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# HYDROGRAPHIC SURVEYING

## NOAA Needs Better Cost Data and a Strategy for Expanding Private Sector Involvement in Data Collection

Accessible Version

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#### Why GAO Did This Study

NOAA is responsible for collecting hydrographic data—that is, data on the depth and bottom configuration of water bodies—to help create nautical charts. NOAA collects data using its fleet and also procures data from the private sector. The Hydrographic Services Improvement Act of 1998 requires NOAA to acquire such data from the private sector “to the greatest extent practicable and cost-effective.”

GAO was asked to review NOAA efforts to collect hydrographic data. This report examines (1) how NOAA determines its hydrographic survey priorities, (2) NOAA’s efforts to compare the costs of collecting its own survey data to the costs of procuring such data from the private sector, and (3) the extent to which NOAA has developed a strategy for private sector involvement in hydrographic data collection.

GAO analyzed relevant laws and agency procedures, NOAA cost comparison reports from fiscal years 2006 through 2016, and other NOAA information, such as hydrographic survey program priorities. GAO also interviewed NOAA officials and the eight survey companies that currently have contracts with NOAA.

#### What GAO Recommends

GAO recommends that NOAA (1) ensure that its efforts to improve its cost comparison reports include actions to fully track asset and maintenance costs and (2) develop a strategy for expanding private sector involvement in the hydrographic survey program. NOAA agreed with GAO’s recommendations.

View GAO-17-510. For more information, contact Anne-Marie Fennell at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov).

#### What GAO Found

The Department of Commerce’s National Oceanic and Atmospheric Administration (NOAA) uses a three-step process to determine its hydrographic survey priorities, according to agency documents and officials. NOAA first identifies areas in greatest need of surveying by analyzing data such as seafloor depth, shipping tonnage, and the time elapsed since the most recent survey. Second, the agency evaluates the availability of funding resources as well as the availability and capability of NOAA and private sector hydrographic survey vessels. Third, NOAA develops an annual hydrographic surveying plan that identifies survey priorities. To help inform the first step in this process, NOAA is developing a model to take advantage of new mapping technologies.

NOAA prepares an annual report comparing the cost of collecting its own hydrographic survey data to the cost of procuring data from the private sector but does not include all costs in its cost comparisons. Under its standard operating procedure, NOAA is to report the full cost of the hydrographic survey program, including equipment, maintenance, and administrative costs. GAO’s review of NOAA’s cost comparison reports from fiscal years 2006 through 2016, however, found that NOAA did not in all instances report complete or accurate cost data. For example, NOAA did not include the acquisition of a \$24 million vessel in 2012, and in some cases it did not report certain costs in the year to which those costs should be assigned. NOAA officials said they recognized the need to improve the agency’s tracking of costs, and they identified actions they intend to take but did not always provide information about specific steps to carry out these actions or associated time frames. For example, NOAA officials said they planned to implement an improved process in fiscal year 2019 for tracking the costs of capital assets such as vessels but did not identify specific steps to do so. They also said they plan to develop a system to better track maintenance costs but did not provide specific details or a time frame to do this. Without ensuring that its efforts to improve its cost comparison reports include actions to fully track asset and maintenance costs, NOAA may be unable to prepare cost comparison reports that reflect the full cost of its survey program, as specified in the agency’s standard operating procedure.

NOAA has taken steps to increase private sector involvement in its hydrographic data collection program but has not developed a strategy for expanding such involvement as required by law. For example, NOAA moved to a centralized process for competing and awarding contracts, which NOAA officials said reduced administrative costs and contract award time and allowed NOAA to increase the number of private sector firms under contract from five to eight. However, NOAA did not develop a strategy for expanding its use of the private sector to minimize duplication and take maximum advantage of private sector capabilities, as required by law. NOAA officials said the agency intends to develop such a strategy but must first make improvements in its approach to comparing its own hydrographic survey costs to those of the private sector. However, NOAA officials did not provide specific information about how they intend to develop the strategy, what elements it will contain, or when it will be completed. Without developing such a strategy, NOAA may have difficulty minimizing duplication and taking advantage of private sector capabilities.

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**Abbreviations:**

NOAA	National Oceanic and Atmospheric Administration
HSSD	Hydrographic Surveys Specifications and Deliverables
PPA	Programs, Projects, and Activities

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U.S. GOVERNMENT ACCOUNTABILITY OFFICE

441 G St. N.W.  
Washington, DC 20548

June 15, 2017

The Honorable John Thune  
Chairman  
Committee on Commerce, Science, and Transportation  
United States Senate

The Honorable Bill Shuster  
Chairman  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable Dan Sullivan  
United States Senate

Each year, the United States' maritime transportation system moves 2 billion tons of freight in and out of our nation's ports. The National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce is responsible for collecting hydrographic data—that is, data on the depth and bottom configuration of water bodies. Such data support the creation of nautical charts, which, according to NOAA documents, are the foundation of safe ocean transportation of people and goods for commercial and recreational purposes. Within NOAA, the Office of Coast Survey collects hydrographic survey data using NOAA's hydrographic survey fleet and also procures and oversees hydrographic surveying and related services from the private sector. NOAA conducts hydrographic surveys in U.S. territorial waters and the U.S. Exclusive Economic Zone, which generally extends 3 to 200 nautical miles offshore—an area of about 3.4 million square nautical miles.<sup>1</sup>

The Hydrographic Services Improvement Act of 1998,<sup>2</sup> which was amended in 2002 and 2008,<sup>3</sup> was intended to divide responsibility for

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<sup>1</sup>The United States has sovereign rights and jurisdiction over the U.S. Exclusive Economic Zone, including the right to manage natural resources and jurisdiction to protect and preserve the marine environment.

<sup>2</sup>Pub. L. No. 105-384, tit. III, 112 Stat. 3451, 3454 (1998) (codified as amended at 33 U.S.C. §§ 892-892d).

<sup>3</sup>Hydrographic Services Improvement Act Amendments of 2002, Pub. L. No. 107-372, tit. I, 116 Stat. 3078, 3079-82 (2002); Hydrographic Services Improvement Act Amendments of 2008, Pub. L. No. 110-386, 122 Stat. 4106 (2008).

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hydrographic services between NOAA and the private sector, according to a House committee report.<sup>4</sup> The act as amended requires NOAA to, among other things, acquire hydrographic survey data through contracts with private entities “to the greatest extent practicable and cost-effective” and to issue standards for hydrographic data used by NOAA. In addition, the Ocean and Coastal Mapping Integration Act, enacted in 2009, required the NOAA Administrator to transmit a report to relevant congressional committees by July 28, 2009, that described the agency’s strategy for expanding contracting with the private sector to minimize duplication and take maximum advantage of private sector capabilities in fulfilling the agency’s mapping and charting responsibilities.<sup>5</sup> According to NOAA officials, the congressional committee reports accompanying NOAA’s appropriations acts for fiscal years 2007 through 2016 provided about \$342 million of the agency’s appropriation for the Hydrographic Survey Priorities/Contracts budget line item. According to NOAA officials, the most recent contracts were awarded in June 2014 to eight private sector hydrographic survey companies for a 5-year contract period.

You asked us to review NOAA’s efforts to collect hydrographic data, including its use of the private sector in doing so. This report examines (1) how NOAA determines its hydrographic survey priorities, (2) NOAA’s efforts to compare the costs of collecting its own hydrographic survey data to the costs of procuring such data from the private sector, and (3) the extent to which NOAA has developed a strategy for private sector involvement in hydrographic data collection.

To conduct our work, we reviewed relevant laws and agency procedures and interviewed NOAA officials as well as stakeholders selected because of their involvement in NOAA’s hydrographic survey program. The stakeholders we interviewed were the eight hydrographic survey companies that have contracts with NOAA as of the time of this report and the chairman of the Hydrographic Services Review Panel, a federal advisory committee that advises NOAA on matters related to hydrographic surveying. For context, in April 2016, we also observed a demonstration of the equipment used by one of the eight hydrographic survey contractors.

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<sup>4</sup>H.R. Rep. No. 105-485, at 6 (1998).

<sup>5</sup>Pub. L. No. 111-11, tit. XII, subtit. B, 123 Stat. 991, 1426 (2009) (codified at 33 U.S.C. § 3504(d)).

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To determine how NOAA sets its hydrographic survey priorities, we reviewed and analyzed NOAA documents, including its most recent management and strategic plan, prepared in 2015; standard operating procedures for developing priorities; and NOAA reports that describe previous and emerging survey priorities. We also interviewed officials from NOAA's Office of Coast Survey about the agency's priority-setting process.

