

The Department Needs to Improve Its Metadata Processes Under the Geospatial Data Act

FINAL REPORT NO. OIG-22-032-A

SEPTEMBER 22, 2022



U.S. Department of Commerce
Office of Inspector General
Office of Audit and Evaluation



September 22, 2022

MEMORANDUM FOR: Don Graves
Deputy Secretary of Commerce

FROM: Frederick J. Meny, Jr.
Assistant Inspector General for Audit and Evaluation

SUBJECT: *The Department Needs to Improve Its Metadata Processes Under the Geospatial Data Act*
Final Report No. OIG-22-032-A

Attached is our final report on our audit of the U.S. Department of Commerce's (the Department's) collection, production, acquisition, maintenance, distribution, use, and preservation of geospatial data. Our objective was to assess the Department's progress toward compliance with Geospatial Data Act requirements under 43 U.S.C. § 2808(a).

We found the Department has generally made progress toward complying with 10 of the 13 requirements under this section. However,

- I. The Department's geospatial metadata is inconsistent with best practices from *FGDC Technical Guidance: Data.gov and The GeoPlatform Metadata Recommendations Including Guidelines for National Geospatial Data Assets (NGDA)*.
- II. Technical challenges on GeoPlatform are still causing metadata harvesting issues.

In response to our draft report, the Department concurred with all the recommendations and generally described plans it has taken or will take to meet them. The Department's response is included within the final report as appendix E.

Pursuant to Department Administrative Order 213-5, please submit to us an action plan that addresses the recommendations in this report within 60 calendar days. This final report will be posted on the Office of Inspector General's website pursuant to sections 4 and 8M of the Inspector General Act of 1978, as amended (5 U.S.C. App., §§ 4 & 8M).

We appreciate the cooperation and courtesies extended to us by your staff during our audit. If you have any questions or concerns about this report, please contact me at (202) 793-2938 or Kevin Ryan, Director for Audit and Evaluation, at (202) 695-0791.

Attachment

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Report in Brief

September 22, 2022

Background

On October 5, 2018, Congress enacted the Geospatial Data Act of 2018 (GDA) to foster efficient management of geospatial data, technologies, and infrastructure through enhanced coordination among the federal government, state and local authorities, the private sector, and academia. The GDA created a geospatial management structure to minimize the duplication of geospatial data and improve collaboration across agencies.

The GDA requires inspectors general of the covered agencies to audit the agencies' collection, production, acquisition, maintenance, distribution, use, and preservation of geospatial data not less than once every 2 years. In October 2021, the Council of the Inspectors General on Integrity and Efficiency clarified that these audits should only include the agency's progress meeting GDA section 759(a), 43 U.S.C. § 2808(a). This is our second audit of the U.S. Department of Commerce (the Department) under the GDA.

The GDA defines 13 responsibilities for covered agencies. These responsibilities include geospatial strategy, data sharing, integration, records retention, management, standards, partnerships, application, privacy, classification, duplication, quality, and points of contact.

Why We Did This Review

Our audit objective was to assess the Department's progress toward compliance with GDA requirements under 43 U.S.C. § 2808(a).

OFFICE OF THE SECRETARY

The Department Needs to Improve Its Metadata Processes Under the Geospatial Data Act

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WHAT WE FOUND

We found the Department has generally made progress toward complying with 10 of the 13 requirements under 43 U.S.C. § 2808(a). However, we found the Department's geospatial metadata is inconsistent with best practices in *FGDC Technical Guidance: Data.gov and The GeoPlatform Metadata Recommendations Including Guidelines for National Geospatial Data Assets (NGDA) (FGDC Guidance)*. Without following the *FGDC Guidance*, the Department's geospatial data stakeholders could face challenges—regardless of where users discover or access the data—to making the most efficient and effective use of the Department's entire geospatial data portfolio. We also found technical challenges on the GeoPlatform are still causing metadata harvesting issues for the Department, which means GeoPlatform users may be unable to find the Department's geospatial data and determine if it meets their needs.

WHAT WE RECOMMEND

We recommend that the Department's Chief Data Officer and the Senior Agency Official for Geospatial Information do the following:

1. Develop plans and timeframes to align metadata quality control processes with *FGDC Guidance*.
2. Ensure that the U.S. Census Bureau aligns its metadata quality control process to *FGDC Guidance* best practices for metadata content.
3. Ensure that the National Oceanic and Atmospheric Administration aligns its metadata quality control process to *FGDC Guidance* best practices for metadata content.

We recommend that the Department's Chief Data Officer do the following:

4. Review the Department's geospatial data harvesting processes to Data.gov to ensure that it does not contain duplicates.

We recommend that the Senior Agency Official for Geospatial Information do the following:

5. Work with the U.S. Department of the Interior to establish a reporting process to identify any issues with the availability and organization of national geospatial data assets on the GeoPlatform and to understand GeoPlatform changes affecting the Department's harvesting processes.

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Cover: Herbert C. Hoover Building main entrance at 14th Street Northwest in Washington, DC. Completed in 1932, the building is named after the former Secretary of Commerce and 31st President of the United States.

Introduction

On October 5, 2018, Congress enacted the Geospatial Data Act of 2018 (GDA)¹ to foster efficient management of geospatial data, technologies, and infrastructure through enhanced coordination among the federal government, state and local authorities, the private sector, and academia. The GDA created a geospatial management structure to minimize the duplication of geospatial data and improve collaboration across agencies.

