



Testimony
Before the Subcommittee on
Energy and Mineral Resources,
Committee on Natural
Resources, House of

For Release on Delivery
Expected at 9:30 a.m.
EST
Thursday, December 5,
2013

GEOSPATIAL INFORMATION

OMB and Agencies Can Reduce Duplication by Making Coordination a Priority

Statement of David A. Powner, Director
Information Technology Management Issues

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately

GAO Highlights

Highlights of [GAO-14-226T](#), a testimony before the Subcommittee on Energy and Mineral Resources, Committee on Natural Resources, House of Representatives

GEOSPATIAL INFORMATION

OMB and Agencies Can Reduce Duplication by Making Coordination a Priority

Why GAO Did This Study

The federal government collects, maintains, and uses geospatial information—information linked to specific geographic locations—to support many functions, including national security and disaster response. In 2012, the Department of the Interior estimated that the federal government was investing billions of dollars on geospatial data annually, and that duplication was common.

In November 2012, GAO reported on efforts to reduce duplicative investments in geospatial data, focusing on OMB, FGDC, and three agencies: the Departments of Commerce, Interior, and Transportation.

This statement summarizes the results of that November 2012 report on progress and challenges in coordinating geospatial information and includes updates on the implementation of recommendations made in that report.

What GAO Recommends

GAO is making no new recommendations in this statement. In November 2012, GAO recommended that to improve coordination and reduce duplication, FGDC develop a national strategy for coordinating geospatial investments; federal agencies follow federal guidance for managing geospatial investments; and OMB develop a mechanism to identify and report on geospatial investments. Since that time, FGDC and several agencies have taken some steps to implement the recommendations. However, additional actions are still needed.

What GAO Found

The President and the Office of Management and Budget (OMB) have established policies and procedures for coordinating investments in geospatial data, however, in November 2012, GAO reported that governmentwide committees and federal departments and agencies had not effectively implemented them. The committee that was established to promote the coordination of geospatial data nationwide—the Federal Geographic Data Committee (FGDC)—had developed and endorsed key standards and had established a clearinghouse of metadata. GAO found that the clearinghouse was not being used by agencies to identify planned geospatial investments to promote coordination and reduce duplication. In addition, the committee had not yet planned or implemented an approach to manage geospatial data as related groups of investments to allow agencies to more effectively plan geospatial data collection efforts and minimize duplicative investments, and its strategic plan was missing key elements.

Other shortfalls have impaired progress in coordinating geospatial data. Specifically, none of the three federal departments in GAO's review had fully implemented important activities such as preparing and implementing a strategy for advancing geospatial activities within their respective departments (see table). Moreover, the agencies in GAO's review responsible for governmentwide management of specific geospatial data had implemented some but not all key activities for coordinating the national coverage of specific geospatial data.

Status of Federal Departments' Implementation of Geospatial Activities, as of November 2012

Activity	Commerce	Interior	Transportation
Designate a senior official	◐	●	◐
Prepare and implement a strategy	○	○	○
Develop a policy for metadata	◐	○	○
Make metadata available on clearinghouse	●	●	●
Adopt procedures for accessing clearinghouse	○	○	○

● = Fully met ◐ = Partially met ○ = Not met

Source: GAO analysis of agency documentation.

While OMB has oversight responsibilities for geospatial data, GAO reported in November 2012 that according to OMB staff, the agency did not have complete and reliable information to identify potentially duplicative geospatial investments. GAO also reported that FGDC, federal departments and agencies, and OMB had not yet fully implemented policies and procedures for coordinating geospatial investments because these efforts had not been a priority. As a result, efforts to acquire data were uncoordinated and the federal government acquired duplicative geospatial data. For example, a National Geospatial Advisory Committee representative stated that a commercial provider leases the same proprietary parcel data to six federal agencies. GAO concluded that unless the key entities determined that coordinating geospatial investments was a priority, the federal government would continue to acquire duplicative geospatial information and waste taxpayer dollars.

View [GAO-14-226T](#). For more information, contact Dave Powner at (202) 512-9286 or pownerd@gao.gov.

Chairman Lamborn, Ranking Member Holt, and Members of the Subcommittee:

I am pleased to be here today to discuss the importance of coordinating federal investments in geospatial information—information linked to specific geographic locations—in order to avoid duplication. The federal government collects, maintains, and uses geospatial information to support many functions, including national security and disaster response. In 2012, the Department of the Interior estimated that the federal government was investing billions of dollars on geospatial data annually, and that duplication was common.

In November 2012, we reported that while the President and the Office of Management and Budget (OMB) had established policies and procedures for coordinating investments in geospatial data, governmentwide committees and selected federal departments and agencies had not effectively implemented them.¹ In that report, we made multiple recommendations to OMB and federal agencies to improve coordination and reduce duplication among geospatial data investments. My testimony today will summarize the results of that report. Specifically, I will cover (1) progress and challenges in coordinating geospatial data, and (2) the current status of agencies implementation of GAO's recommendations.