To examine NOAA's efforts to compare the costs of collecting its own hydrographic survey data to the costs of procuring such data from the private sector, we reviewed NOAA's procedures for collecting and reporting cost information, including NOAA's standard operating procedure for this activity.<sup>6</sup> We also reviewed Office of Management and Budget Circular A-76, which provides guidance on comparing public and private sector costs, and reviewed reports prepared by the Department of Commerce Inspector General and the Hydrographic Services Review Panel on NOAA's cost comparison methodologies.<sup>7</sup> In addition, we obtained and analyzed cost comparison reports prepared by NOAA for fiscal years 2006 through 2016, which detail NOAA's costs for hydrographic surveys conducted by the agency and the private sector, to determine the extent to which the reports complied with the agency's standard operating procedure. We also compared the information in the reports to other NOAA information, including budget data from NOAA's Management Analysis and Reporting System and data on ship usage and miles surveyed from NOAA's Office of Marine and Aviation Operations, to identify any discrepancies. In cases in which we identified possible errors or discrepancies in the cost comparison reports, we interviewed officials from NOAA's Office of Coast Survey and Office of Marine and Aviation Operations to obtain additional information. We determined that the information contained in the cost comparison reports was not in all cases complete or accurate, as described later in this report. We also interviewed officials from NOAA's Office of Coast Survey and Office of

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<sup>6</sup>National Oceanic and Atmospheric Administration, *Annual Hydrographic Survey Program Cost Report*, Standard Operating Procedure (revised May 18, 2016).

<sup>7</sup>Office of Management and Budget, *Circular No. A-76 Revised: Performance of Commercial Activities* (Washington D.C.: May 29, 2003); Department of Commerce Office of Inspector General, *National Oceanic and Atmospheric Administration: Process for Reducing The Critical Hydrographic Survey Backlog Lacks Key Management Controls*, STD-15120-3-0001 (Washington, D.C.: July 28, 2003); Hydrographic Services Review Panel, *Findings and Recommendations: Hydrographic Survey Cost Analysis* (Silver Spring, Md.: Sept. 28, 2005).

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Marine and Aviation Operations to obtain information on any agency initiatives to improve cost data. We did not conduct a cost comparison study to independently determine whether it is more cost-effective for NOAA or the private sector to conduct hydrographic surveys because such a study was not within the scope of our review.

To determine the extent to which NOAA has developed a strategy for private sector involvement in hydrographic data collection, we reviewed and analyzed requirements for such a strategy in the Ocean and Coastal Mapping Integration Act. We also examined agency contracting policies and strategic planning documents as well as agency documents describing NOAA's use of contractors in hydrographic surveying, including the number of contractors and the amount of surveying conducted. In addition, we interviewed officials from NOAA's Office of Coast Survey to obtain information on actions the agency has taken in response to the Ocean and Coastal Mapping Integration Act's requirement to develop a strategy to expand contracting with the private sector for NOAA's mapping and charting responsibilities. We then compared information contained in NOAA's policies and strategic planning documents, as well as actions taken by NOAA, to this requirement.

We conducted this performance audit from January 2016 to June 2017 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.

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## Background

NOAA's Office of Coast Survey provides navigational services intended to ensure the safe and efficient passage of maritime commerce through oceans and coastal waters within U.S. jurisdiction, and in the Great Lakes. In this capacity, the Office of Coast Survey develops, updates, and maintains more than 1,000 nautical charts—maps used for navigating waterways—containing information about water depth, the shape of the water body floor and coastline, the location of possible obstructions, and other physical features within these water bodies. According to NOAA documentation, nautical charts provide information critical to safe navigation, such as symbols that inform ship captains or recreational

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boaters if an area is shallow or has dangerous conditions that could imperil navigation. Hydrography is the science that informs the surveying methods for collecting the data used to create and update nautical charts. In addition, information collected through hydrographic surveying supports a variety of maritime functions such as port and harbor maintenance, beach erosion and replenishment studies, management of coastal areas, and offshore resource development.

NOAA operates four ships that predominantly support hydrographic surveys: the *Fairweather*, *Ferdinand R. Hassler*, *Rainier*, and *Thomas Jefferson* (see fig.1). The *Hassler*, commissioned in 2012, is the newest of the four vessels.

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**Figure 1: National Oceanic and Atmospheric Administration's Hydrographic Survey Vessels**



NOAA Ship *Fairweather*



NOAA Ship *Thomas Jefferson*



NOAA Ship *Rainier*



NOAA Ship *Ferdinand R. Hassler*

Source: National Oceanic and Atmospheric Administration (NOAA). | GAO-17-510

NOAA also procures and oversees hydrographic surveying and related services from the private sector. NOAA officials said the congressional committee reports accompanying NOAA's appropriations acts for fiscal years 2007 through 2016 provided about \$342 million of the agency's appropriation for the Hydrographic Survey Priorities/Contracts budget line item. The most recent contracts were awarded in June 2014 to eight

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hydrographic survey companies for a 5-year period and are valued at up to \$250 million over this contract period based on NOAA documents.<sup>8</sup> In addition, according to NOAA officials, NOAA works with other federal agencies to collect hydrographic survey data. For example, the U.S. Army Corps of Engineers provides such data for the federal harbor waterways that support the U.S. port system.

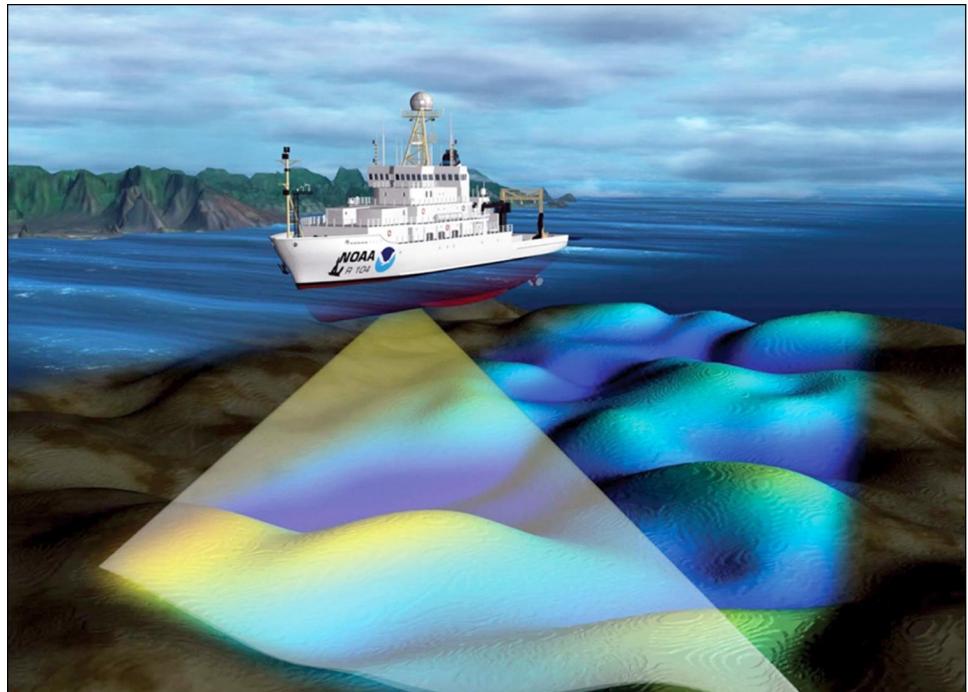
NOAA primarily uses two kinds of sonar for hydrographic surveying—multibeam and side scan. Multibeam sonar measures the depth of the water by analyzing the time it takes sound waves to travel from a vessel to the bottom of the water body and back and provides detailed information about the water body floor. Multibeam sonar is generally used in areas such as the northeast United States and Alaska, where the water body floor is complex and often strewn with rocks. See figure 2 for an illustration of a NOAA ship using multibeam sonar.

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<sup>8</sup>The final amount of the contracts will be determined by the value of individual hydrographic surveying task orders issued by NOAA during the contract period but cannot exceed \$250 million.

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**Figure 2: National Oceanic and Atmospheric Administration Ship Using Multibeam Sonar to Map the Sea Floor**

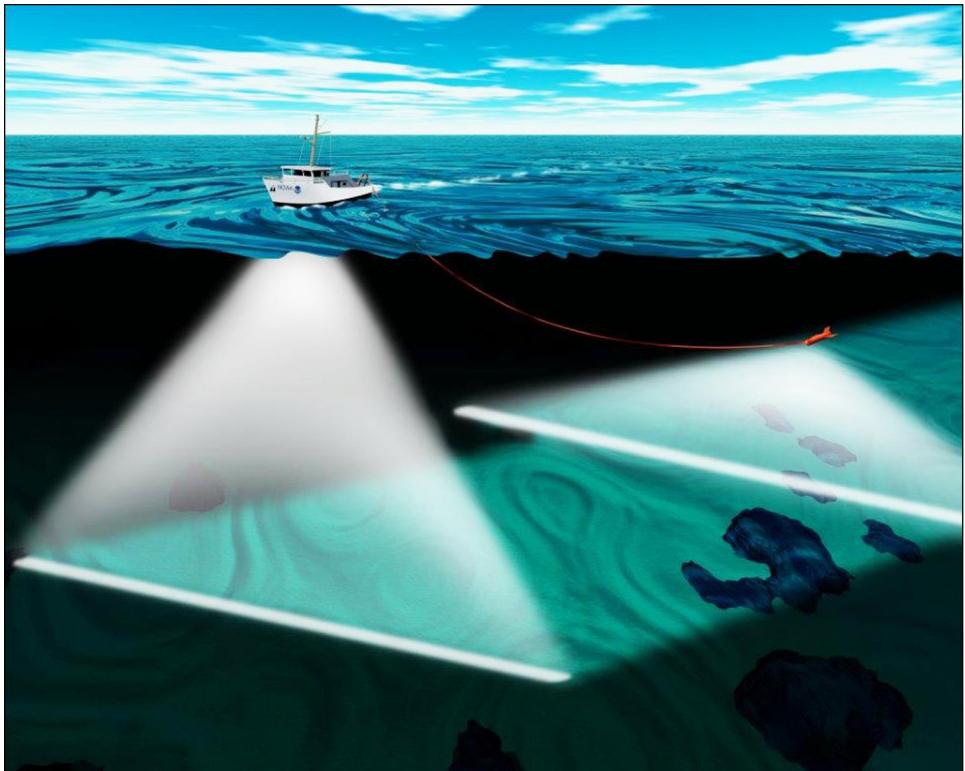


Source: National Oceanic and Atmospheric Administration. | GAO-17-510

In contrast, in relatively shallow flat areas like those along the mid-Atlantic coast, NOAA uses side scan sonar. Side scan sonar creates an image of the water body floor but does not determine depths. If NOAA finds a shipwreck or obstruction using side scan sonar, it will determine its depth using multibeam sonar. See figure 3 for an illustration of a NOAA ship using side scan sonar.