The GDA requires inspectors general of the covered agencies to audit the agencies' collection, production, acquisition, maintenance, distribution, use, and preservation of geospatial data not less than once every 2 years.² However, on October 18, 2021, the Council of the Inspectors General on Integrity and Efficiency (CIGIE) wrote to Congress to clarify that the audits conducted by the inspectors general should only include the agency's progress meeting GDA section 759(a), 43 U.S.C. § 2808(a), since standards have not been endorsed yet, nor has the 5-year phase-in period from the establishment of standards before a covered agency is restricted from using federal funds on geospatial data.³ This is our second audit of the U.S. Department of Commerce (the Department) under the GDA.⁴

The GDA defines 13 responsibilities for covered agencies.⁵ These responsibilities include geospatial strategy, data sharing, integration, records retention, management, standards, partnerships, application, privacy, classification, duplication, quality, and points of contact. See appendix B for a summary, listing, and description of these 13 responsibilities.

Geospatial Data and Metadata

Geospatial data is information derived from, among other things, remote sensing, mapping, and surveying and tied to a location on the Earth, maintained in a digitized or nondigitized format.⁶

Geospatial metadata supplies answers to a potential user's most basic questions (who, what, where, when, why, and how) about a linked geospatial data resource. It also provides additional information that enables both users and information systems to organize or filter data resources by content, source, age, accuracy, condition, projection, method of collection, or other characteristics (such as keywords).⁷

¹ Pub. L. No. 115-254, Subtitle F (2018), codified at 43 U.S.C. §§ 2801-2811.

² 43 U.S.C. § 2808(c).

³ A copy of the CIGIE letter is in appendix D.

⁴ U.S. Department of Commerce Office of Inspector General, October 1, 2020. *The Department Has Made Progress Meeting Its Responsibilities Under the Geospatial Data Act But Must Improve Controls to Ensure Full Compliance*, OIG-21-001-A. Washington, DC: DOC OIG.

⁵ 43 U.S.C. § 2808(a). As defined under the GDA, the Department is a covered agency subject to these requirements. 43 U.S.C. § 2801(3).

⁶ See 43 U.S.C. § 2801(5).

⁷ See 43 U.S.C. § 2801(11).

When searching a geographic information system for a specific topic, location, or timeframe, a potential user typically relies on metadata keywords to help identify those data resources most relevant to their interests. Maintaining an accurate keyword profile allows both people and systems to quickly outline the metadata's content, purpose, and unique features.

National Geospatial Data Asset (NGDA) Themes and Datasets

NGDA data themes are conceptual topics that describe digital spatial information for the United States and consist of associated datasets (with attribute records and coordinates).⁸

An NGDA dataset is a group of geospatial data that has been designated as such by the Federal Geographic Data Committee (FGDC).⁹ The Department leads or co-leads 6 of 18 NGDA data themes within the federal government and is responsible for 59 of 173 NGDA datasets. Within the Department, the U.S. Census Bureau (the Census Bureau) provides 35 datasets, and the National Oceanic and Atmospheric Administration (NOAA) provides 24. Two of the Department's NGDA datasets include

- geospatial shoreline information for nautical charting for the United States and its territories, and
- congressional district mapping for the 435 areas from which people are elected to the U.S. House of Representatives.

The GeoPlatform

The GDA requires covered agencies to make their geospatial metadata available through the GeoPlatform, an electronic service managed by the U.S. Department of the Interior that provides the public access to geospatial data and metadata.¹⁰ The Department spends about \$230,000 each year to share its geospatial data, services, and applications on the GeoPlatform. While the GeoPlatform is intended to help reduce data duplication by providing a central portal for all geospatial metadata and datasets, Department officials explained that users primarily access geospatial data directly from Department websites such as data.noaa.gov and data.census.gov.

FGDC Metadata Technical Guidance

FGDC developed the *FGDC Technical Guidance: Data.gov and The GeoPlatform Metadata Recommendations Including Guidelines for National Geospatial Data Assets (NGDA) (FGDC Guidance)*.¹¹ This guidance applies to metadata files hosted on the GeoPlatform and leverages international standards as a foundation for its best practices. The guidance is designed to help

⁸ 43 U.S.C. §§ 2805(a)(1) and (a)(2).

⁹ Per 43 U.S.C. § 2802(a), the FGDC provides direction and oversight for geospatial decisions and initiatives across the federal government.

¹⁰ See 43 U.S.C. § 2808(a)(6). The GeoPlatform is available online at geoplatform.gov.

¹¹ Federal Geographic Data Committee, October 27, 2021. *FGDC Technical Guidance: Data.gov and The GeoPlatform Metadata Recommendations Including Guidelines for National Geospatial Data Assets (NGDA)*. Reston, VA: FGDC. Available online at <https://www.fgdc.gov/technical-guidance/metadata/fgdc-technical-guidance-datagov-geoplatform-ngda.pdf> (accessed June 7, 2022).

covered agencies meet the requirements of the GDA and support the development of useful metadata content on the GeoPlatform.

Recommendations From Previous Audit

In our prior report, we made six recommendations focused on the following areas: the geospatial data strategic plan, procedures for policy on planned geospatial acquisitions, GeoPlatform data harvesting, and metadata standards compliance.¹² One recommendation remains open: that the Department develop procedures to ensure consistent implementation of its *Policy on Planned Geospatial Acquisitions*. It remains open because the Department is waiting for Office of Management and Budget to issue GDA implementation guidance that would inform the procedures.

¹² OIG-21-001-A, pgs. 6–9.

Objective, Findings, and Recommendations

Our objective was to assess the Department's progress toward compliance with GDA requirements under 43 U.S.C. § 2808(a). See appendix A for a full description of our scope and methodology.

