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Report to the Chairman,
Committee on Natural Resources,
House of Representatives

October 2022

FEDERAL FISHERIES MANAGEMENT

Overfishing Determinations Vary Across Regions, and Data Challenges Complicate Management Efforts

GAO-23-105172

GAO Highlights

Highlights of GAO-23-105172, a report to the Chairman, Committee on Natural Resources, House of Representatives

October 2022

FEDERAL FISHERIES MANAGEMENT

Overfishing Determinations Vary Across Regions, and Data Challenges Complicate Management Efforts

Why GAO Did This Study

Commercial and recreational marine fisheries are a critical part of our nation's economy. These fisheries contributed $118 billion to the U.S. gross domestic product and supported 1.8 million jobs in 2019. NMFS and eight Regional Fishery Management Councils (Council) are responsible for managing about 460 fish stocks in federal waters. This includes minimizing the extent to which stocks experience overfishing or become overfished. Overfishing occurs when the number of fish caught is above a certain threshold; a stock becomes overfished when its population is deemed to be too low.

GAO was asked to review federal efforts to prevent overfishing and manage overfished stocks. Among other things, this report examines the number of stock assessments conducted from 2011 to 2020, along with the number and status of overfishing and overfished stocks during this period. GAO reviewed NMFS policies and documents; interviewed NMFS regions, Councils, and relevant stakeholders based on factors such as familiarity with different regions of the United States; and analyzed data from NMFS' Species Information System database.

What GAO Recommends

GAO is making two recommendations to NMFS on the structural limitations of the Species Information System database, including developing guidelines for conducting certain multiyear analyses, as well as incorporating leading practices into its database improvement plans. The agency agreed with GAO's recommendations.

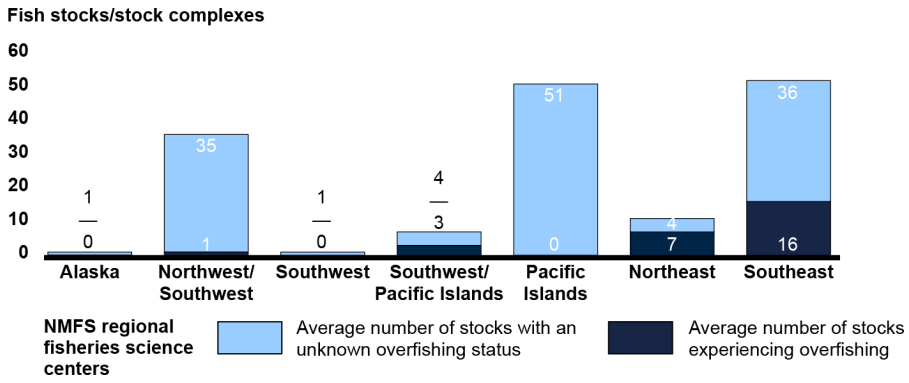
View GAO-23-105172. For more information, contact Cardell Johnson at (202) 512-3841 or johnsoncd1@gao.gov.

What GAO Found

GAO's analysis of National Marine Fisheries Service (NMFS) data found that the number of fish stocks assessed for 2011 through 2020 varied by the six NMFS regional fisheries science centers and that many stocks were not assessed. For example, on average, the Southeast Science Center assessed about 10 percent of the 153 stocks it supported each year, while the Alaska Science Center assessed about 78 percent of its 64 stocks.

NMFS uses these assessments to support management, including determining whether a stock is in overfishing or is overfished. GAO found that the number of stocks in these statuses varied by science center and that many stocks had an unknown status (see fig. for overfishing information). Challenges inherent in collecting fisheries data, along with resource challenges, affected the availability and quality of the data. For example, trawl surveys, which are used to collect fisheries data, are challenging and costly to conduct over large geographic areas. These challenges were a key source of the variability in the number of stocks assessed and one of the reasons why many stocks may have unknown status.

Average Annual Number of Fish Stocks Experiencing Overfishing and Average Number with an Unknown Overfishing Status, by National Marine Fisheries Service (NMFS) Fisheries Science Centers for 2011 through 2020



Source: GAO analysis of NMFS Species Information System data. | GAO-23-105172

Note: Some science centers are jointly responsible for assessing a fish stock. The averages do not total the amount noted in the report, due to rounding. A fish stock is a fish species or stock complex, which is a group of stocks similar enough to be managed as a single unit.

In reviewing NMFS' stock assessment and status data, GAO identified issues with the Species Information System database that prevented conducting certain multiyear trend analyses. NMFS has not documented these structural limitations or developed general guidelines for how to complete such analyses. NMFS officials noted that such analyses can be useful for tracking changes in stock status, as well as the frequency with which individual fish stocks have been assessed over time. NMFS is working on two projects to improve the functionality of the database. The plans for these projects do not include key project management elements, such as written goals and timelines. Developing a plan that includes these elements could help ensure completion of the projects and help NMFS conduct additional analyses that could be used to support management measures to prevent overfishing and manage overfished stocks.