The work on which my statement is based was conducted from November 2011 to November 2012 and was focused on governmentwide activities to implement the National Spatial Data Infrastructure (NSDI)—an infrastructure to facilitate the efficient collection, sharing, and dissemination of geospatial data among all levels of government, and public and private sectors—as well as efforts of the Federal Geographic Data Committee (FGDC)—the federal committee established to promote the coordinated use, sharing, and dissemination of geospatial data nationwide. Additionally, the report focused on activities within three selected departments: Department of Commerce (Commerce), Department of the Interior (Interior), and Department of Transportation (Transportation); and within three selected agencies responsible for managing data themes:² the National Oceanic and Atmospheric

¹ GAO, *Geospatial Information: OMB and Agencies Need to Make Coordination a Priority to Reduce Duplication*, GAO-13-94 (Washington, D.C.: November 26, 2012).

²Data themes are comprised of one or more sets of geospatial data that have national significance, as established by federal guidance, such as hydrography (i.e., surface water features, such as lakes, ponds, streams, and rivers).

Administration, the U.S. Geological Survey, and the Bureau of Transportation Statistics. Further details on the scope and methodology for the previously issued report are available within that published product. In addition, we analyzed documentation from the agencies on the status of their efforts to address our recommendations. All work on which this testimony is based was performed 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.

Background

For many years, the federal government has taken steps to coordinate geospatial activities both within and outside the federal government. In 1953, the Bureau of the Budget³ first issued Circular A-16, encouraging expeditious surveying and mapping activities across all levels of government and avoidance of duplicative efforts. In 1990, OMB revised Circular A-16 to, among other things, establish the Federal Geospatial Data Committee (FGDC) within Interior to promote the coordinated use, sharing, and dissemination of geospatial data nationwide. Building on that guidance, in 1994 the President issued Executive Order 12906 for the purpose of addressing wasteful duplication and incompatibility of geospatial information, and assigned FGDC the responsibility to coordinate the development of NSDI.⁴ In 2002, OMB again revised Circular A-16 to further describe the components of NSDI; clearly define agency responsibilities for acquiring, maintaining, distributing, using, and preserving geospatial data; and to reaffirm FGDC's role as the interagency coordinating body for NSDI-related activities.⁵ The circular established the following five components of NSDI and described how these components were to be implemented.

³The Bureau of the Budget became OMB in 1970.

⁴ Executive Order No. 12906, *Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure*, 59 Fed. Reg. 17,671 (Washington, D.C.: Apr. 11, 1994).

⁵ OMB, Circular No. A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, (Washington, D.C.: Aug. 19, 2002).

-
- **Data themes.** Data themes are topics of national significance, such as cadastre, which includes rights and interests in real property and surveys and land use/land cover, which includes land surface features and use. OMB Circular A-16 currently identifies 34 data themes and identifies the “lead” agency or agencies for each theme. Each data theme is to be comprised of one or more electronic data records, known as a dataset. Of the 34 themes, 9 are identified as a “framework” theme⁶—that is, a theme identified in Circular A-16 as being critical for any geospatial application.
 - **Standards.** Geospatial standards provide common and repeatable rules or guidelines for the development, documentation, and exchange of geospatial datasets.
 - **Metadata.** Metadata are information about datasets, such as content, source, accuracy, method of collection, and point-of-contact. Metadata are used to facilitate the search of and access to datasets within a data library or clearinghouse, and enable potential users to determine the data’s applicability for their use.
 - **National Spatial Data Clearinghouse.** The clearinghouse is intended to be a centralized geospatial metadata repository that contains geospatial metadata records from federal agencies, state and local governments, and academic and private sector organizations that can be searched to determine whether needed geospatial data exist and can be shared. Federal agencies are required to identify their existing and planned geospatial investments in the clearinghouse, and search the clearinghouse for cost-saving opportunities before acquiring geospatial data. In 2003, FGDC created the Geospatial One-Stop to provide “one-stop” access to geospatial metadata from a centralized database and search function. In October 2011, the Geospatial One-Stop was retired, and FGDC initiated a pilot project, known as the Geospatial Platform, which was envisioned to provide shared and trusted geospatial data, services, and applications for use by government agencies, their partners, and the public.⁷ According to Interior officials, Interior is the managing partner of the Geospatial Platform. As of August 2012, there were approximately 835,000

⁶According to FGDC officials, there are seven framework themes, with two of the themes having two parts.

⁷<http://www.geoplatform.gov>.

geospatial metadata records in the central repository, of which about 373,000 were from federal sources.

- **Partnerships.** Partnerships are efforts aimed at involving all stakeholders (e.g., federal, tribal, state, local government, and academic institutions) in the development of NSDI.