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**Figure 3: National Oceanic and Atmospheric Administration Ship Using Side Scan Sonar to Map the Sea Floor**



Source: National Oceanic and Atmospheric Administration. | GAO-17-510

NOAA's National Ocean Service is responsible for providing data, tools, and services that support mapping, charting, and maritime transportation activities, among other things. Within the National Ocean Service, the Office of Coast Survey directs the agency's hydrographic surveying operations. In particular, it develops survey specifications, evaluates new technologies, and implements procedures for acquiring hydrographic survey data, processing the data, and producing nautical charts. Within the Office of Coast Survey, the Hydrographic Surveys Division is responsible for planning, managing, and supporting hydrographic surveying operations. This includes compiling, verifying, and certifying hydrographic data, as well as determining hydrographic survey priorities and issuing an annual hydrographic survey prioritization report. The Hydrographic Surveys Division coordinates with NOAA's Office of Marine and Aviation Operations to plan and schedule NOAA vessels for hydrographic surveying. The Office of Marine and Aviation Operations manages, operates, and maintains NOAA's fleet of 16 ships, including the 4 ships that predominantly support hydrographic surveying. According to

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NOAA officials, during fiscal years 2007 through 2016, NOAA expended about \$303 million for its in-house hydrographic survey program.

The Hydrographic Surveys Division also works with the Hydrographic Services Review Panel, an external committee that advises NOAA on matters related to hydrographic services, including surveying. The review panel, which was required by the Hydrographic Services Improvement Act Amendments of 2002,<sup>9</sup> is composed of 15 voting members appointed by the NOAA Administrator as well as several NOAA employees who are nonvoting members. Voting members must be especially qualified in one or more disciplines relating to hydrographic data and services, vessel pilotage, port administration, coastal management, fisheries management, marine transportation, and other disciplines as determined appropriate by the NOAA Administrator.<sup>10</sup> The NOAA Administrator is required to solicit nominations for panel membership at least once a year; voting members serve a 4-year term,<sup>11</sup> and may be appointed to one additional term.<sup>12</sup> The Director of the Office of Coast Survey serves as the designated federal officer.<sup>13</sup>

NOAA's standards for hydrographic surveying are contained in a technical specifications document known as the Hydrographic Surveys Specifications and Deliverables.<sup>14</sup> The document is updated annually by NOAA hydrographers and, according to NOAA officials, is also the standard on which many other hydrographic survey entities base their hydrographic surveying requirements. In addition, NOAA maintains a quality assurance program for all hydrographic survey data submitted by the private sector and NOAA hydrographers. The quality assurance

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<sup>9</sup>Pub. L. No. 107-372, § 105, 116 Stat. 3078, 3080-81 (2002) (codified as amended at 33 U.S.C. § 892c(c)(3)).

<sup>10</sup>33 U.S.C. § 892c(c)(1)(A).

<sup>11</sup>33 U.S.C. § 892c(c)(2)(A).

<sup>12</sup>33 U.S.C. § 892c(c)(2)(B).

<sup>13</sup>The designated federal officer is the NOAA official responsible for ensuring the Hydrographic Services Review Panel adheres to certain requirements in the Federal Advisory Committee Act. For example, among other things, the designated federal officer approves the committee meetings and must ensure that meeting minutes are certified within 90 calendar days.

<sup>14</sup>Department of Commerce, National Oceanic and Atmospheric Administration, *National Ocean Service Hydrographic Surveys Specifications and Deliverables* (March 2016).

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program includes three main review procedures intended to ensure that hydrographic data submitted to NOAA meet quality standards: the Rapid Survey Assessment, Survey Acceptance Review, and Final Survey Review. See appendix I for additional information about NOAA's data quality standards and review process.

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## NOAA Uses a Three-Step Process to Determine Its Hydrographic Survey Priorities and Is Developing a Model Aimed at Better Assessing Hydrographic Risks

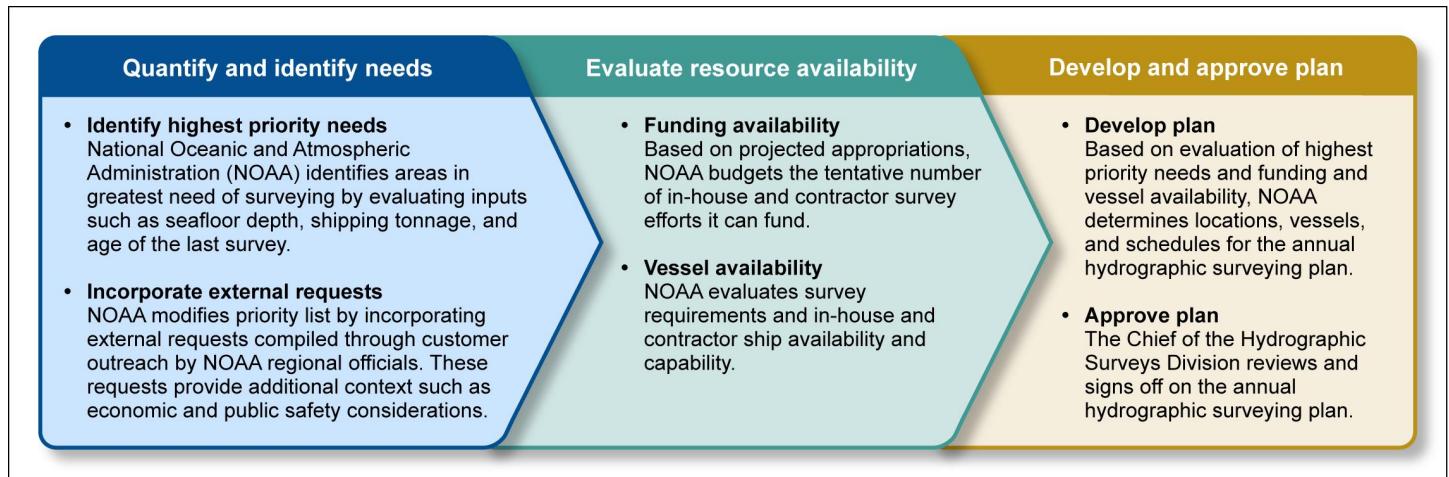
NOAA uses a three-step process to determine its hydrographic survey priorities. In addition, in an effort to improve its priority setting, NOAA is developing a model to better assess hydrographic risks to ships.

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### NOAA Uses a Three-Step Process that Considers Survey Needs and Resource Availability to Determine Hydrographic Survey Priorities

According to NOAA's standard operating procedure and NOAA officials, NOAA uses a three-step process to determine its hydrographic survey priorities. Under this process, NOAA (1) identifies the areas in greatest need of surveying, (2) evaluates resources, including funding and vessel availability, and (3) develops an annual hydrographic surveying plan, which identifies the resulting hydrographic survey priorities. The plan specifies the locations, vessels, and schedules for NOAA hydrographic survey projects and the locations and time frames for private sector hydrographic survey projects. (See fig. 4.)

**Figure 4: Overview of National Oceanic and Atmospheric Administration Process to Develop Annual Hydrographic Surveying Plan**



Source: GAO analysis of National Oceanic and Atmospheric Administration information. | GAO-17-510

### Quantifying and Identifying Needs

NOAA first identifies the areas the agency considers to be in the greatest need of a hydrographic survey, using an approach it developed in 1994 called NOAA Hydrographic Survey Priorities, according to NOAA's standard operating procedure and NOAA officials. NOAA identifies areas of "navigational significance" based on depth, draft of ships,<sup>15</sup> and potential for dangers to marine navigation. NOAA then determines which of these navigationally significant areas are in greatest need of surveying by considering (1) shipping tonnage and trends, (2) age and quality of surveys in the area, (3) seafloor depth, (4) potential for unknown dangers to navigation due to environmental or human influences, and (5) requests for surveys from stakeholders such as pilot associations<sup>16</sup> and the U.S. Coast Guard, and requests received through NOAA's regional navigation

<sup>15</sup>The draft of a ship is the distance between the water surface and the lowest point of a ship and determines the minimum depth of water a ship can safely navigate.

<sup>16</sup>Pilot associations are trade associations of professional maritime pilots.