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Abbreviations

Council	Regional Fishery Management Council
HMS Division	NMFS' Atlantic Highly Migratory Species Division
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

October 13, 2022

The Honorable Raúl Grijalva
Chairman
Committee on Natural Resources
House of Representatives

Dear Mr. Chairman:

Commercial and recreational marine fisheries are critical to the nation's economy, contributing nearly $118 billion to the U.S. gross domestic product and supporting approximately 1.8 million jobs in 2019.[1] Sustainable management of commercial and recreational fisheries, including minimizing the extent to which fish stocks experience overfishing or become overfished, is key to ensuring the continuation of these benefits.[2] Overfishing occurs when the number of fish caught is above a certain threshold.[3] A fish stock is considered overfished when the stock's population is at a level that jeopardizes its future ability to produce

[1]National Marine Fisheries Service, *Fisheries Economics of the United States, 2019,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-F/SPO-229 (Silver Spring, MD: March 2022). A fishery is (1) one or more stocks of fish that can be treated as a unit for purposes of conservation and management and that are identified on the basis of geographic, scientific, technical, recreational, or economic characteristics, or method of catch; or (2) any fishing for such stocks. For the purposes of this report, the terms fisheries and fisheries management refer to marine fisheries that are at least in part federally managed and include fish and invertebrate species, such as shellfish.

[2]A stock of fish, or fish stock, means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. Throughout this report, the term fish stock is used to mean one fish species or a fish stock complex, which is a group of stocks similar enough to be managed as a single unit.

[3]Specifically, overfishing occurs whenever a stock or stock complex is subjected to a level of fishing mortality or total catch that jeopardizes the capacity of a stock or stock complex to produce maximum sustainable yield on a continuing basis. Maximum sustainable yield is the largest long-term average catch that can be taken from a stock or stock complex under prevailing ecological, environmental conditions, and fishery technological characteristics, and the distribution of catch among fleets. Catch includes, but is not limited to, any fishing-related activity that results in killing any fish or bringing any live fish on board a vessel.

maximum sustainable yield on a continuing basis.[4] This can be the result of many factors, including overfishing, habitat degradation, pollution, climate change, and disease.

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is the lead agency responsible for managing commercial and recreational marine fisheries in federal waters.[5] The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended, sets forth national standards for federal fisheries conservation and management.[6] Under the Magnuson-Stevens Act, NMFS and eight Regional Fishery Management Councils (Council) are responsible for fisheries management and conservation in federal waters.[7] NMFS and the Councils work together to prevent overfishing and to manage overfished stocks.

As part of these management efforts, NMFS fisheries science centers (science centers)—six regionally located centers that collect and analyze data—conduct stock assessments. These stock assessments can be used to determine whether a fish stock is experiencing overfishing or is overfished, known as stock status. If NMFS determines that overfishing of a certain stock is occurring, it notifies the relevant Council, which is then to take action to end overfishing, such as by reducing the annual catch

[4]Specifically, a stock or stock complex is considered overfished when its biomass has declined below the minimum stock size threshold, which means the level of biomass below which the capacity of the stock or stock complex to produce maximum sustainable yield on a continuing basis has been jeopardized.

[5]Federal waters generally extend 3 to 200 nautical miles off the coast of the United States. Coastal states generally maintain responsibility for managing fisheries in waters that extend approximately out to 3 geographic miles from their coastlines.

[6]*See* 16 U.S.C. §§ 1801 *et seq*. (Magnuson-Stevens Act). The ten national standards are set forth in 16 U.S.C. § 1851(a).

[7]The Councils are supported by federal funds, and have staff to assist them in the performance of their functions. Each Council generally consists of voting members and nonvoting members. Voting members include the principal state official with marine fishery management responsibility and expertise in each state within the Council's region, the NMFS Regional Director for the geographic area concerned, and individuals nominated by state governors and appointed by the Secretary of Commerce who are knowledgeable regarding the conservation and management, or the commercial or recreational harvest, of fishery resources within the Councils' geographic areas. The Councils also include nonvoting members, including officials from other federal agencies.

limit for that stock the following year.[8] Similarly, if NMFS determines that a fish stock has become overfished, it notifies the relevant Council. The Council is to then develop a plan for rebuilding the stock.[9] Plans for rebuilding a fish stock typically allow fishing to continue at a reduced level but with management measures in place to allow the stock to rebuild.

You asked us to review federal efforts to prevent overfishing and to manage overfished stocks. This report examines (1) the processes NMFS and the Councils use to prevent overfishing and to manage overfished stocks; (2) the number of stock assessments conducted by the NMFS science centers for 2011 through 2020; and (3) the number and status of overfishing and overfished stocks for 2011 through 2020, as well as the number of rebuilding plans for overfished stocks for 2001 through 2020.