In November 2010, OMB issued supplemental guidance specifically regarding how agencies are to manage data themes.⁸ This supplemental guidance expands upon and clarifies some of the language and responsibilities contained in OMB Circular A-16 in order to facilitate the adoption and implementation of a geospatial asset management capability.

To fulfill its responsibilities, FGDC is governed by a steering committee—an interagency decision making body that provides leadership and policy direction in support of the development of NSDI. The Secretary of the Interior chairs the committee; the Vice-Chair is the Chief Architect of the Office of E-Government and Information Technology of OMB.⁹ All departments or agencies responsible for geospatial data themes, or that have activities in geographic information or geospatial data collection or use, are required to be members of FGDC. Thirty-two agencies¹⁰ are members of the Steering Committee and are to be represented by their senior agency officials for geospatial information.¹¹ These senior agency

⁸OMB, M-11-03, *Issuance of OMB Circular A-16 Supplemental Guidance*, Nov. 10, 2010.

⁹The chair and vice-chair may select designees to serve on their behalf. The Secretary of the Interior has delegated the committee chair responsibility to the Assistant Secretary for Water and Science.

¹⁰The 32 agency members of the Steering Committee are: Interior, OMB, U. S. Department of Agriculture, Commerce, Department of Defense, U.S. Army Corps of Engineers (non-voting member), Department of Education, Department of Energy, Department of Health and Human Services, Department of Homeland Security, Department of Housing and Urban Development, Department of Justice, Department of Labor, Department of State, Transportation, Department of the Treasury, Department of Veterans Affairs, Environmental Protection Agency, Federal Communications Commission (non-voting member), General Services Administration, Library of Congress, National Aeronautics and Space Administration, National Archives and Records Administration, National Capital Planning Commission (non-voting member), National Science Foundation, U.S. Nuclear Regulatory Commission, Office of Personnel Management, Small Business Administration, Smithsonian Institution, Social Security Administration, Tennessee Valley Authority, and U.S. Agency for International Development.

¹¹OMB, M-06-07, *Designation of a Senior Agency Official for Geospatial Information*, Mar. 3, 2006, calls for select agencies to appoint to the Steering Committee policy-level officials—a chief information officer or a senior official at the assistant secretary level.

officials are responsible for overseeing, coordinating, and facilitating their respective agency's implementation of geospatial requirements, policies, and activities. FGDC is supported by the Office of the Secretariat, which consists of about 10 people located in U.S. Geological Survey (USGS) who do the day-to-day work of supporting, managing, and coordinating the activities of FGDC.

In addition, in December 2007, the Secretary of the Interior created the National Geospatial Advisory Committee¹² to provide the department and FGDC with advice and recommendations related to the management of federal and national geospatial programs, development of NSDI, and the implementation of related federal guidance. Members of the committee include approximately 30 officials from federal, state, local, and tribal governments, the private sector, and academia.

OMB's Roles and Responsibilities for Overseeing IT Investments

OMB has specific oversight responsibilities for federal information technology (IT) systems and acquisition activities—including geographic information systems—to help ensure their efficient and effective use. Two key laws that outline these responsibilities are the Clinger-Cohen Act of 1996¹³ and the E-Government Act of 2002.¹⁴

- The Clinger-Cohen Act of 1996 requires, among other things, OMB to establish processes to analyze, track, and evaluate the risks and results of major capital investments in information systems made by federal agencies and report to Congress on the net program performance benefits achieved as a result of these investments.
- The E-Government Act of 2002 establishes an e-government initiative that encourages the use of web-based Internet applications to enhance the access to and delivery of government information and services to citizens, to business partners, to employees, and among all levels of government. The act also requires OMB to report annually to Congress on the status of e-government initiatives. In these reports, OMB is to describe the administration's use of e-government principles to improve government performance and the delivery of information and services to the public.

¹²The Secretary created the committee as a federal advisory committee under the Federal Advisory Committee Act.

¹³40 U.S.C § 11101 et seq.

¹⁴Pub. L. No. 107-347 (Dec. 17, 2002).

OMB subsequently began initiatives to fulfill the requirements established by these laws:

- In February 2002, OMB established the Federal Enterprise Architecture, which is intended to facilitate governmentwide improvement through cross-agency analysis and identification of duplicative investments, gaps, and opportunities for collaboration, interoperability, and integration within and across agency programs. The Federal Enterprise Architecture is composed of five “reference models” describing the federal government’s (1) business (or mission) processes and functions, independent of the agencies that perform them; (2) performance goals and outcome measures; (3) means of service delivery; (4) information and data definitions; and (5) technology standards.
- In March 2004, OMB established multiple “lines of business” to consolidate redundant IT investments and business processes across the federal government. Later, in March 2006, OMB established the Geospatial Line of Business. Each line of business is led by an individual agency and supported by other relevant agencies. Interior is the managing partner for the Geospatial Line of Business and the FGDC Secretariat provides project management support. OMB reports to Congress each year on the costs and benefits of these initiatives.