We found the Department has generally made progress toward complying with 10 of the 13 requirements under this section. However, we found the Department's geospatial metadata is inconsistent with best practices in *FGDC Guidance*. Without following the *FGDC Guidance*, the Department's geospatial data stakeholders could face challenges—regardless of where users discover or access the data—to making the most efficient and effective use of the Department's entire geospatial data portfolio.¹³ We also found technical challenges on the GeoPlatform are still causing metadata harvesting issues for the Department, which means GeoPlatform users may be unable to find the Department's geospatial data and determine if it meets their needs. We summarize our findings for all 13 requirements in appendix B.

I. The Department's Geospatial Metadata is Inconsistent with *FGDC Guidance* Best Practices

The GDA requires covered agencies to use metadata standards for geospatial data, document geospatial data with the relevant metadata, and make metadata available through the GeoPlatform.¹⁴ From the 31 metadata content best practices in *FGDC Guidance*, we selected 23 that enhance discovery and enable utility of the data. We then tested all Department-owned and available NGDA geospatial metadata files against these key best practices.¹⁵

We found that the Department's geospatial metadata files were incomplete and inconsistent with the best practices.¹⁶ None of the 56 NGDA metadata files we tested included four date fields: *dataset creation*, *dataset update*, *metadata publication*, and *metadata update*. We also found that 61 percent of the metadata files were missing the *reference system identifier*, which provides information on the data's geospatial coordinate system.¹⁷ In addition, several files lacked hyperlinks to download and access or view the source of the underlying geospatial data.¹⁸

¹³ The Department maintains NGDA metadata files on or among the following locations: a Census Bureau website and servers, NOAA websites and servers, Data.gov, and the GeoPlatform.

¹⁴ 43 U.S.C. § 2808(a)(6).

¹⁵ Though the Census Bureau is a co-lead for the National Address Database, the U.S. Department of Transportation owns this geospatial data resource. As such, and since the National Address Database and its metadata were not available, we removed this dataset from our analysis. The metadata was also not available for two other NGDAs and therefore, we removed these datasets from our analysis.

¹⁶ See appendix C for the summary of our analysis of the Department's metadata files.

¹⁷ Specifically, 18 of NOAA's and 16 of the Census Bureau's metadata files.

¹⁸ Specifically, 8 of NOAA's metadata files lacked the download URL, and 22 (21 of NOAA's and 1 of the Census Bureau's metadata files) lacked the web service URL.

The missing four date fields means a user may struggle to evaluate a data resource or its metadata in terms of age or recency. When a metadata file lacks information on the geospatial coordinate system, a user may not be able to interpret location-specific information needed to understand the data. Users may be unable to easily download or view the source data when the metadata lacks these hyperlinks.

A subset of our tests was related to keywords in the metadata files. We found that 82 percent of the files we tested were missing the *NGDA ID* keyword, 5 percent were missing the phrase “NGDA,” and 39 percent did not have properly formatted keywords.¹⁹ Until the Department ensures it supplies all required keywords in a format consistent with the guidance, users may be unable to uniquely identify each NGDA and obtain relevant search results on desired geospatial themes, topics, features, and locations.

Other metadata fields were generally consistent with *FGDC Guidance*. For example, the Department included titles and abstracts in each of the 56 NGDA files. Both Census Bureau and NOAA officials noted that FGDC revised its metadata guidance in October 2021 and that, as a result, they have not had sufficient time to update metadata files or their quality control procedures.

Census Bureau officials indicated that they plan to realign their quality checks to include FGDC’s revised guidance for the upcoming yearly harvest in October 2022. NOAA officials also stated they stored some of the missing content, such as the dataset creation date, in a different metadata field and location than specified in the *FGDC Guidance*, which details exactly where and how such information should be stored.

Recommendations

We recommend that the Department’s Chief Data Officer and the Senior Agency Official for Geospatial Information do the following:

1. Develop plans and timeframes to align metadata quality control processes with *FGDC Guidance*.
2. Ensure that the Census Bureau aligns its metadata quality control process to *FGDC Guidance* best practices for metadata content.
3. Ensure that NOAA aligns its metadata quality control process to *FGDC Guidance* best practices for metadata content.

¹⁹ FGDC guidance states that keywords should be listed individually, not grouped within one field. Specifically, 22 of NOAA’s and 24 of the Census Bureau’s metadata files were missing the NGDA ID. The files missing the phrase “NGDA” and those that did not have properly formatted keywords were all NOAA metadata files.

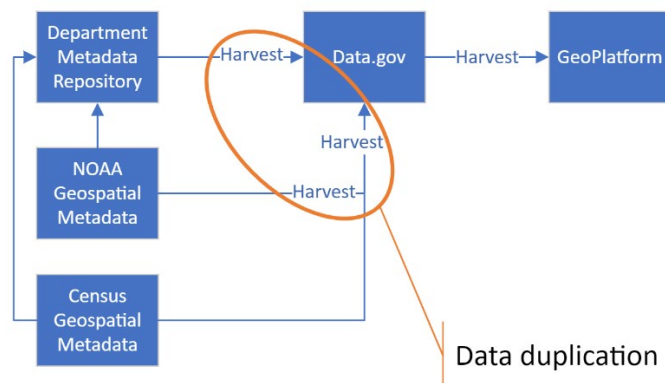
II. Technical Challenges on the GeoPlatform Are Still Causing Metadata Harvesting Issues

The GDA requires covered agencies to collect, maintain, disseminate, and preserve geospatial data such that the resulting data, information, or products can be readily shared.²⁰ According to the GDA, the Department, as the lead and co-lead for several NGDA themes, is responsible for ensuring the datasets under its themes are disseminated using the GeoPlatform.²¹ However, we found that technical challenges on the GeoPlatform are still causing metadata harvesting issues for the Department.