To examine the processes NMFS and the Councils use to prevent overfishing and to manage overfished stocks, we reviewed the Magnuson-Stevens Act and NOAA guidelines and policies related to overfishing and overfished stocks. Specifically, we reviewed agency documents, including NMFS guidelines, procedures, and technical memorandums, regarding the steps NMFS and the Councils are to take to prevent overfishing and to manage overfished stocks.[10] We also interviewed officials from NMFS' headquarters; all five of its regional offices; and all six of its science centers, as well as officials from all eight Councils. In addition, we interviewed stakeholders from nine organizations—including representatives from academia, environmental organizations, and commercial and recreational fishing groups—about NMFS' and the Councils' efforts to prevent overfishing and to manage

[8]An annual catch limit is a limit on the total annual catch of a stock or stock complex, which cannot exceed the acceptable biological catch that serves as a basis for invoking accountability measures. Annual catch limits, in coordination with accountability measures, must prevent overfishing.

[9]Within 2 years of receiving notification of a NMFS' determination that a stock is overfished, the Council is to prepare and implement a plan for rebuilding the stock. The Council is to specify a period for rebuilding the stock, which is not to exceed 10 years, subject to exception.

[10]50 C.F.R. pt. 600, subpt. D (guidelines based on the national standards); National Marine Fisheries Service, *Procedures to Determine Stock Status and Rebuilding Progress,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Procedure 01-101-09 (August 2017); and *Technical Guidance on the Use of Precautionary Approaches to Implementing Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-F/SPO-31 (July 1998).

overfished stocks. We selected this nongeneralizable sample of stakeholders to gather a range of views. Our selection of stakeholders was based on factors such as familiarity with different aspects of the fisheries management process and familiarity with the different regions of the U.S. Views from these stakeholders cannot be generalized to those we did not select and interview.

To examine the number of stock assessments conducted by the science centers, as well as the number of stocks experiencing overfishing or in overfished status for 2011 through 2020, we analyzed data from NMFS' Species Information System database. Specifically, we examined data on the number of stock assessments conducted, as well as the number of stocks in overfishing and overfished status for calendar years 2011 through 2020. We also analyzed data about when rebuilding plans for overfished stocks were initiated and the status of those plans, for calendar years 2001 through 2020.[11]

To determine the reliability of these data, we conducted electronic testing, interviewed agency officials familiar with the data, and reviewed documentation about NMFS' Species Information System database. In the course of reviewing the data, we identified some inconsistencies, including the use of different names for the same stocks over various years.[12] Although these name changes are tracked in the database, reporting limitations make it challenging to conduct multiyear analyses of all managed stocks without manual manipulation to link related stocks through time by knowledgeable NMFS officials. These challenges prevented us from conducting certain multiyear trend analyses for stock status and assessments. For other annual analyses, however, we determined that the data were sufficiently reliable for our purposes.

We also conducted interviews to understand agency officials' and stakeholders' views about fish stock assessments, overfishing and overfished stocks, rebuilding plans, and any challenges associated with preventing overfishing and managing overfished stocks. Specifically, we interviewed officials from NMFS' headquarters; all five regional offices; all six science centers; and all eight Councils, as well as the same stakeholders noted above, representing academia, environmental organizations, and commercial and recreational fishing groups. Further

[11]We chose to review data on rebuilding plans for a more extended time frame because rebuilding plans can last 10 years or more.

[12]NMFS officials told us that these naming changes are often a result of shifts in how the stock is identified, because of evolving biological information, or shifts in which Council is managing the stock.

details on our objectives, scope, and methodology can be found in appendix I.

We conducted this performance audit from April 2021 to October 2022, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