Geospatial Investments Were Included in GAO’s Duplication Series

Over the past few years, we have issued a series of reports that have identified federal programs and functional areas where unnecessary duplication, overlap, or fragmentation exists;¹⁵ the actions needed to address such conditions; and the potential financial and other benefits of

¹⁵Fragmentation refers to those circumstances in which more than one federal agency (or more than one organization within an agency) is involved in the same broad area of national need and opportunities exist to improve service delivery. Overlap occurs when multiple agencies or program have similar goals, engage in similar activities or strategies to achieve them, or target similar beneficiaries. Duplication occurs when two or more agencies or program are engaged in the same activities or provide the same services to the same beneficiaries.

doing so.¹⁶ In particular, we identified opportunities to reduce duplication and the cost of government operations in several critical IT areas. In our most recent duplication report, we reported that better coordination among federal agencies that collect, maintain, and use geospatial information could help reduce duplication of geospatial investments and provide the opportunity for potential savings of millions of dollars. The duplication report reiterated the need for action among several federal agencies, FGDC, and OMB.

Progress and Challenges in Coordinating Geospatial Data

FGDC Had Not Made Fully Implementing Key Activities for Coordinating Geospatial Data a Priority

While the FGDC had made progress in some areas to improve coordination in geospatial activities, our November 2012 report identified a number of areas in which little progress had been made. For example, FGDC had developed a metadata standard that included descriptive information about a dataset—such as the framework theme to which it relates, the time frame of when the data was collected, and who to contact for more information that facilitates the sharing of geospatial data.¹⁷ FGDC had also established a clearinghouse that allowed users to determine whether the geospatial data (including planned data) they are seeking exist. As noted previously, the clearinghouse consists of a centralized repository that contains geospatial metadata¹⁸ records from federal agencies, state and local governments, academic and private-

¹⁶GAO, *2013 Annual Report: Actions Needed to Reduce Fragmentation, Overlap and Duplication, and Achieve Other Financial Benefits*, GAO-13-279SP (Washington, D.C.: Apr. 9, 2013); *2012 Annual Report: Opportunities to Reduce Duplication, Overlap and Fragmentation, Achieve Savings, and Enhance Revenue*, GAO-12-342SP (Washington, D.C.: Feb. 28, 2012); and *Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue*, GAO-11-318SP (Washington, D.C.: Mar. 1, 2011).

¹⁷FGDC, *FGDC-STD-001-1998: Content Standard for Digital Geospatial Metadata* (Washington, D.C.:1998).

¹⁸As previously noted, metadata are information about datasets, such as content, source, accuracy, method of collection, and point of contact.

sector organizations; and multiple web-based portals from which the metadata can be searched.

However, despite this progress, we found that FGDC had not fully implemented key aspects of activities needed for coordinating investments in geospatial data. First, although the clearinghouse was reported to have been modified in May 2012 to allow agencies to identify their planned investments, as of September 2012, there were no federal agencies using this function because FGDC had not yet completed and shared guidance with agencies on how to do so.

Second, FGDC had not fully planned for or implemented a portfolio management approach per OMB guidance.¹⁹ Specifically, we found that FGDC had evaluated the 34 data themes identified in OMB Circular A-16 to determine whether any changes were needed; in August 2011, the Steering Committee proposed consolidating the 34 data themes into 17 themes; FGDC Secretariat officials subsequently stated that FGDC agencies were proposing to eliminate one more theme for a total of 16.²⁰ We reported that officials further stated that, as of August 2012, lead agencies had been identified for each of the 16 themes. However, at the time, the data themes, lead agencies, and datasets had neither been finalized nor approved, and FGDC had yet to provide guidance to agencies about how to implement the portfolio management approach. While Secretariat officials stated that they had developed a draft implementation plan in November 2011, when we issued our November 2012 report, the plan had not been finalized or approved, and FGDC Secretariat officials were unable, on behalf of FGDC agencies, to provide a time frame for doing so.

Third, FGDC's strategic plan was missing key components and had not been kept up-to-date. Specifically, we found that FGDC's current plan had been issued in 2004 and included OMB-required components such as (1) a vision statement, (2) three outcome-oriented goals and 13 objectives to be accomplished between 2005 and 2008, and (3) a high-level description of how all but 1 of the 13 objectives were to be achieved.

¹⁹OMB, M-11-03, *Issuance of OMB Circular A-16 Supplemental Guidance*, (Washington, D.C.: Nov. 10, 2010).

²⁰One of the 16 themes is Land Use/Land Cover, which refers to natural and man-made surface features and how the land is used. Examples of Land Cover are grass, asphalt, trees, bare ground, and water. Examples of Land Use are urban, agricultural, and forest areas. A complete list of the 16 data themes are found in appendix I.

However, the plan did not include components such as needed resources, performance measures for 9 of the 13 objectives, or external factors that could affect the achievement of the plan's goals and objectives. Further, the plan did not reflect significant initiatives that the FGDC Steering Committee had engaged in—such as the Geospatial Platform—and the time frames for the goals were outdated.

