined that the license and auction participant data are sufficiently reliable for our purpose of identifying some tribal entities that have applied to participate in a spectrum auction or held active spectrum licenses as of September 2018. However, our analysis does not capture the extent that tribal entities may have obtained a

license that is no longer active. To identify tribal entities that used unlicensed spectrum to deliver unlicensed service, we interviewed the tribal entities identified above. In addition, we obtained stakeholder views on the advantages and disadvantages of using unlicensed and licensed frequency bands and any barriers that tribal entities face in obtaining spectrum licenses by interviewing the selected stakeholders noted above.

To determine the extent to which FCC promotes and supports tribal entities' efforts to obtain and access spectrum, first, we reviewed FCC's proposals in its ongoing 2011 Notice of Proposed Rulemaking In the Matter of Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum over Tribal Lands and its ongoing 2018 Notice of Proposed Rulemaking In the Matter of Transforming the 2.5 GHz Band. We summarized public comments submitted, as of August 2018, by private and tribal providers, rural and nationwide industry associations, tribal associations, and tribal governments on FCC's 2011 proposed rulemaking. We did not analyze comments on FCC's 2018 Notice of Proposed Rulemaking because FCC was in the process of responding to these comments at the time of our review. Second, we reviewed rules that FCC officials identified that increased the availability of unlicensed and licensed frequency bands for broadband use and that may be particularly useful for tribal entities. These rules included FCC's 2010 and 2012 rules related to TV white space spectrum and its 2015 rule and 2017 Notice of Proposed Rulemaking related to the Citizens Broadband Radio Services (CBRS) spectrum.⁵ We identified tribal entities that had been using CBRS frequency bands by reviewing FCC licensed data and TV white space frequency bands through interviews with tribal entities and regional consortia. Third, we identified FCC's outreach activities to provide tribal entities with assistance on spectrum-related issues by interviewing FCC officials and reviewing documentation on the content of FCC-led trainings and workshops, e-mail correspondences, and related publications, such

⁵*In the Matter of Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz Band*, Second Memorandum Opinion and Order, 25 FCC Rcd 18661 (2010); *In the Matter of Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3GHz Band*, Third Memorandum Opinion and Order, 28 FCC Rcd 5330 (2012); *In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking (2015); *In the Matter of Promoting Investment in the 3550-3700 MHz Band; Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, Notice of Proposed Rulemaking and Order Terminating Petitions, 2017 FCC LEXIS 3329 (2017).

as public notices. Lastly, we interviewed FCC officials on the information that they collect, analyze, and report related to tribal use of spectrum and reviewed related documentation, including FCC's Office of Native Affairs and Policy 2012 Annual Report and FCC's license and auction data.⁶ We interviewed stakeholders, as noted above, and summarized their views of FCC efforts. We also compared FCC's efforts against FCC's 2018-2022 strategic plan, recommendations made in FCC's *National Broadband Plan*, and *Standards for Internal Control in the Federal Government* related to using quality information.⁷

We conducted this performance audit from November 2017 to November 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

⁶FCC's Office of Native Affairs and Policy, *2012 Annual Report*, (Washington, D.C.).

⁷FCC, *Strategic Plan 2018-2022* (Washington, D.C.), FCC, *Connecting America: The National Broadband Plan* (Washington, D.C.: 2010); GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

Appendix II: Auctioned Licensed Spectrum Available for Commercial Broadband Services

We identified the spectrum frequency bands that the Federal Communications Commission (FCC) has made available for commercial broadband services and that FCC assigns licenses through auctions. Table 3 describes these licenses, including the number and date of related auctions.

Table 3: Auctioned Licensed Spectrum Frequency Bands the Federal Communications Commission (FCC) Has Made Available for Commercial Broadband Services