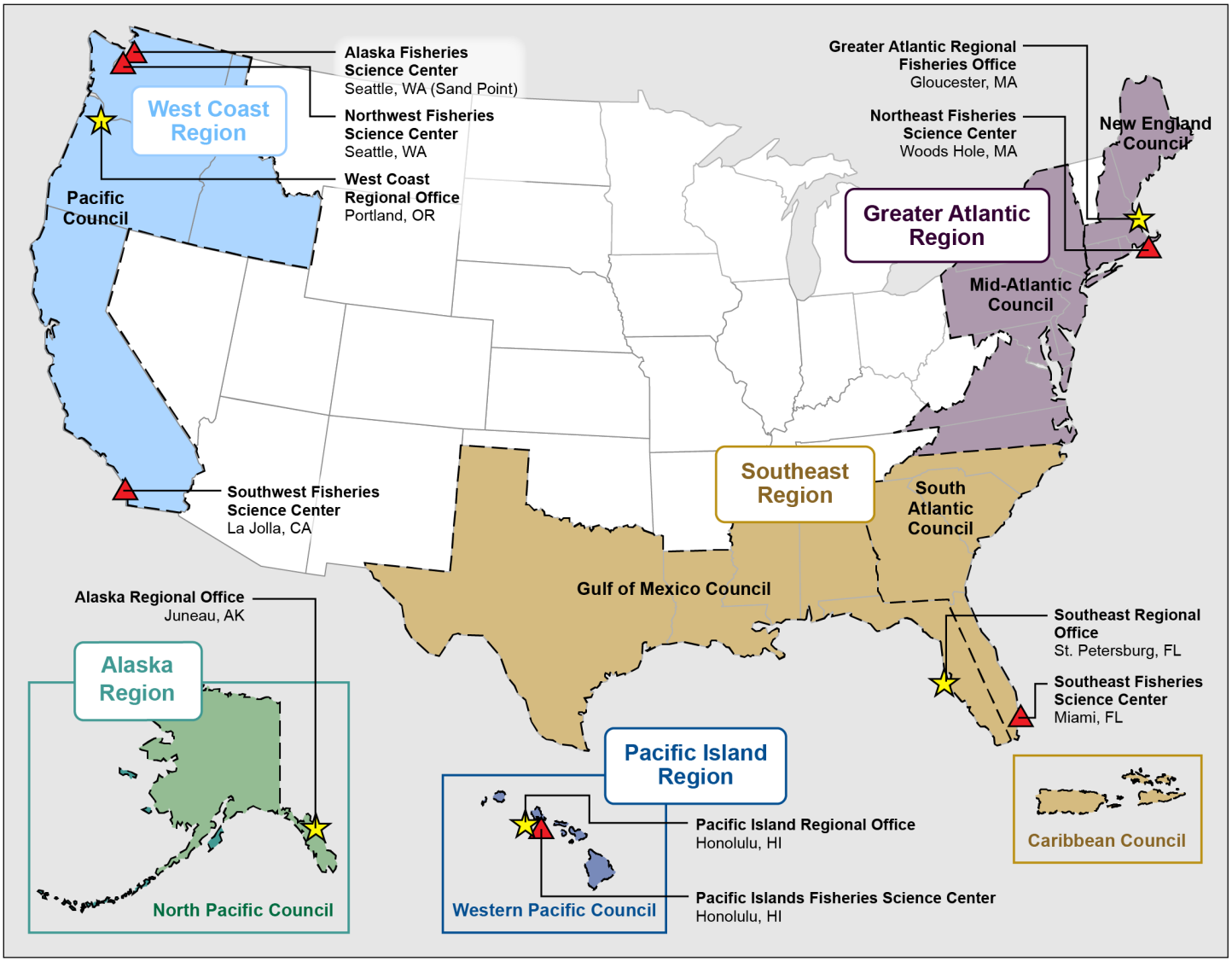
Background

Federal Fisheries Management

NMFS and the eight Councils are responsible for managing approximately 460 fish stocks in federal waters across five geographic regions of the country. Federal waters generally extend from 3 to 200 nautical miles off the coast of the United States. NMFS operates through its headquarters, five regional offices, and six science centers to partner with the Councils to manage federal fisheries, as shown in figure 1. Under this structure, NMFS provides scientific information and management advice, and the Councils use this information to make management recommendations that they submit to NMFS for approval. In addition, NMFS' Atlantic Highly Migratory Species Division (HMS Division) manages highly migratory fish species in certain federal waters.[13]

[13]Specifically, the HMS Division is responsible for managing billfish, shark, and swordfish in federal waters, from Maine to Texas, as well as Puerto Rico and the U.S. Virgin Islands. The HMS Division is also responsible for managing Atlantic tuna stocks in federal waters to the shore in all states except Connecticut and Mississippi.

Figure 1: National Marine Fisheries Service (NMFS) Regional Offices, Fisheries Science Centers, and Regional Fishery Management Councils (Council)



Sources: NMFS; Map Resources (map). | GAO-23-105172

Note: The Western Pacific Fishery Management Council also includes the Mariana Islands archipelago, American Samoa, and a range of remote islands in the central and western Pacific not depicted on this map.

In addition, three interstate marine fisheries commissions, representing states in the Atlantic, Gulf, and Pacific regions, support both state and federal fisheries management. NMFS, the Councils, interstate marine fisheries commissions, and other partners have varying roles in the

federal fisheries management process. These roles generally involve data collection and research, analyzing this information to develop management advice, and taking management actions.

NMFS' six science centers are primarily responsible for collecting fisheries data and for conducting scientific research and analysis necessary for the conservation, management, and use of marine resources, including fisheries. Data are collected on fish stocks and ecosystem conditions on an ongoing basis to support scientific analyses. The science centers provide the results of their analyses to the Councils, who use the information to develop fishery management plans and plan amendments, on the basis of regulations, guidelines, and policies developed by NMFS. These plans, and any amendments to them, include fishery conservation and management measures. Plans are then submitted to the Assistant Administrator for NMFS for approval or disapproval. NMFS promulgates regulations to implement approved plans.[14]

Overfishing and Overfished Stocks

The Magnuson-Stevens Act established 10 national standards for fishery conservation and management and provided that fishery management plans are to be consistent with the standards.[15] Under the act, NOAA established guidelines, based on the national standards, to assist in the development and review of fishery management plans, amendments, and regulations prepared by the Councils and NOAA.[16] Two of the national standards, in particular, help establish how NMFS and the Councils are to prevent overfishing and to manage overfished stocks.

National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the U. S. fishing industry.[17] The

[14]The Magnuson-Stevens Act provides that the Secretary of Commerce shall approve, disapprove, or partially approve a fishery management plan or plan amendment submitted by the Councils after a public comment period. 16 U.S.C. § 1854(a)(3). The Secretary has subsequently delegated this responsibility to the Assistant Administrator for NMFS.