As we reported in November 2012, according to FGDC officials, they had not yet fully implemented policies and procedures for coordinating geospatial investments because these efforts had not been made a priority. Instead, FGDC officials had been primarily focused on the development of the Geospatial Platform. As a result, we determined in 2012 that efforts to acquire data were uncoordinated and the federal government acquired duplicative geospatial data. For example, a National Geospatial Advisory Committee representative told us that, at that time, a commercial provider was leasing the same proprietary parcel data to six federal agencies; the Department of Housing and Urban Development, the Department of Homeland Security, the Federal Bureau of Investigation, the Small Business Administration, the Federal Deposit Insurance Corporation, and the Federal Reserve. We concluded that unless FGDC decides that coordinating geospatial investments was a priority, this situation would likely continue.

Departments Had Not Fully Implemented Important Activities for Coordinating and Managing Geospatial Data

Our November 2012 report also showed that none of the three federal departments in our review—the Departments of Commerce, the Interior, and Transportation—had fully implemented activities needed for effectively coordinating and managing geospatial activities within their respective departments. According to OMB guidance and the executive order,²¹ federal departments and agencies that handle geospatial data are to:

²¹OMB, M-06-07, *Designation of a Senior Agency Official for Geospatial Information*, (Washington, D.C.: Mar. 3, 2006); OMB, Circular No. A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, (Washington, D.C.: Aug. 19, 2002); and Executive Order No. 12906, *Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure*, 59 Fed. Reg. 17,671 (Washington, D.C.: Apr. 11, 1994).

- designate a senior agency official for geospatial information that has departmentwide responsibility, accountability, and authority for geospatial information issues;
- prepare, maintain, publish, and implement a strategy for advancing geographic information and related geospatial data activities appropriate to their mission, and in support of NSDI strategy;
- develop a policy that requires them to make their geospatial metadata available on the clearinghouse;
- make all metadata associated with geospatial data available on the clearinghouse, and use the metadata standard; and
- adopt internal procedures to ensure that they access the NSDI clearinghouse before they expend funds to collect or produce new geospatial data to determine (1) whether the information has already been collected by others, or (2) whether cooperative efforts to obtain the data are possible.

However, while all three of the departments had made their metadata available on the clearinghouse, none of the three federal departments in our review had fully implemented all of the other important activities (see table 1).

Table 1: Status of Federal Departments’ Implementation of Geospatial Activities, as of November 2012

Activity	Commerce	Interior	Transportation
Designate a senior official with departmentwide responsibility	◐	●	◐
Prepare and implement a strategy	○	○	○
Develop a policy for metadata	◐	○	○
Make metadata available on clearinghouse	●	●	●
Adopt procedures for accessing the clearinghouse	○	○	○

Source: GAO analysis of department documentation.

Key

● = Fully met—the department provided evidence that addressed the criteria.

◐ = Partially met—the department provided evidence that addressed about half or a large portion of the criteria.

○ = Not met—the department did not provide evidence that addressed the criteria or provided evidence that minimally addressed the criteria.

Department officials stated that the lack of progress in these activities was due, in part, to a lack in designating priorities. This lack of priority had contributed to the acquisition of duplicative geospatial data. For example, three separate federal agencies were independently acquiring road centerline data.²² We concluded in November 2012 that unless the federal departments decided that completing activities to better coordinate geospatial investments was a priority, this situation would likely continue.

Theme-lead Agencies Had Not Fully Implemented Important Activities for Coordinating and Managing Geospatial Data

The three theme-lead agencies in our review—the National Oceanic and Atmospheric Administration (NOAA), USGS, and the Bureau of Transportation Statistics (BTS) had implemented some but not all of the geospatial activities necessary to ensure the national coverage and stewardship of specific geospatial data themes in our review.²³ According to OMB,²⁴ theme-lead agencies are to:

- designate a point of contact who is responsible for the development, maintenance, coordination, and dissemination of data using the clearinghouse;
- prepare goals relating to the theme that support the NSDI strategy, and as needed, collect and analyze information from user needs and include those needs in the theme-related goals;

develop and implement a plan for the nationwide population of the data theme that includes (1) the development of partnership programs with states, tribes, academia, the private sector, other federal agencies, and localities that meet the needs of users; (2) human and

²²Road centerlines are vector line data that represent the geographic center of road rights-of-way on transportation networks.

²³The three data themes in our review were 1) geodetic control (NOAA), which is data used to establish the precise location of other types of geospatial data; 2) hydrography (USGS), which includes data on surface water features such as lakes, ponds, streams, rivers, canals, oceans, and coastlines, and 3) transportation (BTS), which includes both physical and nonphysical components representing all modes of travel that allow the movement of goods and people between locations.