We previously reported on data harvesting issues causing inconsistencies in the Department's metadata. According to Department officials, these issues were resolved when they worked with Data.gov and the GeoPlatform, from October 2020 to March 2021, to test harvesting improvements by removing and reharvesting metadata to the GeoPlatform. NOAA's data catalog managers also verified their metadata records were present on the GeoPlatform.

However, during our fieldwork we identified data duplication issues and software upgrades that contribute to the difficulty of harvesting geospatial metadata to the GeoPlatform. The Department maintains multiple metadata harvesting sources on Data.gov (see figure 1). Once duplicate data is on Data.gov, this affects the GeoPlatform harvesting process.

Figure 1. Harvesting the Department's Geospatial Metadata to GeoPlatform



Source: Office of Inspector General

The GeoPlatform migrated to a new platform in March 2022. Since then, ongoing software changes are causing inconsistencies on the GeoPlatform, specifically with some of the Department's NGDA datasets. We observed inconsistencies on the GeoPlatform within one NGDA theme and missing datasets within two other themes. For example, the "Current, Nation, U.S., Counties and Equivalent Entities" dataset was unavailable on June 9, then available on June 13. Department officials stated that GeoPlatform officials do not

²⁰ 43 U.S.C. § 2808(a)(2).

²¹ 43 U.S.C. § 2805(b)(1) – (b)(3).

notify them of harvesting software updates ahead of time and that the GeoPlatform does not have a project plan identifying milestones or software updates to share with the Department. GeoPlatform officials were also unable to provide a project plan with such information when we requested it.

Some users searching for the Department's geospatial data may choose to visit only the GeoPlatform and not the Department's sites. Without the Department's NGDAs being consistently available on the GeoPlatform, these users may be unable to determine if the Department's geospatial data meets their needs before expending funds for geospatial data collection.²²

Recommendations

We recommend that the Department's Chief Data Officer do the following:

4. Review the Department's geospatial data harvesting processes to Data.gov to ensure that it does not contain duplicates.

We recommend that the Senior Agency Official for Geospatial Information do the following:

5. Work with the U.S Department of the Interior to establish a reporting process to identify any issues with the availability and organization of NGDAs on the GeoPlatform and to understand GeoPlatform changes affecting the Department's harvesting processes.

²² Per 43 U.S.C. § 2808(a)(11), covered agencies are required to search all sources, including the GeoPlatform, to determine if existing federal, state, local, or private geospatial data meets its needs before expending funds for geospatial data collection.

Summary of Agency Response and OIG Comments

In response to our draft report, the Department concurred with all recommendations and generally described plans it has taken or will take to meet them. The Department's response is included in appendix E. The Department also separately provided technical and editorial comments. We considered these comments and made changes in the final report to provide additional clarity.

We are pleased with Department's response to the report and look forward to reviewing its action plan for implementing the recommendations.

Appendix A: Objective, Scope, and Methodology

Our objective was to assess the Department's progress toward compliance with GDA requirements under 43 U.S.C. § 2808(a). To satisfy our objective, we assessed each of the 13 requirements as follows:

To accomplish our objective for requirement 1, we obtained and reviewed the *2021 Covered Agency Annual Report and Self-Assessment for Department of Commerce, Geospatial Data Act of 2018 Section USC 43 Sec 2808(a) Requirements*²³ (*2021 Covered Agency Report*); the Commerce Data Governance Board (CDGB) monthly meeting agendas, minutes, and slides for 2020 and 2021; and Commerce Geospatial Working Group (CGWG) monthly meeting agendas and minutes for 2021 and 2022. We ensured the goals and objectives of the *National Spatial Data Infrastructure Strategic Plan (2021–2024) (NSDI SP)* aligned with the *Department of Commerce Geospatial Strategy Fiscal Years 2021–2024*. We also interviewed the Department's Senior Agency Official for Geospatial Information (SAOGI) along with the CGWG Co-Chair to understand the Department's geospatial strategy and action plan, as well as the crosswalk between the goals and objectives of the *NSDI SP* and the Department's geospatial strategy.

To accomplish our objective for requirement 2, we observed some of the Department's NGDA datasets for the Department's six themes at selected times to gauge how consistently they were available on the NGDA theme page of the GeoPlatform. We specifically focused on how the Department's metadata is harvested onto Data.gov and then onto the GeoPlatform. To understand how geospatial metadata is harvested to Data.gov and the GeoPlatform from the Department, we interviewed NOAA and Census Bureau officials, the SAOGI, the Department's Chief Data Officer, and NOAA and Census Bureau metadata staff responsible for preparing and initiating the metadata harvest.

To understand issues with processing geospatial metadata for availability on Data.gov and the GeoPlatform, we interviewed GeoPlatform and Data.gov representatives. Additionally, we inspected the Data.gov and GeoPlatform software repository sites and the customer issues site for the GeoPlatform to understand data harvesting, duplicate data, and index issues reported by NOAA and Census Bureau officials.