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managers.<sup>17</sup> Through this process, NOAA designates high-priority areas in any of four categories:

- **Critical areas.** Areas that NOAA identified in 1994 as experiencing such circumstances as high shipping traffic or hazardous material transport or having a significant number of survey requests from users.<sup>18</sup>
- **Emerging critical areas.** Areas in the Gulf of Mexico and Alaska that NOAA identified after 1994 that met the critical area definition but that NOAA chose to designate in a separate category from the 1994 critical areas for tracking purposes.
- **Resurvey areas.** Areas that NOAA identified as requiring recurring surveys because of changes to seafloors, use by vessel traffic, or other reasons.
- **Priority 1-5 areas.** Areas that do not fall into any of the three categories above are subdivided into five priority areas based on the date of the most recent survey and the level of usage by vessels.

Until 2012, according to NOAA's standard operating procedure, NOAA used the results of its approach for identifying areas most in need of surveying to publish annual hydrographic survey prioritization reports—a component of the overall hydrographic surveying plan. However, NOAA officials said they found this approach increasingly outdated because it did not reflect changing ocean and shipping conditions or take advantage of available technology. These officials said they are in the process of developing a new methodology (described later in this report) to help identify areas that need surveys. According to NOAA officials, they have continued to update computerized mapping files and reports related to hydrographic survey priorities since 2012 but have not published new hydrographic survey prioritization reports. However, these officials said they will provide information to the public upon request.

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<sup>17</sup>NOAA's navigation managers, stationed in port areas along U.S. coasts and the Great Lakes, work directly with pilots, mariners, port authorities, and recreational boaters. They help identify navigational challenges facing the marine transportation system and provide resources and services to promote safe and efficient navigation.

<sup>18</sup>In 1994, NOAA examined the 3.4 million square nautical miles of the U.S. Exclusive Economic Zone for navigational significance and determined that approximately 500,000 square nautical miles of this zone are navigationally significant. Of those significant areas, NOAA identified approximately 43,000 square nautical miles as critical areas.

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According to NOAA's standard operating procedure and NOAA officials, once NOAA identifies its highest priority areas, the agency compares its priorities to those identified by external stakeholders through NOAA's navigation managers and its Integrated Ocean and Coastal Mapping program.<sup>19</sup> NOAA officials said this input helps them understand potential economic and safety issues, among other things, that may affect hydrographic survey priorities. NOAA officials said they look to find areas of intersection between areas identified through the NOAA Hydrographic Survey Priorities process and those compiled by NOAA's navigation managers and external stakeholders. NOAA's standard operating procedure states that when determining which areas to survey, NOAA generally gives precedence to survey areas identified through the NOAA Hydrographic Survey Priorities process, but stakeholder input may shape survey priorities in unusual cases, such as when hurricane-related requests indicate the need for an immediate resurvey.

#### Evaluating Resource Availability

According to NOAA's standard operating procedure and NOAA officials, NOAA estimates the amount of funds it expects to be available to conduct surveys and develops a preliminary survey plan that seeks to maximize in-house and contractor resources. Once funds are appropriated, NOAA modifies its preliminary plan to reflect the amounts available for NOAA fleet operations and survey contracting. NOAA also evaluates survey requirements and in-house and contractor ship availability and capability. As NOAA obligates funds for in-house surveys and for contracts, it refines and finalizes the actual amount of surveying to be conducted by both in-house and contractor hydrographers.

#### Developing and Approving Plan

According to NOAA's standard operating procedure and NOAA officials, based on an evaluation of the identified hydrographic survey needs, available funding, and vessel availability and capability, NOAA develops a hydrographic surveying plan for the coming year. NOAA evaluates the mix of available NOAA and private sector vessels to meet the highest-ranked survey needs with available funding. NOAA also engages offices within NOAA to coordinate hydrographic survey ship schedules to

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<sup>19</sup>The Integrated Ocean and Coastal Mapping program coordinates with internal and external stakeholders to develop mapping standards and techniques, improve data management and access, and implement cooperative projects.

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accommodate other agency projects and plans. For example, NOAA officials said they may use hydrographic survey ships to accommodate the testing of new types of equipment, such as unmanned surface vehicles. Once the surveying plan is developed, it is submitted to the Chief of the Hydrographic Surveys Division for approval, according to NOAA's standard operating procedure.

When we began our review, NOAA officials told us they did not have written procedures documenting how the Hydrographic Surveys Division is to develop its annual hydrographic surveying plan. In response to our review, NOAA issued a standard operating procedure in September 2016 documenting how the division is to develop the plan.<sup>20</sup>

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### NOAA is Developing a Model to Better Assess Hydrographic Risks to Help Inform Prioritization Decisions

NOAA is developing a model intended to better assess hydrographic risks as part of its effort to identify areas most in need of hydrographic surveys—the first step in NOAA's process for creating the hydrographic surveying plan. According to NOAA officials, the model is aimed at addressing several limitations they found with the agency's existing approach for identifying areas most in need of surveys. For example, they said the existing approach does not account for such changes as:

- the emergence of new ports and subsequent changes in waterway traffic patterns;
- seafloor changes from weather and oceanic processes, and the resulting need for some areas to be surveyed more often than others; and
- sizes and capabilities of ships, with many of them having deeper drafts since NOAA developed its plan in 1994.

In addition, NOAA officials noted that the existing approach has focused on large container ships and oil tankers and not the many smaller vessels (e.g., fishing vessels and recreational boats) that also rely on NOAA hydrographic survey data to navigate safely.

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<sup>20</sup>National Oceanic and Atmospheric Administration, *Hydrographic Surveying Plan*, Standard Operating Procedure (initial release September 15, 2016).

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According to NOAA documents, the new model—which NOAA refers to as a “hydrographic health” model—will help NOAA identify survey needs by taking advantage of new technologies and more precise information about weather and oceanic processes. For example, agency officials said that with the advent of a Global Positioning System-based technology known as the Automatic Identification System, NOAA has data on the actual paths of vessels equipped with this technology, including when and where vessels have travelled as well as their length, width, and draft.<sup>21</sup> The new model also analyzes information that is similar to what NOAA currently uses, such as (1) areas of shallow seafloor depth, (2) unsurveyed areas, (3) known or reported discrepancies on the nautical chart for an area, (4) reported accidents, (5) stakeholder requests, and (6) established national priorities.

NOAA officials said they completed a test of the new hydrographic health model in 2016 for coastal waters in the southeastern United States—including coastal Alabama, Florida, and Georgia—and solicited feedback on the model from internal stakeholders. NOAA also presented the model at an international hydrographic conference in May 2016 and began using the model in the second quarter of fiscal year 2017. NOAA officials said the agency is preparing to submit a paper describing this model to an international hydrographic journal for peer review in the second quarter of fiscal year 2018. NOAA officials said they will incorporate the peer review feedback into the model in the third quarter of fiscal year 2018.<sup>22</sup> NOAA also plans to release periodic reports describing the state of the hydrographic health of the nation’s waters after the model is fully implemented, according to the standard operating procedure.

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<sup>21</sup>The International Maritime Organization’s International Convention for the Safety of Life at Sea requires the Automatic Identification System to be fitted aboard international voyaging ships with a gross tonnage of 300 tons or more, and all passenger ships regardless of size.

<sup>22</sup>We did not assess the merits of the proposed model or its related testing because doing so was not within the scope of our review.

## NOAA's Annual Report Compares the Cost of Collecting Its Own Survey Data to the Cost of Procuring Data from the Private Sector but Does Not Include All Costs

NOAA prepares an annual report that compares the cost of collecting its own hydrographic survey data to the cost of procuring such data from the private sector. According to NOAA's standard operating procedure for conducting this cost analysis, the purpose of the analysis is to track and report the full cost of the hydrographic survey program, detailing costs for all activities that directly or indirectly contribute to the program.<sup>23</sup>

Specifically, NOAA's standard operating procedure for preparing the annual cost comparison report states that the report should include, by fiscal year, all costs that directly or indirectly contribute to conducting hydrographic surveys, regardless of funding sources.

According to NOAA's standard operating procedure, to create the report, NOAA annually obtains data on survey costs for the previous fiscal year from the various NOAA offices involved in collecting hydrographic survey data. These offices collect cost data from staffing and financial data systems and enter the information into a spreadsheet, according to NOAA officials and NOAA's standard operating procedure. NOAA documentation indicates these data include direct costs NOAA incurs to collect hydrographic data using its own ships; these direct costs include equipment and maintenance, labor, and fuel. In addition, according to NOAA officials and NOAA's standard operating procedure, NOAA obtains data on indirect costs, such as administrative costs apportioned to the hydrographic survey program and amounts paid to the private sector for conducting surveys.

In 2005, NOAA began reporting hydrographic survey costs in an annual cost comparison report in response to a 2003 recommendation from the Department of Commerce Office of Inspector General that NOAA track

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<sup>23</sup>National Oceanic and Atmospheric Administration, *Annual Hydrographic Survey Program Cost Report*, Standard Operating Procedure (revised May 18, 2016).