²⁴OMB, Circular No. A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, (Washington, D.C.: Aug.19, 2002).

financial resource needs; (3) standards, metadata, and the clearinghouse needs; and (4) a timetable for the development for the theme; and

- create a plan to develop and implement theme standards.

However, we found that while all three of the theme-lead agencies had made some progress, none of them had implemented all of these important activities (see table 2).

Table 2: Status of Theme-lead Agencies' Implementation of Geospatial Activities, as of November 2012

Activity	NOAA	USGS	BTS
Designate a theme point of contact	●	●	●
Prepare goals and analyze user needs	●	◐	◐
Develop a plan for theme population	●	◐	◐
Develop a standards plan	○	○	○

Source: GAO analysis of agency documentation.

Key

● = Fully met—the agency provided evidence that addressed the criteria.

◐ = Partially met—the agency provided evidence that addressed about half or a large portion of the criteria.

○ = Not met—the agency did not provide evidence that addressed the criteria or provided evidence that minimally addressed the criteria.

Theme-lead agency officials attributed the lack of progress in implementing these activities to competing priorities, among other things. As a result, efforts to acquire data were uncoordinated and the federal government acquired duplicative geospatial data. For example, according to a National Geospatial Advisory Committee official, several federal agencies collected, purchased, or leased address information in a noncoordinated fashion. We concluded in November 2012 that unless the federal agencies were to decide that completing activities to coordinate geospatial investments was a priority, the potential for duplication would continue to exist.

OMB Did Not Have Complete and Reliable Information to Identify Duplicative Geospatial Investments

OMB has oversight responsibilities for federal IT systems and acquisition activities—including geographic information systems—to help ensure

their efficient and effective use. According to OMB Office of E-Government staff members, OMB relies primarily on the annual budget process to identify potentially duplicative geospatial investments. Specifically, OMB requires federal departments and agencies to provide information related to their IT investments (called exhibit 53s²⁵) and capital asset plans and business cases (called exhibit 300s²⁶).

However, as we reported in November 2012, OMB's Office of E-Government staff members acknowledged that these two sources may not in all cases provide the necessary information to allow OMB to identify potentially duplicative investments or accurately quantify the amount of federal dollars spent on geospatial datasets for three primary reasons.

First, according to these staff members some federal agencies may not classify investments in geospatial data as "information technology" (such as satellites), meaning that they would not be captured in exhibit 53s. OMB staff members stated that agencies are to determine what qualifies as an IT investment and stated that there are variations in the way that agencies interpret the definition of IT.

Second, agencies do not always appropriately classify geospatial investments as "geospatial services" using the Federal Enterprise Architecture codes. Our analysis of the fiscal year 2013 exhibit 53s for the three departments that we reviewed showed that only 5 of their 24 key datasets—1 of NOAA's 6 geodetic control datasets and 4 of USGS's 7 hydrography datasets—were included in the departments' exhibit 53s. Further, only 1 of these investments was identified with the geospatial services code, as required by OMB's fiscal year 2013 budget formulation guidance.

Third, given that the geospatial data may be only one component of an IT

²⁵The purpose of the exhibit 53 is to identify all IT investments—both major and nonmajor—and their associated costs within a federal organization. Information included in agency exhibit 53s is designed, in part, to help OMB better understand agencies' spending on IT investments. OMB guidance for the fiscal years 2013 and 2014 budget formulation instructs agencies to identify their geospatial investments in the exhibit 53 using Federal Enterprise Architecture codes for specific functions (e.g., geospatial services, financial management, and acquisition management).

²⁶The purpose of the exhibit 300 is to provide a business case for each major IT investment and to allow OMB to monitor IT investments once they are funded. Agencies are required to provide information on each major investment's cost, schedule, and performance.

investment or capital asset, even if it were included in the agencies' exhibit 53s or 300s, we determined that OMB would have difficulties in identifying the geospatial component, and the associated dollars, without having a detailed discussion with individuals responsible for each investment.

OMB staff members stated that, as a result, they did not have a complete picture of how much money is being spent on geospatial investments across the federal government because, as noted, what was being reported may not have captured all geospatial spending, and the data had not been reliable. We also reported in November 2012 that according to OMB, although eliminating duplication in geospatial investments was important, OMB's recent efforts had focused on other commodity IT areas with higher spending and cyber security ramifications. As a result, OMB had not yet established a way to collect complete and reliable information about geospatial investments because this had not been a priority. We concluded that, unless OMB decides that coordinating geospatial investments is designated as a priority, duplicative investments would likely continue.

Implementing GAO Recommendations Can Reduce Duplication and Provide Cost Savings

Our November 2012 report made numerous recommendations aimed at improving coordination and reducing duplication of geospatial data. Interior and Commerce generally agreed with our recommendations; Transportation neither agreed nor disagreed.