To accomplish our objective for requirement 3, we interviewed NOAA and Census Bureau officials and partners to understand the extent of data collection, any external data used, and the process for data integration. We reviewed the Department's 2021 reports for its six covered themes and reviewed the partnership information received from NOAA and Census Bureau officials to understand current partnerships that use and/or collect geospatial data. We

²³ DOC, January 14, 2022. *2021 Covered Agency Annual Report and Self-Assessment for Department of Commerce, Geospatial Data Act of 2018 Section USC 43 Sec 2808(a) Requirements*. Washington, DC: DOC. Available online at <https://www.fgdc.gov/gda/gda-ca-reports/fy2021/fy2021-doc-gda-covered-agency-report.pdf> (accessed August 1, 2022).

also interviewed selected partners from state, private, and higher education entities to understand how they collect geospatial data for the Department.

To accomplish our objective for requirement 4, we obtained policies and procedures that included geospatial data on agency records schedules from NOAA officials and a Census Bureau website. We reviewed the *2021 Covered Agency Report* for the Department's response to progress made with this requirement. We also obtained National Archives and Records Administration (NARA)-approved records schedules from NOAA officials and compared them against the approved schedules on NARA's website, along with verifying the Census Bureau had no new records schedules within the scope of our audit.

To accomplish our objective for requirement 5, we obtained information from Census Bureau and NOAA officials on how they allocated resources across different categories, such as budget, personnel, information technology (IT) resources, geospatial equipment, training, supporting contracts, or interagency agreements. We also interviewed Census Bureau and NOAA officials and collected supporting documentation about their current levels of resource allocation. Additionally, we collected information from NOAA officials identifying resource allocations by the amount of burden NOAA faces when fulfilling its GDA responsibilities across geospatial full-time equivalent personnel.

To accomplish our objective for requirement 6, we determined that the audit scope would include the Department's owned and available 56 NGDAs. We reviewed the *FGDC Guidance* and used our professional judgment to identify those metadata content fields most critical or relevant to a user's basic understanding or ability to find a given data resource. We selected the following 14 metadata content fields:

- Title
- Abstract
- Dataset creation date
- Dataset publication date
- Dataset last updated date
- Metadata publication date
- Metadata last updated date
- Date stamp
- Citation identifier
- Metadata identifier
- Reference system identifier
- Download URL
- Webservice URL
- Keywords

In addition to the above 14 metadata content fields, we also determined that there were 9 additional quality tests for metadata content to ensure consistency with *FGDC Guidance*. These tests included 2 for date validity, 2 for date formatting, and 5 for different required NGDA keywords within each metadata file.

We collected the Department's NGDA metadata files from the GeoPlatform and the Department's servers. Our data analytics team then developed a software script to iteratively scan each metadata file to identify issues in content or quality against our tests. We met with the Census Bureau's Geography Division staff, NOAA's Office of the Chief Data Officer staff, and subject matter experts in creating and maintaining NGDA metadata files to discuss the results of our analysis.

To accomplish our objective for requirement 7, we interviewed the SAOGI to identify if the Department had any policies or procedures related to partnerships. We also interviewed NOAA and Census Bureau officials to understand the extent of data collection, use of external data, and the process for establishing partnerships. We reviewed the Department's 2021 reports for its six covered themes and reviewed NOAA and Census Bureau partnership information to understand current partnerships that use or collect geospatial data. We also interviewed higher education and private sector partners identified by NOAA and the Census Bureau to understand challenges, suggested improvements, and how partnerships function with the Department. Finally, we collected partnership agreements to understand the responsibilities, functions, and process.

To accomplish our objective for requirement 8, we reviewed the *2021 Covered Agency Report* and verified the information provided within the report. We also obtained information from NOAA and the Census Bureau to understand how each conducts outreach and engages with its partners. Additionally, we conducted interviews with the National Telecommunications and Information Administration (NTIA), Bureau of Economic Analysis, National Institute of Standards and Technology (NIST), and Economic Development Agency to understand if they produce or use geospatial data.

To accomplish our objective for requirement 9, we interviewed and requested information from Census Bureau and NOAA officials regarding any systems that process geospatial information and privacy or confidential information (e.g., personally identifiable information). We collected and reviewed various privacy and security policies, plans, and other privacy and information security artifacts to determine the extent to which individual systems adhered to Department guidance for protecting privacy and maintaining confidentiality. We interviewed both the Census Bureau and NOAA IT security and privacy officials to understand how each implemented the relevant privacy and security controls and where they documented the information.

To accomplish our objective for requirement 10, we reviewed the Department's response to this requirement in the *2021 Covered Agency Report* and obtained information from the Department, NOAA, and Census Bureau to understand how Department officials work across the government to determine which data is most appropriate and useful for inclusion in the NSDI.

To accomplish our objective for requirement 11, we reached out to NOAA's Acquisition and Grants office to understand if it verifies a search was conducted before obligating funds. We also reached out to NOAA's dataset managers who issued grants or contracts during the scope of the audit to understand how searches are conducted and if documented policies or procedures exist.

To accomplish our objective for requirement 12, we obtained from NOAA officials a list of contracts and grants issued since October 2020 to judgmentally sample. We then reviewed multiple contracts' statements of work and performance work statements to determine the extent of quality processes and the referencing of quality standards specified for the geospatial data quality being gathered. Additionally, we evaluated the product acceptance process that NOAA followed when the contractor delivered geospatial data. We also interviewed NOAA officials, including Contracting Officer's Representatives, the Team Lead, and the Project Manager to understand the step-by-step process of administering a geospatial data contract and NOAA's acceptance of the geospatial data. In addition, we obtained information from Census Bureau officials regarding quality control processes for their cost-share agreement with the U.S. Department of Agriculture.

To accomplish our objective for requirement 13, we obtained from NOAA and Census Bureau officials the NGDA Theme Leads points of contact they work with to compare against individuals identified in the *2021 Covered Agency Report*. We also obtained information from selected theme leads to understand who their point of contact was within the Census Bureau, any challenges they encountered, and the benefits of having the Census Bureau or NOAA provide support to the theme they lead.