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and report the full costs of its survey program.<sup>24</sup> In addition, in 2005, the Hydrographic Services Review Panel recommended that NOAA use actual costs rather than estimates and “reasonably follow” Office of Management and Budget Circular A-76 guidelines to calculate the cost comparison; these guidelines state, among other things, that capital assets should be depreciated in cost estimates.<sup>25</sup>

Based on our review of NOAA’s cost comparison reports for fiscal years 2006 through 2016, NOAA did not in all instances report complete or accurate cost data for its hydrographic survey program. Specifically, NOAA did not include the complete cost of the hydrographic survey program for the following activities:

- **Vessel acquisition.** NOAA did not include the 2012 acquisition cost of a NOAA survey vessel (the *Hassler*) in its cost comparison reports from fiscal years 2012 through 2016. According to NOAA documentation, this vessel cost \$24.3 million, and NOAA officials agreed that they should include the acquisition cost of NOAA vessels in cost comparison reports and that such costs should be depreciated.<sup>26</sup> NOAA officials said they have not included such costs in annual cost comparison reports because depreciation costs are tracked in NOAA’s property management system but not in NOAA’s budget tracking system. These officials said they are uncertain

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<sup>24</sup>Department of Commerce Office of Inspector General, *National Oceanic and Atmospheric Administration: Process for Reducing The Critical Hydrographic Survey Backlog Lacks Key Management Controls*, STD-15120-3-0001 (Washington, D.C.: July 28, 2003.)

<sup>25</sup>Depreciation is the decline in value of a capital asset and represents the cost of ownership and consumption of an asset’s useful life. Office of Management and Budget Circular No. A-76 (May 29, 2003, revised) provides that when developing a cost comparison, agency and public reimbursable sources shall use the Useful Life and Disposal Value Table to calculate residual value, and the Federal Accounting Standards for Property, Plant and Equipment to establish depreciation schedules, rates of depreciation, and other related guidance. Circular A-76, however, is specific to conducting competitions between public agencies and the private sector, and the moratorium on executive agencies conducting public-private competitions under Circular A-76 or any other provision of law or regulation, enacted through the Omnibus Appropriations Act, 2009, remains in effect. See Pub. L. No. 111-8, div. D, tit. VII, § 736, 123 Stat. 524, 689-90 (2009).

<sup>26</sup>According to the Department of Commerce’s Fiscal Year 2016 Agency Financial Report, NOAA has a “capitalization threshold” of \$200,000, meaning that NOAA should depreciate asset expenditures of \$200,000 or more. Department of Commerce, Office of Financial Management, *Agency Financial Report, Fiscal Year 2016* (Washington, D.C.: November 2016).

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whether these two systems can be linked because they are separate databases managed by different NOAA offices.

- **Major vessel maintenance.** NOAA did not include the cost of major maintenance performed in 2010 on the hydrographic survey vessel *Rainier* in its cost comparison reports from fiscal years 2010 through 2016. According to NOAA officials, the agency spent \$13.7 million in support of maintenance for the *Rainier*. NOAA officials acknowledged that such costs should be reflected in NOAA's cost comparison reports and that such costs should be depreciated. NOAA officials explained that they allocate annual maintenance and repair costs associated with the hydrographic survey program according to the number of days a ship is at sea conducting surveys. In this case, they said because the *Rainier* was in port the entire year undergoing repairs, they did not include these capital improvement costs in the cost comparison report.
- **Contract administration for private sector hydrographers.** NOAA did not include in its cost comparison reports for fiscal years 2006 through 2016 contract administration costs for managing private sector hydrographers working under contract to the agency. NOAA's standard operating procedure for conducting the annual cost analysis specifies that the agency should include the costs associated with contract management and monitoring. NOAA officials said these costs were not included in the reports in part because they did not have the software to track contract administration costs. NOAA officials acknowledged that they should include such costs in the cost comparison report.

In addition to incomplete costs for some activities, we also noted that NOAA did not accurately report certain costs of the hydrographic survey program in the year to which those costs should be assigned.

- **Equipment, repair, and maintenance costs.** NOAA includes equipment, repair, and maintenance costs in the hydrographic survey cost comparison report for the year in which such costs are reported in NOAA's financial system. However, as with major vessel maintenance costs previously discussed, NOAA officials acknowledged that these costs should be depreciated. As a result of this practice, NOAA's hydrographic survey costs may appear artificially high during years in which NOAA incurs large equipment, repair, and maintenance costs. NOAA officials said they recognize that reporting equipment, repair, and maintenance costs in the year they are incurred does not accurately represent agency costs.

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- **Cost and performance data for survey work conducted by the private sector.** NOAA does not track cost data in a way that allows the agency to link the cost for private sector surveys to the amount of survey work conducted. For example, in the cost comparison report for fiscal year 2014, NOAA included funds that were obligated for two contractors to conduct survey work, but the report showed that these contractors did not survey any nautical miles during that year. NOAA officials explained that they obligated funds in fiscal year 2014 to pay for the contract survey work, but the contractors did not begin the work until fiscal year 2015. These officials stated that they record contractor costs in the year in which the obligation occurs, and they record the miles surveyed in the year in which the surveying occurs. However, the 2014 cost per square nautical mile may appear artificially high because costs were recorded without including corresponding mileage surveyed. In contrast, the 2015 cost per square nautical mile may appear artificially low because survey miles were recorded, but the costs for conducting those surveys were not included in the 2015 report. NOAA officials acknowledged that their current method for tracking contractor costs and work performed needs improvement. They explained that the data inaccuracies arise in part from NOAA's current process for tracking contractor cost and performance through manual entry of data into multiple spreadsheets.

Furthermore, we found that NOAA uses a single measure—cost per square nautical mile surveyed—to compare its own survey costs to those of its contractors. However, in 2005, the Hydrographic Services Review Panel concluded that a single cost measure, such as the cost per square nautical mile, should not be used as the primary factor to determine the relative cost-effectiveness of NOAA and private sector efforts to collect hydrographic data. The panel recommended that NOAA consider a wider variety of measures to help provide additional insight. NOAA officials acknowledged that the cost per square nautical mile was not a comprehensive measure of cost-effectiveness and that having additional measures would improve the accuracy of cost comparisons to account for factors such as region and water depth.

As a result of the concerns we identified, during our review, NOAA officials began identifying actions they would take to improve NOAA's cost data. In some instances, officials identified specific steps and associated time frames to carry out these actions. For example, NOAA officials said they started using new project management software in fiscal year 2017 to help track contract administration costs for inclusion in future cost comparison reports. In addition, to allow NOAA to better link the costs for private sector surveys to the amount of survey work

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conducted, NOAA officials said they plan to develop a new database by March 2018; this database would help eliminate the need for manual data entry and allow NOAA to track survey cost and performance data for various time frames and regions. To improve NOAA's ability to compare its own survey costs to those of contractors, NOAA officials said they were in the process of developing additional survey measures beyond cost per square nautical mile that could include a new "survey complexity rating" designed to account for factors such as region and water depth. Officials said they expect to have these additional measures in place by October 2018.

However, NOAA officials could not yet identify the steps or associated time frames for carrying out other actions to improve the completeness and accuracy of cost data. For example, to help improve NOAA's process for tracking depreciation costs of capital assets—such as vessel acquisition or equipment, repair, and maintenance—NOAA officials said they planned to implement an improved process in fiscal year 2019 but did not identify the specific steps to implement this process. In addition, to account for ships that are in port undergoing major maintenance, NOAA officials said they plan to develop a tracking system to help ensure such maintenance costs are included in NOAA's cost comparison reports, but they did not provide additional specific details or identify when they intend to implement such a system. For these recently identified actions, NOAA officials explained that it was uncertain how NOAA would proceed because identifying and implementing certain steps requires the coordination of multiple offices within NOAA such as the Office of Coast Survey, Office of Marine and Aviation Operations, and Office of the Chief Administrative Officer. Without ensuring that its efforts to improve its cost comparison reports include actions to fully track capital asset depreciation costs and account for ships in port undergoing major maintenance, NOAA may be unable to prepare cost comparison reports that reflect the full cost of its hydrographic survey program, as called for in the agency's standard operating procedure.

## NOAA Has Taken Steps to Increase Private Sector Involvement in Data Collection, but Has Not Developed a Strategy for Expanding Such Involvement as Required by Law

NOAA has taken steps aimed at increasing private sector involvement in its hydrographic data collection program, such as streamlining its contracting process and increasing communication with contractors. However, NOAA has not developed a strategy for expanding its use of the private sector as required by a 2009 law.

### NOAA Has Taken Several Steps to Increase Private Sector Involvement in Data Collection

According to NOAA officials, NOAA has taken several steps to increase private sector involvement in its hydrographic data collection program. For example, NOAA developed a centralized process for competing and awarding contracts in 2003, which NOAA officials said reduced administrative costs and contract award time. Before this change, NOAA awarded contracts to individual contractors at the regional level, which required expending resources to process each individual contract. As a result of implementing a centralized process for competing and awarding contracts, NOAA officials said they increased the number of private sector firms under contract, from five during the 2003-2008 contract period to eight during the current 2014-2019 contract period. However, NOAA officials said they have not awarded task orders for surveys to all eight private sector firms in the same fiscal year because of NOAA's appropriation, which has remained mostly flat during the current contract period.

NOAA also took steps to increase communication with contractors, according to NOAA officials. For example, starting in 2005, NOAA has invited hydrographic survey contractors to its annual field procedures workshop, which brings together officials from NOAA's headquarters, field offices, and quality assurance processing branches, among others. The purpose of the workshop is to discuss updates to hydrographic survey requirements and new hydrographic survey technologies. Also, since 2005, according to NOAA officials, contracting officer representatives have improved their communication with contractors through the various stages of the contract and survey activities by answering contractors'

questions regarding project requirements, expected deliverables, data processing, and unanticipated challenges that may occur when conducting surveys.