First, we recommended that the Secretary of the Interior, as FGDC Chair, direct the FGDC Steering Committee to:

- establish a time frame for completing a plan to facilitate the implementation of OMB's November 2010 management guidance, and develop and implement the plan within the established time frame;
- develop and implement guidance for identifying planned geospatial investments in the Geospatial Platform, and establish a time frame for doing so; and
- establish a time frame for creating and updating a strategic plan to improve coordination and reduce duplication, and create and implement the plan within the established time frame. The plan, at a minimum, should include (1) a vision statement for the NSDI; (2)

outcome-oriented goals and objectives that address all aspects of the NSDI; (3) a description of how the goals and objectives are to be achieved, including a description of the resources needed to achieve the goals and objectives and how FGDC is to work with other agencies to achieve them; (4) performance measures for achieving the stated goals; and (5) external factors that could affect the achievement of the goals and objectives.

In addition, we recommended that the Secretaries of Commerce, the Interior, and Transportation implement the relevant executive order requirements and OMB guidance that apply to their departments and agencies:

- designate a senior agency official with departmentwide accountability, authority, and responsibility for geospatial information issues;
- prepare, maintain, publish, and implement a strategy for advancing geographic information and related geospatial data activities appropriate to its mission;
- develop a policy that requires the department to make its geospatial metadata available on the clearinghouse;
- develop and implement internal procedures to ensure that the department accesses the NSDI clearinghouse before it expends funds to collect or produce new geospatial data to determine (1) whether the information has already been collected by others and (2) whether cooperative efforts to obtain the data are possible;
- prepare goals relating to all datasets within the relevant theme that support the NSDI;
- develop and implement a plan for the nationwide population of the relevant theme that addresses all datasets within the theme and that includes (1) the development of partnership programs with states, tribes, academia, the private sector, other federal agencies, and localities that meet the needs of users; (2) human and financial resource needs; (3) standards, metadata, and the clearinghouse needs; and (4) a timetable for the development for the theme; and
- create and implement a plan to develop and implement relevant theme standards.

Further, we recommended that the Director of OMB develop a mechanism, or modify existing mechanisms, to identify and report

annually on all geospatial-related investments, including dollars invested and the nature of the investment.

In the year since our report was issued, FGDC, OMB, and selected agencies have made some progress in addressing recommendations. For example, in September 2013, FGDC issued guidance directing all FGDC departments to identify planned geospatial investments using the Geospatial Platform. In May 2013, OMB issued guidance to agencies on how to document information on the nature of investments, such as using common standards, specifications, and formats developed by the geospatial community, which would allow others to determine the fitness of the data for their needs. However, because the implementation of this new guidance is still dependent on the use of exhibit 53s and 300s for reporting past, present, and future costs, it is unclear the extent to which federal agencies, OMB, or others will effectively be able to identify how much federal funding is being spent on geospatial systems and data.

In addition, the federal departments we reviewed have taken some steps to implement our recommendations. For example, the Departments of Commerce, the Interior, and Transportation have all begun preparing, maintaining, publishing, and implementing strategies for advancing geographic information and related geospatial data activities appropriate to their missions.

In addition, the three agencies with theme-lead responsibilities that we reviewed have begun implementing our recommendations. For example, NOAA, USGS, and BTS have all taken some steps to create a plan to develop and implement relevant theme standards. However, until a comprehensive national strategy is put in place and federal departments and agencies establish and implement the policies, procedures, and plans to coordinate their geospatial activities as we recommended, the vision of the NSDI to improve the coordination and use of geospatial information will likely not be fully realized and duplicative investments will likely continue. Further, until OMB establishes a way to obtain reliable information about federal geospatial investments as we recommended, OMB will not be able to readily identify potentially duplicative geospatial investments.

In summary, it was slightly over a year ago that we reported that the key players in ensuring coordination on geospatial data investments—FGDC, federal departments and agencies, and OMB—had not fully implemented policies and procedures for coordinating geospatial investments because these efforts were not made a priority. As a result, efforts to acquire data

were uncoordinated and the federal government was acquiring duplicative geospatial data. At that time, we noted that unless OMB, FGDC, and federal departments and agencies decide that coordinating geospatial investments is a priority, this situation would likely continue.

Now, a year later, there has been some progress in improving policies and procedures for coordinating the geospatial investments. However, much remains to be done to implement and enforce the policies and to achieve cost savings to the federal government. Until FGDC, federal departments and agencies, and OMB decide that investments in geospatial information are a priority, these investments will remain uncoordinated, and the federal government will continue to acquire duplicative geospatial information and waste taxpayer dollars.

Chairman Lamborn, Ranking Member Holt, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

GAO Contact and Staff Acknowledgments

If you or your staffs have any questions about this testimony, please contact me at (202) 512-9286 or at pownerd@gao.gov. Individuals who made key contributions to this testimony are Colleen Phillips (assistant director), Kaelin Kuhn, Nancy Glover, Jamelyn Payan, and Jessica Waselkow.