We gained an understanding of internal control significant within the context of the audit objective through reviewing documentation such as the *Department of Commerce Geospatial Strategy Fiscal Years 2021–2024*. We assessed the implementation of internal control through (1) document reviews such as CDGB and CGWG meeting minutes and slides and (2) interviews with Department officials to determine adherence to procedures and plans. We did not detect any incidents of fraud, illegal acts, or abuse.

In satisfying our objective, we reviewed computer-processed data. We took reasonable steps to determine if the computer-processed data was sufficiently reliable, such as collecting record-level metadata files directly from the source, testing each record for missing data, testing for valid dates, testing for valid date formats, and manually cross-checking and validating script results against source files. We also shared preliminary record-level software script results with knowledgeable officials.

Although we could not independently verify the reliability of all the information we collected, we compared it with other available supporting documents to determine data consistency and reasonableness. Based on these efforts, we believe the information we obtained is sufficiently reliable for this report.

We conducted our review from January 2022 through July 2022 under the authority of the Inspector General Act of 1978, as amended (5 U.S.C. App.), and Department Organization Order 10-13, dated October 21, 2020. We performed our fieldwork remotely.

We conducted this performance audit in accordance with generally accepted government auditing standards. These 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 objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Appendix B: Summary of the Department's Progress Implementing GDA Responsibilities

Table B-1. Summary of Department Progress Implementing Covered Agency Responsibilities Under 43 U.S.C. § 2808(a)

Responsibility	Description	Department's Progress
1. Strategy	Prepare, maintain, publish, and implement a strategy for promoting the use of geographic information and related geospatial data and activities appropriate to the agency's mission, in support of the strategic plan for the NSDI.	The <i>Department of Commerce Geospatial Strategy Fiscal Years 2021–2024</i> was developed in July 2021 by the CGWG. This strategy identifies goals and objectives that we verified directly support the <i>Department of Commerce Data Strategy (Fiscal Years 2021–2024)</i> and <i>NSDI SP</i> . The <i>Geospatial Strategic Action Plan</i> was published in November 2021 and is intended to provide the actions and timeline for achieving the goals set out in the strategy.
2. Management of geospatial data	Collect, maintain, disseminate, and preserve geospatial data so that it can be readily shared with other federal agencies and nonfederal users.	See finding II of this report.
3. Promotion of integration	Promote the integration of geospatial data from all sources.	The Department promotes the integration of geospatial data from all sources through its partnerships to collect geospatial data, shares with users how they can discover data, and has data integration processes to integrate nonagency data.
4. Inclusion of geospatial data in agency records schedules	Ensure that data information products and other records created in geospatial data are included on NARA-approved agency records schedules.	NOAA and the Census Bureau have policies and procedures that include geospatial data on agency records schedules. NOAA has two NARA-approved records schedules for geospatial data that are included in the Department's records schedules. The Census Bureau did not have any records schedules for geospatial data that were within the scope of this audit.
5. Allocation of resources	Allocate resources to fulfill responsibilities of collection, production, and stewardship, with regard to related activities of the covered agency, and support Committee activities.	<p>The Census Bureau stated that work in the metadata area will grow beyond its current level of staffing and plans to increase its budget and resources (e.g., by acquiring a metadata contractor) to meet this challenge. However, it did not provide any specific documentation of such plans or budgets.</p> <p>NOAA described several resource challenges, such as working with the GeoPlatform on metadata harvesting and addressing metadata errors. NOAA has plans to address each challenge through a combination of leveraging technology, increasing the resource level, or acquiring new equipment (e.g., ships).</p> <p>The resource challenges both NOAA and the Census Bureau identified appear to be manageable given their current budget allocations and resource assignments when fulfilling their required responsibilities under the GDA.</p>
6. Use of geospatial data standards	Use the appropriate standards for documenting geospatial data with relevant metadata and making metadata available through the GeoPlatform.	See finding I of this report.

Responsibility	Description	Department's Progress
7. Coordination	Coordinate and work with other federal agencies; state, tribal, and local governments; institutions of higher education; and the private sector to efficiently and cost-effectively collect, integrate, maintain, disseminate, and preserve geospatial data, building upon existing nonfederal geospatial data to the extent possible.	<p>NOAA has established partnership programs and agreements with government, private, and academic partners across its mission areas. Many of NOAA's geospatial datasets integrate geospatial data from various government and nongovernment sources.</p> <p>The Census Bureau integrates address, feature, and boundary data provided by tribal, federal, state, and local government partners through partnership programs, such as the Boundary and Annexation Survey.</p> <p>NOAA and Census Bureau partners we interviewed did not identify significant challenges. The Census Bureau partners identified some minor challenges, including difficulties understanding the BAS, process, and the complexity of the data submission portal.</p>
8. Use of geospatial information	Use geospatial information to (a) make federal geospatial information and services useful to the public, (b) enhance operations, (c) support decision making, and (d) enhance reporting to the public and Congress.	<p>The Department's geospatial strategy enhances operations and supports decision making since it aligns with the <i>Department of Commerce Data Strategy (2021–2024)</i>. NOAA and the Census Bureau participate in many different geospatial-related working groups, councils, special listening sessions, and summits that ensure continued outreach and communications with the public. NIST uses geospatial data for the tracking and source prediction of greenhouse gases. NTIA uses geospatial data as input for its National Broadband Availability Map, used by broadband policymakers. The public and other agencies can find information about the Department's geospatial data on agency websites, Data.gov, and the GeoPlatform.</p>
9. Personal privacy and confidentiality	Protect personal privacy and maintain confidentiality in accordance with federal policy and law.	<p>NOAA and the Census Bureau's geospatial systems that include personally identifiable information implement all applicable privacy controls from Appendix J of NIST's <i>SP 800-53 Rev. 4, Security and Privacy Controls for Federal Information Systems and Organizations</i>, as required by the Department's <i>Privacy Program Plan</i>.</p>
10. Declassified data	Participate in determining whether declassified data can contribute to and become a part of the NSDI.	<p>According to Department officials, the Department does not have declassified geospatial data that could become part of the NSDI. Through the Department's representation on the U.S. Civil Applications Committee, FGDC Steering Committee, and National Geospatial Advisory Committee, it works across the government to determine which data is most appropriate and useful for inclusion in the NSDI.</p>
11. Review of existing geospatial data	Search all sources, including the GeoPlatform, to determine whether existing federal, state, local, and private geospatial data meets the needs of the covered agency before users expend funds for geospatial data collection.	<p>Although NOAA conducts searches before issuing a contract for geospatial data collection, there are no procedures or policies in place to ensure searches are conducted. According to NOAA's Acquisition and Grants Office, the program office is responsible for ensuring searches are conducted before procuring and obligating funds. The Department has an outstanding recommendation from our previous audit (OIG-21-001-A).</p>