[15]The 10 national standards relate to optimum yield, scientific information, management units, allocations, efficiency, variations and contingencies, costs and benefits, communities, bycatch, and safety of life at sea. 16 U.S.C. § 1851(a)(1)-(10).

[16]The act called for NOAA to establish advisory guidelines, which are not to have the force and effect of law, based on the national standards, to assist in the development of fishery management plans. 16 U.S.C. § 1851(b). For NOAA's guidelines based on the national standards, see 50 C.F.R. §§ 600.305-355.

[17]16 U.S.C. § 1851(a)(1).

guidelines based on this standard provide definitions for overfishing and overfished statuses. The definitions are based on the maximum sustainable yield, which is defined as the largest long-term average catch that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics, and the distribution of catch among fleets. Further, as summarized in NMFS' annual *Status of Stocks* report:[18]

- Overfishing occurs when a stock has a harvest rate higher than the rate that produces its maximum sustainable yield.[19] Overfishing is generally a direct result of fishing activities.
- A stock is considered overfished when its population size is too low, such that it jeopardizes the stock's ability to produce its maximum sustainable yield. Overfished status can be the result of many factors, including overfishing, as well as habitat degradation, pollution, climate change, and disease.
- Rebuilt refers to a stock that was previously overfished and that has increased in abundance to the target population size that supports its maximum sustainable yield.[20]

The guidelines based on National Standard 1 also set forth actions that the Councils are to take in response to notification of a NOAA determination that overfishing is occurring or a stock or stock complex is overfished. For example, the Magnuson-Stevens Act and the National Standard 1 guidelines provide that, when a stock is overfished, a Council is to specify a period for rebuilding the stock or stock complex that is as short as possible, taking into account the status and biology of any overfished stock and the needs of the fishing communities, among other things. The period is not to exceed 10 years, except where biology of the stock, other environmental conditions, or management measures under an international agreement to which the United States participates dictate otherwise.

National Standard 2 states that conservation and management measures shall be based upon the best scientific information available.[21] The

[18]National Marine Fisheries Service, *Status of Stocks 2020: Annual Report to Congress on the Status of U.S. Fisheries,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration (May 2021).

[19]Catch, take, or harvest includes, but is not limited to, any activity that results in killing any fish or bringing any live fish on board a vessel.

[20]Abundance is defined as the total number of a kind of fish in a population.

[21]16 U.S.C. § 1851(a)(2).

guidelines based on this standard provide further direction on the underlying scientific information to be used in fisheries conservation and management. The guidelines note that criteria to consider when evaluating best scientific information are relevance, inclusiveness, objectivity, transparency and openness, timeliness, verification and validation, and peer review, as appropriate. NMFS is to include these considerations when evaluating whether a stock is experiencing overfishing, is overfished, or has been rebuilt.

General Practices for Preventing Overfishing and Managing Overfished Stocks

NMFS science centers are responsible for conducting fish stock assessments, which are a key tool for managing fish stocks and determining whether a stock is experiencing overfishing or is overfished. Stock assessments are scientific efforts that involve data collection, data processing, and mathematical modeling in order to estimate the health and size of a fish stock, measure how fishing affects the stock, and project harvest levels that achieve the largest sustainable long-term yield. NMFS uses a wide variety of models in conducting its stock assessments. The selection of a specific model is tailored to the available data for a given stock. In general, the models rely on data in three major categories: catch, abundance, and biology.

Broadly, the different types of stock assessments that produce management advice can be placed into two general categories.

(1) **Operational stock assessments** require more time and resources and include efforts to update established models with the most recent data.

(2) **Stock monitoring updates** require less time and resources and involve rerunning an existing model using only updated catch data. They provide updated catch recommendations to fishery managers during periods when an operational stock assessment is not conducted.

Because of the number of stocks needing assessments, the complexity of conducting assessments, and available resources, NMFS and the Councils must prioritize which fish stocks to assess. In 2015, NMFS released a framework for prioritizing fish stock assessments, with guidance to help inform annual stock assessment scheduling.[22] NMFS and Council officials reported that the stock assessment prioritization process involves collaboration between the science centers and the Councils.

[22]National Marine Fisheries Service, *Prioritizing Fish Stock Assessments,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-F/SPO-152 (Silver Spring, MD: August 2015).

NMFS science centers are responsible for evaluating stock status regarding whether a stock is experiencing overfishing or is overfished, according to NMFS officials. A key metric used by the science centers in evaluating stock status is the overfishing limit, which is the best estimate of the maximum amount of a stock that can be caught in a year without resulting in overfishing.[23] NMFS officials noted that, to determine whether a stock is experiencing overfishing, the science centers rely on stock assessments or other methods, such as comparing the overfishing limit to the amount of fish caught in a particular year. To evaluate whether a stock is overfished, the science centers rely on stock assessments. Status determinations are made annually, when new information is available. When new information is not available, the status determination from the prior year is generally maintained for the next year.