In addition, NOAA officials said that in 2010, the agency implemented procedures for obtaining contractor input on changes to its hydrographic survey technical specifications document, the Hydrographic Surveys Specifications and Deliverables. The document is updated annually, and contractors are asked to provide input through their respective contracting officer representatives. Staff review input to determine whether to include the recommended action in the annual technical specifications update. According to NOAA officials, participants discuss recommended changes at meetings held during the annual field procedures workshop.

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### NOAA Has Not Developed a Strategy for Expanding Its Use of the Private Sector in Data Collection

NOAA has not developed a strategy for expanding its use of the private sector in its hydrographic survey data collection program, as required by law. Specifically, the Ocean and Coastal Mapping Integration Act required the NOAA Administrator to transmit a report to relevant congressional committees by July 28, 2009, that described the agency's strategy for expanding contracting with the private sector to minimize duplication and take maximum advantage of private sector capabilities in fulfilling NOAA's mapping and charting responsibilities. NOAA officials could not provide us any documentation indicating what information the agency provided to Congress in response to this statutory requirement.

In 2010, NOAA issued its Ocean and Coastal Mapping and Contracting Policy, which states that the policy was developed in response to the act.<sup>27</sup> However, rather than describing a strategy for expanding contracting with the private sector, as required by the 2009 law, the policy states that it is NOAA's intent to contract with the private sector for ocean and coastal mapping services when the agency determines it is cost-effective to do so and funds are available. NOAA officials acknowledged that the contracting policy does not meet the statutory requirement that

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<sup>27</sup> 75 Fed. Reg. 2109 (Jan. 14, 2010). According to the policy, ocean and coastal mapping includes hydrographic services as well as the acquisition, processing, and management of physical, biological, geological, chemical, and archaeological characteristics and boundaries of ocean and coastal areas.

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the agency develop a strategy for expanding contracting with the private sector.

NOAA officials said the agency is limited in its ability to expand private sector contracting because of congressional direction on the use of the agency's appropriations. Specifically, NOAA's hydrographic survey program is supported by two separate funding elements, known as "Programs, Projects, and Activities" (PPA), within NOAA's Operations, Research, and Facilities appropriation account. One PPA is for private sector hydrographic data collection,<sup>28</sup> and the other is for general operations, maintenance, and repair of NOAA's entire fleet of ships, including the hydrographic survey vessels.<sup>29</sup> According to NOAA officials, the agency has limited authority to reprogram funds between these two PPAs without congressional notification and agreement that such reprogramming is warranted. To propose a reprogramming of funds, NOAA officials said they would need to evaluate the prioritization of all fleet missions. In addition, NOAA officials said they would have to continue to fund fixed operational costs and agency expenses for NOAA's entire fleet even if operations funds were reprogrammed to hydrographic data acquisition contracts.

NOAA officials said the agency intends to develop a strategy describing how it plans to expand private sector involvement in the hydrographic data collection program—which the Ocean and Coastal Mapping Integration Act required the agency to submit in a report to relevant congressional committees in 2009—and it will use the 2010 Ocean and Coastal Mapping and Contracting Policy to guide this effort. These officials said the agency must first implement its planned improvements in collecting both NOAA and private sector hydrographic survey costs; once NOAA has a more accurate basis on which to compare costs, the agency will assess the extent to which it can expand its use of the private sector and develop a strategy accordingly. These officials said that if their analysis indicates the agency should expand its use of the private sector beyond what is currently possible given agency appropriations, the agency will request changes to its appropriations to allow it more flexibility in expanding its use of the private sector. However, NOAA officials did not provide specific information about how they intend to develop the strategy, what elements it will contain, or when it will be completed.

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<sup>28</sup>National Ocean Service's Hydrographic Survey Priorities/Contracts PPA.

<sup>29</sup>Office of Marine and Aviation Operations' Marine Operations and Maintenance PPA.

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Without developing such a strategy, NOAA may have difficulty minimizing duplication and taking maximum advantage of private sector capabilities in fulfilling NOAA's mapping and charting responsibilities.

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## Conclusions

Recognizing the importance of nautical charts to help ensure safe passage of people and goods through the nation's waterways, NOAA has taken steps to improve its ability to set priorities for collecting hydrographic data. NOAA also prepares annual reports that compare the costs of NOAA conducting its own hydrographic surveys to the costs of contracting for such surveys. NOAA's standard operating procedure requires the agency to track and report all costs for the hydrographic survey program. However, NOAA has not determined how it will track depreciation costs of capital assets or established time frames to improve its tracking of major maintenance costs for vessels. Without ensuring that its efforts to improve its cost comparison reports include actions to fully track capital asset depreciation costs and account for ships in port undergoing major maintenance, NOAA may be unable to prepare cost comparison reports that reflect the full cost of its hydrographic survey program, as called for by the agency's standard operating procedure. In addition, NOAA was required by law to develop a strategy for expanding its use of the private sector in its hydrographic survey program, but it has not done so and has not provided specific information on how and when it will. Without such a strategy, NOAA may have difficulty minimizing duplication and taking maximum advantage of private sector capabilities in fulfilling NOAA's mapping and charting responsibilities.

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## Recommendations for Executive Action

We recommend that the Secretary of Commerce direct the NOAA Administrator to take the following two actions:

- ensure that NOAA's efforts to improve its cost comparison reports include actions to fully track capital asset depreciation costs and account for ships in port undergoing major maintenance in accordance with its standard operating procedure, and
- develop a strategy for expanding NOAA's use of the private sector in its hydrographic survey program, as required by law.

## Agency Comments

We provided a draft of this report to the Department of Commerce for review and comment. NOAA, responding on behalf of Commerce, stated in its written comments (reproduced in app. II) that it agreed with our two recommendations. Regarding our recommendation related to improving NOAA's cost comparison reports, NOAA agreed that its cost estimates should include the depreciation costs of new vessels once they are operational and stated that it will work to obtain an accurate depreciation schedule. NOAA also stated that it will take steps to improve its tracking and reporting of depreciation costs for equipment and repair and maintenance, including its accounting for ships in port undergoing major maintenance. Regarding our recommendation that NOAA develop a strategy for expanding its use of the private sector in hydrographic surveying, NOAA stated that the agency will develop such a strategy once it improves its approach for comparing its hydrographic survey costs to those of the private sector. NOAA also provided one technical comment, which we incorporated.

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

If you or your staff members have any questions regarding this report, please contact me at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to the report are listed in appendix III.



Anne-Marie Fennell  
Director, Natural Resources and Environment

# **Appendix I: National Oceanic and Atmospheric Administration Hydrographic Data Quality Standards and Review Process**

The National Oceanic and Atmospheric Administration (NOAA) has issued standards—known as the Hydrographic Surveys Specifications and Deliverables (HSSD)<sup>1</sup>—for all hydrographic survey data collected by both private sector contractors and NOAA staff. NOAA maintains a quality assurance program for these data that includes three main review procedures (described below). The HSSD standards for conducting hydrographic surveys are based in part on the International Hydrographic Organization’s Standards for Hydrographic Surveys.<sup>2</sup> These standards pertain to hydrographic surveys that are intended for harbors, harbor approach channels, inland navigation channels, and coastal areas of high commercial traffic density, and they generally pertain to shallower areas less than 100 meters in depth.

According to NOAA officials, the HSSD has been reviewed annually since its initial publication in 2000, and NOAA has procedures in place to obtain suggestions from private sector contractors regarding changes to the HSSD. For example, at its annual field procedures workshop, NOAA conducts a session on data quality review standards and practices, and it solicits recommendations for changes to the HSSD from both NOAA staff and private sector hydrographers. According to NOAA officials, contractors submitted fewer than 10 recommendations in 2016 but submitted more than 30 recommendations in 2017. All recommended changes to the HSSD are reviewed by the Office of Coast Survey’s Hydrographic Surveys Division, Operations Branch. Recommendations are then forwarded to the Office of Coast Survey Board of Hydrographers for review, and the survey board submits its recommendations to the Chief of the Hydrographic Surveys Division for final approval. NOAA’s

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<sup>1</sup>Department of Commerce, National Oceanic and Atmospheric Administration, *National Ocean Service Hydrographic Surveys Specifications and Deliverables* (March 2016).

<sup>2</sup>The International Hydrographic Organization is an intergovernmental consultative and technical organization that was established to support safety of navigation and the protection of the marine environment.

hydrographers test the feasibility of many significant changes to the HSSD before they are put into practice by private sector hydrographers. In June 2016, NOAA approved a new position specifically to oversee and coordinate efforts related to hydrographic specifications, recommended procedures, and training. According to NOAA officials, they intend to fill the position in August 2017.

NOAA officials said the HSSD is also the standard on which many other international hydrographic entities base their hydrographic surveying requirements and is widely utilized by the hydrographic mapping community. According to NOAA officials, examples of uses of HSSD are:

- The hydrographic specifications section of the National Society of Professional Surveyors/Hydrographic Society of America certified hydrographer exam is based in part on the HSSD.
- The University Oceanographic Laboratory System Multibeam Advisory Committee references the HSSD in its specifications for multibeam sonar calibrations.
- The only two U.S. universities with graduate programs in hydrography—the University of New Hampshire and the University of Southern Mississippi—rely on the HSSD as part of their programs.