Responsibility	Description	Department's Progress
12. Collection of high-quality data	To the extent possible, ensure that persons that receive federal funds to collect geospatial data provide high-quality data.	<p>NOAA has quality control procedures and processes in place to ensure it receives high quality geospatial data from its contractors. For example, each task order for a hydrographic survey follows the <i>Hydrographic Survey Specification and Deliverables</i> document, where each survey undergoes a Hydrographic Data Review. This is a checklist that the individual reviewer completes to verify the collected data. Once the review is completed, the data is sent to the operations branch for verification. If the data fails any significant checks during the process, it will be sent back to the contractor for correction.</p> <p>Generally, the Census Bureau does not expend funds to collect geospatial data from its Tribal, federal, State, and local partners. However, in 2021, the Census Bureau became a cost-share partner for the U.S. Department of Agriculture National Agriculture Imagery Program (NAIP). According to Census Bureau officials, the NAIP imagery includes sufficient accuracy specifications, compliance guidelines, and is subjected to automated and visual product inspections.</p>
13. Appointment of contact	Appoint a contact to coordinate with lead covered agencies for collection, acquisition, maintenance, and dissemination of the NGDA data themes.	The Department has appointed multiple points of contact who coordinate with lead covered agencies for NGDA themes that it does not lead or co-lead.

Source: Office of Inspector General analysis of documentation from NOAA, the Census Bureau, and the Department

Appendix C: Analysis of Department Metadata Files

Table C-1. Pass/Fail Analysis of FGDC Best Practices Against Department Metadata Files^a

Test Number	FGDC Metadata Content Field Tested	Department Metadata Files Passed	Department Metadata Files Failed
1	Title	56	0
2	Abstract	56	0
3	Data set creation date	0	56
4	Data set publication	55	1
5	Valid publication date	55	1
6	Proper publication date formatting	55	1
7	Data set last updated	0	56
8	Metadata publication date	0	56
9	Metadata last update date	0	56
10	Date stamp	56	0
11	Valid date stamp	56	0
12	Proper date stamp formatting	56	0
13	Citation identifier	55	1
14	Metadata identifier	55	1
15	Reference system identifier	22	34
16	Download URL	48	8
17	Webservice URL	34	22
18	Keyword field(s)	56	0
19	Keywords listed "NGDA"	53	3
20	Keywords listed "National Geospatial Data Asset"	56	0
21	Keywords listed the NGDA ID ("NGDA###")	10	46
22	Keywords listed the NGDA theme	56	0
23	Keywords properly formatted	34	22

Source: Office of Inspector General analysis of metadata files from the Department or the GeoPlatform.

^a We did not analyze three NGDA metadata files since they were not readily accessible from the GeoPlatform or the Department: (1) National Address Database; (2) Environmental Sensitivity Index Data Viewer and REST Services for Atlases; and (3) Geodetic Control Information on Passive Marks: Horizontal and Vertical Geodetic Control Data for the United States – National Geos.

Appendix D: CIGIE Letter to Congress



October 18, 2021

The Honorable Maria Cantwell
Chairwoman
The Honorable Roger F. Wicker
Ranking Member
Committee on Commerce, Science,
and Transportation
United States Senate
Washington, D.C.

The Honorable Eddie Bernice Johnson
Chairwoman
The Honorable Frank Lucas
Ranking Member
Committee on Science, Space,
and Technology
U.S. House of Representatives
Washington, D.C.

Dear Chairwomen and Ranking Members:

The Council of the Inspectors General on Integrity and Efficiency (CIGIE) recognizes and appreciates your leadership on issues of geospatial data. In particular, we believe the enactment of the Geospatial Data Act of 2018 (P.L. 115-254) will improve the continuing development of geospatial data and technology. To make sure this happens, the Geospatial Data Act provides for oversight by way of the Federal Inspectors General. Specifically, the Geospatial Data Act requires the biennial completion of a review of Covered Agencies' compliance with standards established by the Act, Covered Agencies' responsibilities detailed in the Act, and Covered Agencies' compliance with the prohibition of Federal funding for non-compliant datasets.