According to NMFS officials, on the basis of the overfishing and overfished determinations, the Councils amend or adjust the management measures laid out in fishery management plans. Such measures include policies and restrictions on the timing or location of fishing, bag limits on how many fish can be caught, restrictions on gear that can be used when fishing, and quotas or other permitting systems for how many fish can be caught in certain areas by certain fishers. Measures also include setting an annual catch limit, which is a level of allowable catch intended to ensure that overfishing does not occur.[24]

In setting the annual catch limit, the Councils are to account for the scientific and management uncertainties inherent in fisheries management. Scientific uncertainty refers to uncertainty in the information about a stock. Sources of scientific uncertainty can include uncertainty in stock assessment results, time lags in updating assessments, uncertainty in projections, longer-term uncertainties because of potential ecosystem and environmental effects, or other factors. Management uncertainty refers to uncertainty in the ability of fisheries managers to constrain catch so that the annual catch limit is not exceeded, and the uncertainty in quantifying the true catch amounts. Sources of management uncertainty can include late catch reporting, misreporting, underreporting of catch, or other factors.

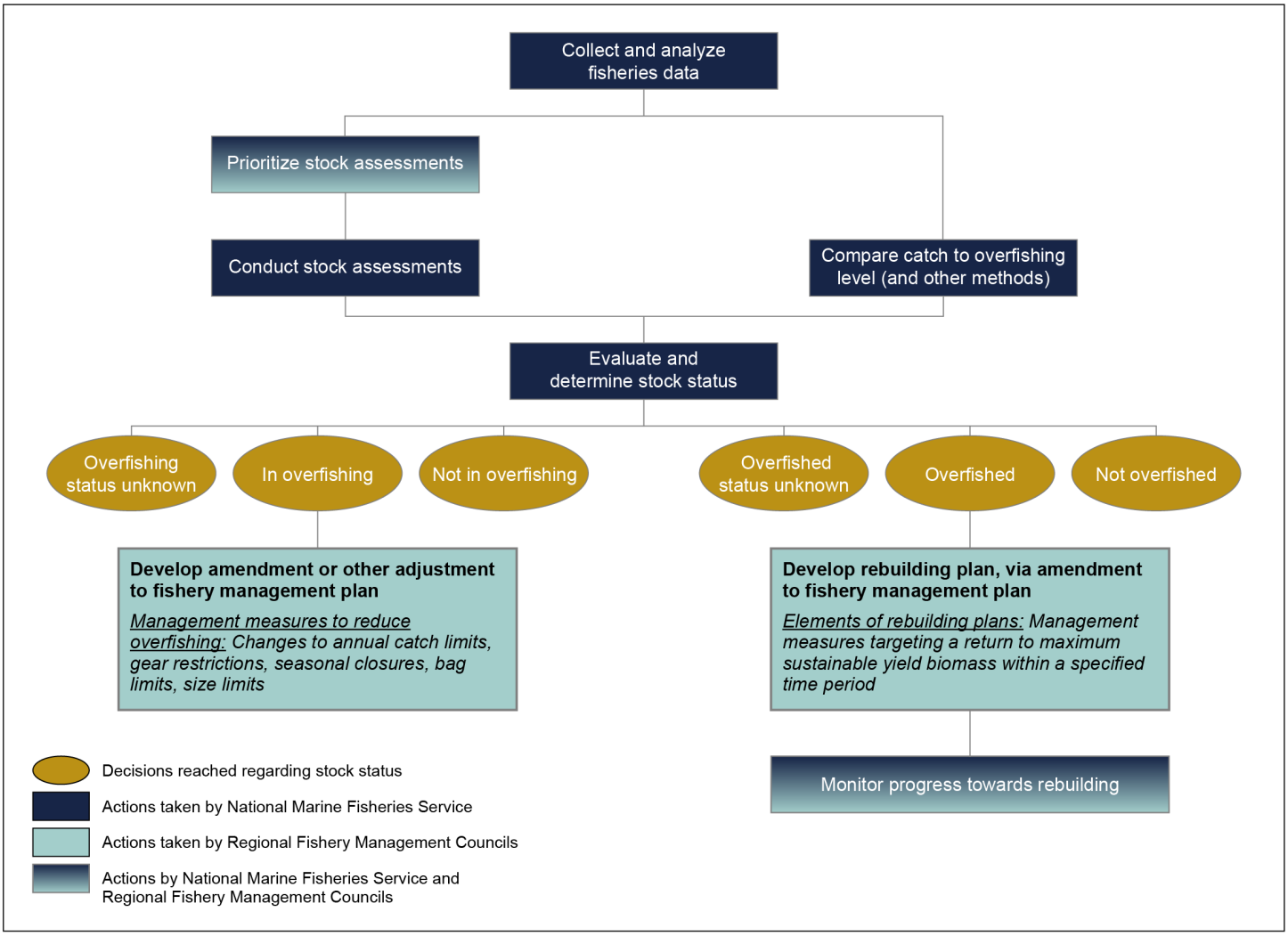
[23]Specifically, under the guidelines implementing National Standard 1, the overfishing limit is defined as the annual amount of catch that corresponds to the estimate of maximum fishing mortality threshold applied to a stock or a stock complex's abundance and is expressed in terms of numbers or weight of fish.