In addition, NOAA officials said the Office of Coast Survey has worked with different entities to help ensure that data collected by these entities meet HSSD specifications so that the data can be used on NOAA's nautical charts. For example, officials said the office has worked with:

- the New Jersey Department of Transportation since 2014 on survey data the department is collecting for all New Jersey coastal waters;
- Coastal Carolina University since 2015 on survey data the university is collecting for the Bureau of Ocean Energy Management, an agency within the Department of the Interior; and
- the University of South Florida since 2016 on survey data the university is collecting for a significant portion of western Florida's coastal waters.

NOAA's quality assurance program includes three main review procedures intended to ensure that hydrographic data submitted to NOAA meet quality standards: the Rapid Survey Assessment, Survey Acceptance Review, and Final Survey Review.

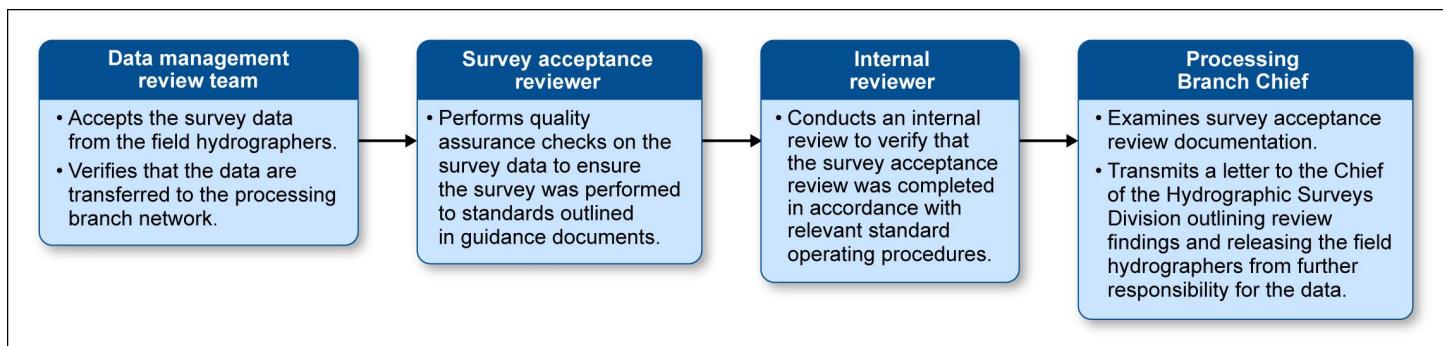
**Rapid Survey Assessment.** NOAA's hydrographic survey data processing branches located in Seattle, Washington, and Norfolk, Virginia, are responsible for initiating a hydrographic survey data "rapid survey assessment" within 5 working days of survey data being delivered to NOAA by private sector contractors and NOAA staff. According to NOAA documentation, the assessment, which should be completed within 2 working days, is intended to improve data quality by quickly identifying significant deficiencies in hydrographic survey data products. The assessment helps ensure the survey data meet HSSD technical requirements and project-specific instructions that are issued at the start of each survey project. If the assessment finds significant deficiencies, NOAA's assessment team may make corrections itself or may return the survey to the hydrographer for rework and resubmission. The hydrographic data processing branches take several factors into consideration when deciding whether to return a survey for rework, such as whether the hydrographers are capable of fixing the error, whether there is value in returning a survey for the purpose of educating the hydrographers to prevent future similar errors, and whether it is faster and more efficient for the processing branch to make corrections. According to NOAA documentation, even if no deficiencies are found, passing the data through this initial assessment does not preclude the processing branch from returning the survey to the field hydrographers for rework and resubmission later in the quality assurance process if significant deficiencies are subsequently found.

**Survey Acceptance Review.** The survey acceptance review is a detailed evaluation and acceptance of hydrographic survey data conducted by the data processing branches in Seattle, Washington, and Norfolk, Virginia. According to NOAA documentation, the survey acceptance review process includes: (1) accepting the survey data from the field hydrographers, (2) evaluating the data and products delivered by hydrographers for deficiencies and deviations from the guidance documents, (3) conducting an internal review of the survey acceptance review process to validate that process, and (4) outlining the findings from the survey acceptance review process and transferring responsibility for the integrity and maintenance of the survey data from the field hydrographer to the processing branch.

The survey acceptance review involves several compliance checks and is intended to confirm that the survey data are accurate and to highlight the strengths and weaknesses of the data. A key element of the survey acceptance review is performing quality assurance checks on the survey data to ensure the survey was performed to the standards required in

guidance documents, including the HSSD, NOAA's hydrographic field procedures manual, and any hydrographic survey project-specific instructions. Upon completion of the survey acceptance review, an internal review is conducted to verify that the survey acceptance review was completed in accordance with relevant standard operating procedures, and that any issues outlined in the review documentation are consistently delineated. After the internal review is completed and approved, the completed documentation is forwarded to the Processing Branch Chief for review. The final output of the review process includes an acceptance letter to the Hydrographic Surveys Division Chief through the Processing Branch Chief outlining any findings from the review and releasing the field hydrographers from further responsibility for the data. Figure 5 illustrates the survey acceptance review process.

**Figure 5: Overview of National Oceanic and Atmospheric Administration Hydrographic Survey Acceptance Review Process**



Source: GAO analysis of National Oceanic and Atmospheric Administration information. | GAO-17-510

**Final Survey Review.** The NOAA contracting officer's representative is responsible for the final quality assurance review for each hydrographic survey project. According to NOAA officials, this is a critical stage, as the contracting officer's representative has been involved at every stage of the survey, from planning and technical evaluation to survey monitoring, including at least one inspection visit with the contractor during the survey time frame. The contracting officer's representative is the primary point of contact when the contractor seeks guidance to resolve technical issues. During the final review, the contracting officer's representative reviews the survey to ensure it is complete—this is the last stage of quality assurance review before the data are archived and made available to the public.

## **Appendix II: Comments from the Department of Commerce**



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Office of the Secretary**  
Washington, D.C. 20230

May 30, 2017

Ms. Anne-Marie Fennell  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Ms. Fennell:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report titled *Hydrographic Surveying: NOAA Needs Better Cost Data and a Strategy for Expanding Private Sector Involvement in Data Collection* (GAO-17-510). Enclosed are the National Oceanic and Atmospheric Administration's programmatic comments to the draft report.

If you have any questions, please contact me or Brian J. Lenihan, Acting Assistant Secretary for Legislative and Intergovernmental Affairs, at (202) 482-3663.

Sincerely,

A handwritten signature in black ink that reads "Ellen Herbst".

Ellen Herbst

Enclosure

**Department of Commerce**  
**National Oceanic and Atmospheric Administration**  
**Response to the GAO Draft Report Titled**  
***Hydrographic Surveying: NOAA Needs Better Cost Data and a Strategy for  
Expanding Private Sector Involvement in Data Collection***  
**(GAO-17-510)**

**General Comments**

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report. The GAO review process and draft report provide a fair, thoughtful, and detailed assessment of NOAA's hydrographic surveying program. NOAA agrees with both GAO recommendations.

The draft report concludes that, without a strategy to expand the use of private sector capabilities, NOAA may have difficulty minimizing duplication. NOAA is committed to developing a strategy to expand use of private sector hydrographic surveying. Through the Integrated Ocean and Coastal Mapping Program, NOAA has minimized and reduced the duplication of mapping efforts of Federal and State agencies by developing the collaborative website, SeaSketch, where multiple agencies can share their ocean mapping plans to reduce duplication of effort. NOAA controls the assignment of all in-house and NOAA contract surveys through the annual hydrographic surveying plan, which specifies separate locations for NOAA ship surveys and private sector survey contracts. There is a distinction between duplication of effort and duplication of capabilities. It is essential for NOAA to retain in-house hydrographic capabilities to provide the Nation with reliable geospatial data. NOAA's hydrographic vessels serve as a training ground to develop and hone both our hydrographic and mariner capabilities – both of which are critical to be good consumers of hydrographic data from our contractors as well as to provide fit-for-purpose navigation products and services to our maritime customers. NOAA welcomes the opportunity to provide GAO with additional details regarding the annual hydrographic surveying plan.

**NOAA Response to GAO Recommendations**

The draft GAO report states, "We recommend that the Secretary of Commerce direct the NOAA Administrator to take the following two actions:"

**Recommendation 1:** "Ensure that NOAA's efforts to improve its cost comparison reports include actions to fully track capital asset depreciation costs and account for ships in port undergoing major maintenance in accordance with its standard operating procedure."

**NOAA Response:** NOAA agrees with Recommendation 1.

Depreciation costs for vessel acquisition – NOAA acknowledges that the cost estimate methodology should include the depreciation of NOAA's new vessel acquisitions once they are operational and should reasonably follow, as recommended by the 2005 Hydrographic Services Review Panel, the Office of Management and Budget (OMB) Circular No. A-76 guidelines on

reporting the depreciation cost when conducting cost comparisons. NOAA will determine a reasonable path forward when tracking and reporting depreciation cost. NOAA's Office of Marine and Aviation Operations (OMAO) will work with the NOAA Finance Office to obtain an accurate depreciation schedule.

