

## Why GAO Did This Study

The increasing popularity of wireless devices that use spectrum, combined with federal spectrum needs for national defense and other public safety activities, have created concerns that a “spectrum crunch” is looming. However, there is also evidence that at any given time or place, spectrum lies fallow or is only intermittently used. In an effort to use spectrum as efficiently as possible, advisory groups and others have proposed solutions to share spectrum.

This requested report examines (1) what factors prevent users from sharing spectrum more frequently and (2) what actions the Federal Communications Commission (FCC), the National Communications Information Administration (NTIA), and others can take to encourage more sharing and efficient spectrum use. GAO reviewed plans and documents from FCC and NTIA regarding their management of nonfederal and federal spectrum-sharing activities, respectively. GAO also interviewed federal and commercial spectrum users, industry and academic experts, and other stakeholders.

## What GAO Recommends

FCC and NTIA should jointly (1) report to Congress on the potential merits and effects of a spectrum fee, (2) determine how to best promote spectrum research and development, and (3) evaluate what regulatory changes might improve the spectrum sharing process. The agencies generally agreed with GAO's findings but identified ongoing efforts that address the recommendations. GAO has modified the recommendations as described further in the report.

View [GAO-13-7](#). For more information, contact Mark Goldstein at (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov).

## SPECTRUM MANAGEMENT

### Incentives, Opportunities, and Testing Needed to Enhance Spectrum Sharing

## What GAO Found

Some spectrum users may lack incentive to share spectrum or otherwise use it efficiently, and federal agencies and private users currently cannot easily identify spectrum available for sharing. Typically, paying the market price for a good or service helps to inform users of the value of the good and provides an incentive for efficient use. Federal agencies, however, pay only a small fee to the NTIA for spectrum assignments and therefore have little incentive to share spectrum. Federal agencies also face concerns that sharing could risk the success of security or safety missions, or could be costly in terms of upgrades to more spectrally efficient equipment. Nonfederal users, such as private companies, are also reluctant to share spectrum. For instance, license holders may be reluctant to encourage additional competition, and companies may be hesitant to enter into sharing agreements that require potentially lengthy and unpredictable regulatory processes. Sharing can be costly for them, too. For example, nonfederal users may be required to cover all interference mitigation costs to use a federal spectrum band, which might include multiple federal users. Sharing can also be hindered because information on federal spectrum use is lacking and information regarding some federal spectrum use may never be publicly available, a situation that makes it difficult for users to identify potential spectrum for sharing.

Federal advisors, agency officials, and experts have identified several options that could provide greater incentives and opportunities for more efficient spectrum use and sharing by federal and nonfederal users. These options include, among other things: considering spectrum usage fees to provide economic incentive for more efficient use and sharing; identifying more spectrum that could be made available for unlicensed use, since unlicensed use is inherently shared; encouraging research and development of technologies that can better enable sharing; and improving and expediting regulatory processes related to sharing. However, these options involve implementation challenges. For example, setting spectrum usage fees for federal users may not result in creating the proper incentives, because agency budgets might simply be increased to accommodate their current use. While new technologies that overcome some of the inherent challenges with sharing spectrum are being developed, proving those technologies under real-world conditions can be difficult, and few incentives exist at the federal level to encourage such technology development. Finally, FCC and NTIA have taken some actions to potentially reduce the amount of time and even the need for potential rulemakings sometimes associated with spectrum sharing, but stakeholders and experts suggested that more could be done to expedite the approval process, such as automating some steps and developing better capabilities to track the status of spectrum-sharing applications. However, any changes to federal regulatory processes related to spectrum management and sharing would need to be carefully studied with respect to potential benefits and costs.