[24]The guidelines implementing National Standard 1 define annual catch limit as a limit on the total annual catch of a stock or stock complex, which cannot exceed the acceptable biological catch that serves as the basis for invoking accountability measures.

Using the management measures outlined above, among others, the Councils are to adjust fishery management plans to end overfishing immediately and to rebuild affected stocks. For stocks that are determined to be overfished, the Councils are to develop and implement rebuilding plans, generally through an amendment to the relevant fishery management plan, according to NMFS officials. Within 2 years of notification of an overfished determination, the Councils are to develop a rebuilding plan to return the stock to maximum sustainable yield biomass, generally within 10 years of beginning to implement the plan.[25] Under the national standards guidelines, progress toward rebuilding is to be tracked. Figure 2 summarizes select steps taken by NMFS and the Councils related to overfishing and overfished determinations.

[25]The rebuilding period is not to exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise.

Figure 2: Select Steps Taken by the National Marine Fisheries Service (NMFS) and the Regional Fishery Management Councils Related to Overfishing and Overfished Determinations



Source: GAO analysis of NMFS documents and interviews with NMFS officials. | GAO-23-105172

The Magnuson-Stevens Act requires NMFS to report annually to Congress and the Councils on the status of federally managed fisheries within each Council's geographical area of authority and to identify those fisheries that are overfished or are approaching a condition of being

overfished.[26] To help compile information for this reporting, NMFS officials stated that the agency uses information from the Species Information System database, which is the national repository for stock assessment results, status determination results, and annual catch limit information. They also noted that information for the database is collected from NMFS regional offices and science centers, and the database is managed by NMFS' Office of Science and Technology, with support from the Office of Sustainable Fisheries.

NMFS and the Councils Have a General Framework to Prevent Overfishing and Manage Overfished Stocks but Use Various Processes and Methods

The Magnuson-Stevens Act and the related NMFS guidelines establish a general framework for how NMFS and the Councils are to prevent overfishing and manage overfished stocks. While certain actions are required in response to overfished determinations, this framework generally provides NMFS and the Councils flexibility in how they prevent overfishing and manage overfished stocks. With this flexibility, NMFS and the Councils use various processes and methods to address overfishing and overfished stocks.

General Framework Provides Flexibility to NMFS and the Councils

The Magnuson-Stevens Act, including its national standards for fishery conservation and management, as well as various NMFS guidelines, outline a general framework for preventing overfishing and managing overfished stocks. As noted, NOAA established guidelines based on the national standards to assist in the development of fishery management plans. The guidelines include actions to be taken when a stock is found to be experiencing overfishing or is overfished. The guidelines also provide further direction on the underlying scientific information to be used in fisheries conservation and management.

While the framework requires certain actions in response to overfished determinations, it generally provides NMFS and the Councils flexibility in how they prevent overfishing and manage overfished stocks. For example, the science centers are to gather and analyze fisheries data to inform the Assistant Administrator for NMFS's determinations of whether

[26]As part of this reporting, NMFS reports on stocks experiencing overfishing, as well as those that are overfished. For the most recent report, see National Marine Fisheries Service, *Status of the Stocks 2020: Annual Report to Congress on the Status of U.S. Fisheries,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration (May 2021).

stocks are experiencing overfishing or are overfished. However, the frequency with which these analyses should occur and the methods to be used in conducting them are not specified. Additionally, the Councils are responsible for addressing stocks in overfishing or overfished status through management measures laid out in fishery management plans. Some of these management measures are specified, but it is generally up to the Councils to recommend specific management changes. This includes deciding whether to implement seasonal closure dates, gear restrictions, catch reductions, or other management measures.

According to NMFS and Council officials, the flexibility provided by the framework is necessary because of the different characteristics and needs across the regions.[27] The regions vary in terms of the characteristics of their fisheries, such as the amount and type of fish harvested, as well as the mix of commercial and recreational fishing that occurs. For example, in the Southeast, fisheries provide recreational opportunities for millions of people, whereas in Alaska, high-volume commercial fisheries target crabs, salmon, and groundfish, such as pollock. Additionally, according to NMFS officials, the regions vary in the nature of their geographies and ecosystems. For example, they noted that some regions have more area with a flat ocean bottom, such that trawling and trawl surveys are more feasible (see fig. 3).[28] By contrast, other regions have more rocky ocean bottoms, or coral reef structures, making trawling and trawl surveys more challenging. Given this regional variability, NMFS officials we interviewed told us that it is important for regions to have some flexibility in the methods and processes that they use to prevent overfishing and to manage overfished stocks.

[27]We use the term region to refer generally to the NMFS regions highlighted in fig. 1, inclusive of the different Council regions that lie within the boundaries of the NMFS regions.

[28]Trawling is a fishing technique in which a net is dragged behind a vessel and retrieved when full of fish; it is used on the ocean bottom or in midwater. Trawl surveys are research and data collection surveys conducted using trawling.