We are writing this letter on behalf of CIGIE to inform you of an important distinction with the biennial Geospatial Data Act audits by the Inspector General community. Specifically, the Fiscal Year 2022 mandatory audit scope period overlaps with the estimated Geospatial Data Act implementation period established by the Federal Geographic Data Committee (FGDC). As part of the implementation phase, the FGDC is evaluating the existing body of standards, among other items. Due to the continuing implementation of the Geospatial Data Act, conducting the mandatory audits as prescribed by the Act would result in reports submitted by the Inspectors General in October 2022 being inconclusive for two of the three audit requirements.

To address this challenge while continuing to meet the mandatory audit requirements, CIGIE convened a working group with representatives from the Covered Agency Inspectors General to reach a consensus on an audit approach for the Fiscal Year 2022 audits. The Covered Agency Inspectors General determined that audits focused on the Covered Agencies' progress toward compliance with the Geospatial Data Act, including the agencies' compliance with requirements under subsection (a), would likely provide the best value to the Covered Agencies, Congress, and the Public. This is a somewhat narrower approach than what the law requires because it is currently difficult to determine which standards the audits should use in evaluating compliance. Also, because the law establishes a five-year implementation period before limiting the use of Federal funds for non-compliant activities, this requirement would not be evaluated in the Fiscal Year 2022 audits.

This consensus approach will afford each Covered Agency Inspector General latitude to perform additional testing based on the Covered Agency's geospatial footprint, as determined necessary by the applicable Inspector General.

Should you or your staffs have any questions about our approach or other aspects of our collective Geospatial Data Act oversight activities, please do not hesitate to contact us at (703) 292-4978 or (703) 248-2296 respectively.

Sincerely,



Allison C. Lerner
Chair, Council of the Inspectors General on
Integrity and Efficiency
Inspector General, National Science
Foundation



Tammy L. Whitcomb
Chair, Council of the Inspectors General on
Integrity and Efficiency, Technology
Committee
Inspector General, U.S. Postal Service

cc: The Honorable Gary C. Peters, Chairman
The Honorable Rob Portman, Ranking Member
Senate Committee on Homeland Security and Governmental Affairs

The Honorable Carolyn B. Maloney, Chairwoman
The Honorable James Comer, Ranking Member
House Committee on Oversight and Reform

The Honorable Jason Miller, Deputy Director OMB and Executive Chair, Council of the
Inspectors General on Integrity and Efficiency

The Honorable Gene Dodaro, Comptroller General, GAO

Appendix E: Agency Response



UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for Economic Affairs

TO: Frederick J. Meny, Jr.
Assistant Inspector General for Audit and Evaluation

FROM: Oliver Wise
Chief Data Officer **OLIVER WISE** Digitally signed by OLIVER WISE
Date: 2022.09.07 09:36:12 -0400

Tony LaVoi
NOAA Chief Data Officer (CDO) and Senior Agency Official for
Geospatial Information **LAVOLANTHONY.ANDREW.1365862** Digitally signed by
580 LAVOLANTHONY.ANDREW.1365862580
Date: 2022.09.07 05:41:09 -0400

SUBJECT: Draft Audit Report entitled *The Department Needs to Improve Its Metadata Processes Under the Geospatial Data Act*

This memorandum contains the Department's response to the Office of the Inspector General (OIG) draft report entitled *The Department Needs to Improve Its Metadata Processes Under the Geospatial Data Act*. The Deputy Secretary's Office has authorized us to provide this response and serve as Agency Action Officials for recommendations made in the final report.

The Department concurs with all the recommendations in the draft report with the comments noted below. We will prepare a formal action plan upon issuance of OIG's final report.

- OIG recommends that the Department's Chief Data Officer (CDO) and the Senior Agency Official for Geospatial Information (SAOGI) do the following:
 1. Develop plans and timeframes to align metadata quality control processes with FGDC Guidance.
 2. Ensure that the Census Bureau aligns its metadata quality control process to FGDC Guidance best practices for metadata content.
 3. Ensure that NOAA aligns its metadata quality control process to FGDC Guidance best practices for metadata content.

We concur with the OIG recommendations directed to the CDO and SAOGI and offer the following comments.

- **Recommendation 2:** The Census Bureau agrees with this recommendation. In response, the Census Bureau has assessed and implemented changes to its geospatial metadata creation and QC processes to ensure better alignment with FGDC guidance. The Census Bureau will continue evaluating FGDC guidance and implement further changes, where necessary.

- **Recommendations 1 and 3:** NOAA concurs with these recommendations. NOAA will align its QC process to the FGDC guidance and develop a timeline and plan for the alignment.
- **IG recommends that the Department's Chief Data Officer do the following:**
 4. Review the Department's geospatial data harvesting processes to Data.gov to ensure that it does not contain duplicates.

We concur with the IG recommendation directed to the CDO. We plan to evaluate the current harvesting process, in coordination with the Data.gov management team, to remove and prevent duplicates.

- **IG recommends that the Senior Agency Official for Geospatial Information do the following:**
 5. Work with the U.S Department of the Interior to establish a reporting process to identify any issues with the availability and organization of NGDAs on the GeoPlatform and to understand GeoPlatform changes affecting the Department's harvesting processes.

We concur with the IG recommendation directed to the SAOGI.

The Department appreciates your team's work on this audit, and we thank you for considering these comments. We have also attached technical comments for OIG's consideration. We look forward to working with you as we continue to address the recommendations in this report.

Should you have questions, please contact MaryAnn Mausser, Commerce GAO/OIG Audit Liaison at mmausser@doc.gov.

Attachment: Technical Comments

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