Depreciation costs for major vessel maintenance and equipment, repair, and maintenance costs – NOAA agrees that its hydrographic survey ship costs may appear artificially high during years in which NOAA incurs large equipment, repair, and maintenance costs and that implementing a policy for tracking and reporting depreciation would allow a more accurate cost comparison between NOAA costs versus private sector costs.

NOAA will assemble a team including, but not restricted to, personnel from OMAO's Resource Management, Finance, and Marine Operations divisions to account for costs of ships when comparing those costs to the private sector. NOAA will take into account the recommendation from the 2005 Hydrographic Services Review Panel to reasonably follow OMB Circular No. A-76 guidelines for agency and public reimbursable sources on calculating cost comparison, including use of the Federal Accounting Standards for Property, Plant, and Equipment to establish depreciation schedules and rates of depreciation. In doing so, NOAA will consider applying a higher depreciation threshold than \$200,000 as described in NOAA's depreciation policy.

Accounting for ships in port undergoing major maintenance – NOAA agrees with the recommendation to account for ships in port undergoing major maintenance. NOAA will review its policy, which currently does not assign costs to a ship that is in port for the entire year and will identify a methodology to account for those costs when comparing to private sector costs.

**Recommendation 2:** “Develop a strategy for expanding NOAA’s use of the private sector in its hydrographic survey program, as required by law.”

**NOAA Response:** NOAA agrees with Recommendation 2.

NOAA will improve its approach for comparing NOAA hydrographic survey costs to those of the private sector. Once NOAA has a more accurate basis for doing so, NOAA will be able to determine the extent to which it can expand its use of the private sector and develop a strategy accordingly.

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## **Appendix III: GAO Contact and Staff Acknowledgments**

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### **GAO Contact**

Anne-Marie Fennell, (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov)

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### **Staff Acknowledgments**

In addition to the individual named above, Steve Gaty (Assistant Director), Leo Acosta (Analyst-in-Charge), Martin (Greg) Campbell, Patricia Farrell Donahue, Timothy Guinane, Benjamin Licht, J. Lawrence Malenich, Ty Mitchell, Guisseli Reyes-Turnell, Danny Royer, Jeanette Soares, and Arvin Wu made key contributions to this report.

## **Appendix IV: Accessible data**

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### **Data Tables**

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**Data table for Figure 4: Overview of National Oceanic and Atmospheric Administration Process to Develop Annual Hydrographic Surveying Plan**

#### **Quantify and identify needs**

- Identify highest priority needs  
National Oceanic and Atmospheric Administration (NOAA) identifies areas in greatest need of surveying by evaluating inputs such as seafloor depth, shipping tonnage, and age of the last survey.
- Incorporate external requests  
NOAA modifies priority list by incorporating external requests compiled through customer outreach by NOAA regional officials. These requests provide additional context such as economic and public safety considerations.

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### Evaluate resource availability

- Funding availability  
Based on projected appropriations, NOAA budgets the tentative number of in-house and contractor survey efforts it can fund.
- Vessel availability  
NOAA evaluates survey requirements and in-house and contractor ship availability and capability.

### Develop and approve plan

- Develop plan  
Based on evaluation of highest priority needs and funding and vessel availability, NOAA determines locations, vessels, and schedules for the annual hydrographic surveying plan.
- Approve plan  
The Chief of the Hydrographic Surveys Division reviews and signs off on the annual hydrographic surveying plan.

Source: GAO analysis of National Oceanic and Atmospheric Administration information. | GAO-17-510

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### Data table for Figure 5: Overview of National Oceanic and Atmospheric Administration Hydrographic Survey Acceptance Review Process

#### Data management review team

- Accepts the survey data from the field hydrographers.
- Verifies that the data are transferred to the processing branch network.

#### Survey acceptance reviewer

- Performs quality assurance checks on the survey data to ensure the survey was performed to standards outlined in guidance documents.

#### Internal reviewer

- Conducts an internal review to verify that the survey acceptance review was completed in accordance with relevant standard operating procedures.

### **Processing Branch Chief**

- Examines survey acceptance review documentation.
- Transmits a letter to the Chief of the Hydrographic Surveys Division outlining review findings and releasing the field hydrographers from further responsibility for the data.

Source: GAO analysis of National Oceanic and Atmospheric Administration information. | GAO-17-510

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### **Agency Comment Letter**

#### **Text of Appendix II: Comments from the Department of Commerce**

##### Page 1

May 30, 2017

Ms. Anne-Marie Fennell

Director, Natural Resources and Environment

U.S. Government Accountability Office 441 G Street, NW

Washington, DC 20548

Dear Ms. Fennell:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report titled Hydrographic Surveying: NOAA Needs Better Cost Data and a Strategy for Expanding Private Sector Involvement in Data Collection (GAO-17-510).

Enclosed are the National Oceanic and Atmospheric Administration's programmatic comments to the draft report.

If you have any questions, please contact me or Brian J. Lenihan, Acting Assistant Secretary for Legislative and Intergovernmental Affairs, at (202) 482-3663.

Sincerely,

Ellen Herbst

Enclosure

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### **General Comments**

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report. The GAO review process and draft report provide a fair, thoughtful, and detailed assessment of NOAA's hydrographic surveying program. NOAA agrees with both GAO recommendations.

The draft report concludes that, without a strategy to expand the use of private sector capabilities, NOAA may have difficulty minimizing duplication. NOAA is committed to developing a strategy to expand use of private sector hydrographic surveying. Through the Integrated Ocean and Coastal Mapping Program, NOAA has minimized and reduced the duplication of mapping efforts of Federal and State agencies by developing the collaborative website, SeaS ketch, where multiple agencies can share their ocean mapping plans to reduce duplication of effort. NOAA controls the assignment of all in-house and NOAA contract surveys through the annual hydrographic surveying plan, which specifies separate locations for NOAA ship surveys and private sector survey contracts. There is a distinction between duplication of effort and duplication of capabilities. It is essential for NOAA to retain in-house hydrographic capabilities to provide the Nation with reliable geospatial data. NOAA's hydrographic vessels serve as a training ground to develop and hone both our hydrographic and mariner capabilities - both of which are critical to be good consumers of hydrographic data from our contractors as well as to provide fit-for-purpose navigation products and services to our maritime customers. NOAA welcomes the opportunity to provide GAO with additional details regarding the annual hydrographic surveying plan.

### **NOAA Response to GAO Recommendations**

The draft GAO report states, "We recommend that the Secretary of Commerce direct the NOAA Administrator to take the following two actions:"

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**Recommendation 1:**

"Ensure that NOAA's efforts to improve its cost comparison reports include actions to fully track capital asset depreciation costs and account for ships in port undergoing major maintenance in accordance with its standard operating procedure."

**NOAA Response: NOAA agrees with Recommendation**

Depreciation costs for vessel acquisition - NOAA acknowledges that the cost estimate methodology should include the depreciation of NOAA's new vessel acquisitions once they are operational and should reasonably follow, as recommended by the 2005 Hydrographic Services Review Panel, the Office of Management and Budget (OMB) Circular No. A-76 guidelines on

Page 3

reporting the depreciation cost when conducting cost comparisons. NOAA will determine a reasonable path forward when tracking and reporting depreciation cost. NOAA's Office of Marine and Aviation Operations (OMAO) will work with the NOAA Finance Office to obtain an accurate depreciation schedule.

Depreciation costs for major vessel maintenance and equipment, repair, and maintenance costs - NOAA agrees that its hydrographic survey ship costs may appear artificially high during years in which NOAA incurs large equipment, repair, and maintenance costs and that implementing a policy for tracking and reporting depreciation would allow a more accurate cost comparison between NOAA costs versus private sector costs.

NOAA will assemble a team including, but not restricted to, personnel from OMAO's Resource Management, Finance, and Marine Operations divisions to account for costs of ships when comparing those costs to the private sector. NOAA will take into account the recommendation from the 2005 Hydrographic Services Review Panel to reasonably follow OMB Circular No. A- 76 guidelines for agency and public reimbursable sources on calculating cost comparison, including use of the Federal Accounting Standards for Property, Plant, and Equipment to establish depreciation schedules and rates of depreciation. In doing so, NOAA will consider applying a higher depreciation threshold than \$200,000 as described in NOAA's depreciation policy.

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Accounting for ships in port undergoing major maintenance - NOAA agrees with the recommendation to account for ships in port undergoing major maintenance. NOAA will review its policy, which currently does not assign costs to a ship that is in port for the entire year and will identify a methodology to account for those costs when comparing to private sector costs.

**Recommendation 2:**

"Develop a strategy for expanding NOAA's use of the private sector in its hydrographic survey program, as required by law."

**NOAA Response: NOAA agrees with Recommendation**

NOAA will improve its approach for comparing NOAA hydrographic survey costs to those of the private sector. Once NOAA has a more accurate basis for doing so, NOAA will be able to determine the extent to which it can expand its use of the private sector and develop a strategy accordingly.

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**Technical Comments**

Recommended Changes for Factual technical Information

Page 8. first paragraph, first sentence:

The text reads "hydrographic surveying" at the end of the sentence, but it should read "hydrographic services, including surveying." As currently written, the sentence does not cover the mandate and scope of the Hydrographic Services Review Panel.

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