Appendix I: Proposed Data Themes, as of November 2012

Proposed Theme	Description
Biota	Pertain to, or describe, the dynamic processes, interactions, distributions, and relationships between and among organisms and their environments.
Cadastre	<p>Past, current, and future rights and interests in real property including the spatial information necessary to describe geographic extents. Rights and interests are benefits or enjoyment in real property that can be conveyed, transferred, or otherwise allocated to another for economic remuneration. Rights and interests are recorded in land record documents.</p> <p>The spatial information necessary to describe geographic extents includes surveys and legal description frameworks such as the Public Land Survey System, as well as parcel-by-parcel surveys and descriptions. Does not include federal government or military facilities.</p>
Climate and Weather	Meteorological conditions, including temperature, precipitation, and wind, that characteristically prevail in a particular region over a long period of time. Weather is the state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and barometric pressure.
Cultural Resources	Features and characteristics of a collection of places of significance in history, architecture, engineering, or society. Includes national monuments and icons.
Elevation	<p>The measured vertical position of the earth surface and other landscape or bathymetric features relative to a reference datum typically related to sea level. These points normally describe bare earth positions but may also describe the top surface of buildings and other objects, vegetation structure, or submerged objects.</p> <p>Elevation data can be stored as a three-dimensional array or as a continuous surface such as a raster, triangulated irregular network, or contours. Elevation data may also be represented in other derivative forms such as slope, aspect, ridge and drainage lines, and shaded relief.</p>
Geodetic Control	Collection of control points that provide a common reference system for establishing coordinates for geographic data.
Geology	<p>Geographically-referenced data pertaining to the origin, history, composition, structure, features, and processes of the solid Earth, both onshore and offshore.</p> <p>Includes geologic, geophysical, and geochemical maps, stratigraphy, paleontology, geochronology, mineral and energy resources, and natural hazards such as earthquakes, volcanic eruptions, coastal erosion, and landslides. Does not include soils.</p>
Governmental Units	Political, governmental, and administrative (management) type boundaries that are used to manage people and resources. Includes geopolitical boundaries (county, parish, state, city, etc), tribal boundaries, federal land boundaries and federal regions, international boundaries, governmental administrative units such as congressional districts, international lines of separation, limits, zones, enclaves/exclaves and special areas between States and dependencies as well as all jurisdictional offshore limits within U.S. sovereignty. Boundaries associated with natural resources, demography, and cultural entities are excluded and can be found in the appropriate subject themes.

Proposed Theme	Description
Imagery	Georeferenced images of the Earth's surface, which have been collected via aerial photography or satellite data. Orthoimagery is prepared through a geometric correction process known as orthorectification to remove image displacements due to relief and sensor characteristics, allowing their use as base maps for digital mapping and analyses in a geographic information system. Specific imagery data sets created through image interpretation and classification, such as a land cover image, can be found under themes specific to the subject matter.
Land Use/Land Cover	Refers collectively to natural and man-made surface features that cover the land (Land Cover) and to the primary ways in which land cover is used by humans (Land Use). Examples of Land Cover may be grass, asphalt, trees, bare ground, water, etc. Examples of Land Use may be urban, agricultural, ranges, and forest areas.
Real Property	The spatial representation (location) of real property entities, typically consisting of one or more of the following: unimproved land, a building, a structure, site improvements and the underlying land. Complex real property entities (aka "facilities") are used for a broad spectrum of functions or missions. This theme focuses on spatial representation of real property assets only and does not seek to describe special purpose functions of real property such as those found in the Cultural Resources, Transportation, or Utilities themes.
Soils	Depicts the geography and attributes of the many kinds of soils found in the landscape at both large and small map scales. A living dynamic resource providing a natural medium for plant growth and habitat for living organisms, soil recycles nutrients and wastes, stores carbon, and purifies water supplies. Soil has distinct layers (called 'horizons') that, in contrast to underlying geologic material, are altered by the interactions of climate, landscape features, and living organisms over time.
Transportation	Means and aids for conveying persons and/or goods. The transportation system includes both physical and non-physical components related to all modes of travel that allow the movement of goods and people between locations.
Utilities	Means, aids, and usage of facilities for producing, conveying, distributing, processing or disposing of public and private commodities including power, energy, communications, natural gas, and water. Includes subthemes for Energy and Communications.
Water – Inland	Interior hydrologic features and characteristics, including classification, measurements, location, and extent. Includes aquifers, watersheds, wetlands, navigation, water quality, water quantity, and groundwater information.
Water – Oceans and Coasts	Features and characteristics of salt water bodies (i.e. tides, tidal waves, coastal information, reefs) and features and characteristics that represent the intersection of the land with the water surface (i.e. shorelines), the lines from which the territorial sea and other maritime zones are measured (i.e. baseline maritime) and lands covered by water at any stage of the tide (i.e. outer continental shelf), as distinguished from tidelands, which are attached to the mainland or an island and cover and uncover with the tide.

Source: GAO analysis of OMB and FGDC documentation