FCC radio service code	Frequency band, megahertz (MHz)/gigahertz (GHz) ^a	Radio service description	Auction(s)	Auction date closed
AH	1915-1920 MHz and 1995-2000 MHz	Advanced Wireless Service	96	2/27/2014
AT	1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz	Advanced Wireless Service-3 (AWS-3)	97	1/29/2015
AW	1710-1755 MHz and 2110-2155 MHz	Advanced Wireless Service (AWS-1)	66 78	9/18/2006 8/20/2008
BB	1390-1392 MHz Block A: 1392-1393.5 and 1432-1433.5 MHz Block B: 1393.5-1395 and 1433.5-1435 MHz (1.4GHz)	Wireless Communications Services	69	3/8/2007
BC	1670-1675 MHz (1.6 GHz)	Wireless Communications Services	46	4/30/2003
BR	2496-2502 MHz, 2602-2615 MHz, 2616-2673.5 MHz (2.5 GHz)	Broadband Radio Service	06 86	3/28/1996 10/30/2009
CJ	800 MHz Block C: 849-850.5/894-895.5 MHz Block D: 850.5-851/895.5-896 MHz	Commercial Aviation Air-Ground Radiotelephone	65	6/2/2006

**Appendix II: Auctioned Licensed Spectrum
Available for Commercial Broadband Services**

FCC radio service code	Frequency band, megahertz (MHz)/gigahertz (GHz)^a	Radio service description	Auction(s)	Auction date closed
CL	800 MHz Block A: Mobile: 824-835 MHz, 845-846.5 MHz Base: 869-880 MHz, 890-891.5 MHz Mobile: 835-845 MHz, 846.5-849 MHz Base: 880-890 MHz, 891.5-894 MHz	Cellular Services	77	6/17/2008
CW	Block A: 1850-1865, 1930-1945 MHz Block B: 1870-1885, 1950-1965 MHz Block C: 1895-1910, 1975-1990 MHz Block D: 1865-1870, 1945-1950 MHz Block E: 1885-1890, 1965-1970 MHz Block F: 1890-1895, 1970-1975 MHz	Broadband Personal Communications Service (PCS)	4 5 10 11 22 35 58 71 78	3/13/1995 5/06/1996 7/16/1996 1/14/1997 4/15/1999 1/26/2001 2/15/2005 5/21/2007 8/20/2008
CY	1915-1920 MHz and 1995-2000 MHz	Narrowband PCS	96	2/27/2014
WS	Block A: 2305-2310 MHz paired with 2350-2355 MHz Block B: 2310-2315 MHz paired with 2355-2360 MHz Block C: 2315-2320 MHz Block D: 2345-2350 MHz (2.3 GHz)	Wireless Communications Services	14	4/25/1997
WT	600 MHz	600 MHz Band	1002	3/30/2017
WU	700 MHz Upper Band (Block C: 710-716 MHz and 740-746 MHz)	Wireless Communications Services	60	7/26/2005
WY	700 MHz Lower Band Block A: 698-704 and 728-734 MHz Block B: 704-710 and 734-740 MHz Block C: 746-757 and 776-787 MHz Block D: 758-763 and 788-793 MHz Block E: 722-728 MHz	Wireless Communications Services	73 92	3/18/2008 7/25/2011
WZ	700 MHz Lower Band, Guard Bands Block C: 710-716 and 740-746 MHz	Wireless Communications Services	60	7/26/2005

**Appendix II: Auctioned Licensed Spectrum
Available for Commercial Broadband Services**

FCC radio service code	Frequency band, megahertz (MHz)/gigahertz (GHz)^a	Radio service description	Auction(s)	Auction date closed
YC	800 MHz Specialized Mobile Radio	Specialized Mobile Radio, 806-821/851-866 MHz, Auctioned	16	12/8/1997
	851.0125-854.7375 MHz / 806.0125-809.7375 MHz		34	9/1/2000
	Block A: 401-420 and 861.0-861.5 MHz paired with 816.0-816.5 MHz		43	1/17/2002
	Block B: 421-480 and 861.5-863.0 MHz paired with 816.5-818.0 MHz Block C: 481-600 and 863.0-866.0 MHz paired with 818.0-821.0 MHz			
YD	900 MHz Specialized Mobile Radio	Specialized Mobile Radio, 896-901/935-940 MHz, Auctioned	7	4/15/1996
	Blocks A thru T: half in 935-940 MHz and half in the 896-901 MHz		55	2/25/2004
UU	24.25-24.45 GHz and 24.75-25.25 GHz (24 GHz)	Upper Microwave Flexible Use Service	54	7/28/2004
			102	Future
DV	12.2-12.7 GHz	Multichannel Video and Distribution and Data Service	53	1/14/2004
			63	12/7/2005
UU	27.5-28.35 GHz	Upper Microwave Flexible Use Service	17	3/25/1998
			23	5/12/1999
			101	Future
LD	29.1-29.25 GHz and 31-31.3 GHz	Local Multipoint Distribution Service	17	3/25/1998
			23	5/12/1999
UU	37.6-38.6 GHz (Upper 37 GHz)	Upper Microwave Flexible Use Service	Future	Future
UU	38.6-40 GHz (39 GHz)	Upper Microwave Flexible Use Service	30	5/8/2000
UU	47.2-48.2 GHz (47 GHz)	Upper Microwave Flexible Use Service	Future	Future

Source: GAO analysis of FCC information. | GAO-19-75

^aRadio frequencies are grouped into bands and are measured in units of Hertz, or cycles per second. The term megahertz (MHz) refers to millions of Hertz and gigahertz (GHz) to billions of Hertz.

Appendix III: Comments from the Federal Communications Commission

**Appendix III: Comments from the Federal
Communications Commission**



Federal Communications Commission
Washington, D.C. 20554

November 2, 2018

Dr. Mark L. Goldstein
Director, Physical Infrastructure Issues
Government Accountability Office
441 G St., NW
Washington, DC 20548

Dear Mr. Goldstein:

Thank you for the opportunity to review GAO's draft report, "Tribal Broadband, FCC Should Undertake Efforts to Better Promote Tribal Access to Spectrum." The Commission has long recognized the particular challenges of providing communications services on Tribal lands, and the role of Tribal access to spectrum in meeting those challenges. As you have noted in the draft report, the Commission has taken a variety of actions to increase Tribal access to and use of spectrum, including rulemaking, outreach, and training efforts. We appreciate your recommendations, and we plan to address them as described below.

Collection of data on tribal acquisition of spectrum. GAO's first recommendation is that the FCC Chairman should "collect data on the extent that tribal entities are obtaining and accessing spectrum and use this information as FCC implements ongoing spectrum initiatives." As noted in the draft report at page 22, the FCC has been collecting information on licensee type in order to determine eligibility to hold a particular license, but since eligibility is not based on Tribal entity status, we have not required reporting of Tribal entity status. Recognizing GAO's concern about whether the FCC has a full understanding of Tribal entity interest and success in obtaining licensed spectrum, the Commission will consider ways to collect data on the extent that tribal entities are obtaining and accessing spectrum, including updating application forms to provide for voluntary submission of this information.

Existence of unused spectrum. GAO's second recommendation is that the FCC Chairman "should analyze data to better understand the extent that unused spectrum licenses exist over tribal lands, such as by analyzing the data for a sample of tribal lands, and as appropriate use this information to inform its oversight of the secondary market." Following this recommendation, we plan to take a sample of spectrum licenses on Tribal lands and then analyze these data to inform our spectrum policies.

Data to assist Tribes. GAO's third recommendation is that the FCC Chairman should "make information on spectrum license holders more accessible and easy to understand for interested parties, including tribal entities, to promote their ability to purchase or lease spectrum licenses from other providers." Our official licensing data is available to Tribal entities and others through our Universal Licensing System (ULS). The Commission is currently engaged in a multi-year project to modernize ULS, transitioning to a new platform that will provide more consistent performance, easier access to information, and enhanced functionality. In the meantime, our Office of Native Affairs and Policy (ONAP) will, of course, continue its outreach and educational efforts toward Tribal entities. Both ONAP and the staff of our Wireless

Telecommunications Bureau are always available to assist any individual Tribe that has questions or requests assistance accessing information.

Thank you for the opportunity to review GAO's recommendations. We look forward to working with GAO in the future.

Sincerely,



Donald Stockdale
Chief, Wireless Telecommunications Bureau



Patrick Webre
Chief, Consumer and Governmental Affairs Bureau

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Mark L. Goldstein, (202) 512-2834 or goldsteinm@gao.gov.

Staff Acknowledgments

In addition to the contact named above, Sally Moino (Assistant Director), Anne Doré (Analyst in Charge), Enyinnaya David Aja, Katherine Blair, Stephen Brown, Camilo Flores, Georgeann Higgins, John Mingus, Josh Ormond, Frank Rusco, Rebecca Rygg, Jay Spaan, Andrew Stavisky, James Sweetman, Jr., Hai Tran, and Michelle Weathers made key contributions to this report.

Appendix V: Accessible Data

Agency Comment Letter

Accessible Text for Appendix III Comments from the Federal Communications Commission

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Page 2

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