Figure 3: National Marine Fisheries Service Scientists Conduct a Trawl Survey Off the Coast of New England

Source: National Oceanic and Atmospheric Administration. | GAO-23-105172

NMFS and the Councils Use Various Processes and Methods to Prevent Overfishing and to Manage Overfished Stocks

NMFS and the Councils use various processes and methods in following the general framework for preventing overfishing and managing overfished stocks. Examples of the various processes and methods that NMFS science centers and the Councils use include:

Processes for prioritizing stock assessments. NMFS officials reported that the process for prioritizing which stocks will be assessed, and when, varies across NMFS science centers and Councils. In 2015, NMFS released guidance on prioritizing stock assessments.[29] The guidance highlights a number of criteria to consider when prioritizing which stocks to assess, including the economic importance of a stock, whether the stock is experiencing overfishing or is overfished, and the availability of new types of data to support an assessment. NMFS' science centers, working with the Councils and other management partners, are encouraged to adapt the prioritization process set forth in the guidance to meet their regional management needs. Ultimately, the prioritization results under the guidance's process are advisory and nonbinding.

We found differences across the science centers in how they prioritize stock assessments. For example, according to officials from the Northeast Science Center, they consider whether a stock is included on the Fish Stock Sustainability Index list in their prioritization process. By

[29]National Marine Fisheries Service, *Prioritizing Fish Stock Assessments.*

contrast, officials from the Alaska Science Center reported that they generally do not consider if stocks are included in the index when prioritizing stock assessments.[30]

We also found that science centers differ in how often they conduct stock assessments. For example, according to officials from the Northwest Science Center, they generally conduct assessments biennially for groundfish stocks, such as Pacific cod, and annually for salmon stocks, because of the need for more frequent management advice for salmon stocks.[31] By contrast, officials from the Northeast Science Center noted that they generally develop a 5-year stock assessment schedule, with assessments conducted every 2 years, if the need arises. According to NMFS officials, the frequency with which assessments are conducted for individual stocks varies regionally, in part because of the number of species in the region and the science center's capacity to conduct assessments. The NMFS guidance notes that the timing of the prioritization process needs to be tailored to the timing of the management cycles of the fishery management plans within each region, which can be annual or multiyear.

Methods for making overfishing determinations. As previously noted, NMFS officials reported that overfished determinations are based on the results of stock assessments, but overfishing determinations can be made without a stock assessment, such as by comparing the overfishing limit to the catch level.[32] They also noted that methods used to determine the overfishing status of stocks are based on, among other variables, the characteristics of the fisheries, the availability of fisheries data, historical precedent, and available resources.

According to officials we interviewed, the science centers use different approaches to evaluate whether stocks in their region are experiencing overfishing. Officials from the Northeast Science Center reported that they primarily rely on stock assessments for overfishing evaluations. By contrast, officials from the Alaska Regional Office and Science Center

[30]The Fish Stock Sustainability Index is a quarterly index that measures the performance of U.S. federal fisheries. Stocks included in the index are primarily those that NMFS considers to be important or of high economic value.

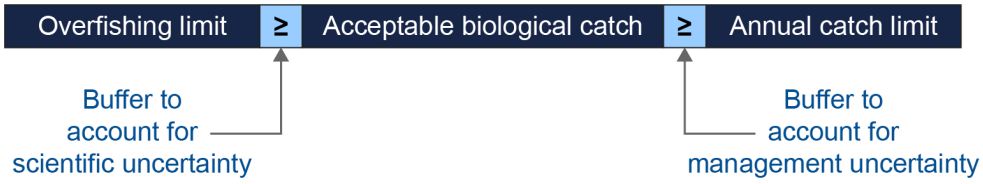
[31]Additionally, the availability of data on salmon stocks is greater because of collaboration with states and tribes in the region because most salmon are anadromous, or fish that migrate up rivers from the sea to spawn.

[32]These approaches are specified by a Council within fishery management plans for specific stocks and stock complexes.

reported that, for crab and groundfish, they rely on a comparison of the stock's overfishing limit to the catch to support overfishing determinations. Additionally, the Southeast Regional Office and Science Center reported using a mix of stock assessments and a comparison of the overfishing limit to catch to support overfishing determinations, depending on the availability of data in a given year. The variation across regions in how overfishing determinations are made demonstrates the flexibility of the framework.

Approaches to risk management. The Councils' use of risk policies and control rules to manage overfishing risks varies. Specifically, the Councils are to consider setting buffers to account for scientific and management uncertainties in setting the annual catch limit for a stock. The Councils set buffers by first setting the acceptable biological catch, which is not to exceed the overfishing level, and is to account for the scientific uncertainty in the estimate of the overfishing level, as well as the Councils' risk policy.[33] Councils then set the annual catch limit, which cannot exceed the acceptable biological catch, and is generally to account for management uncertainty (see fig. 4).

Figure 4: Framework for Setting Buffers to Account for Scientific and Management Uncertainties



Source: GAO analysis of National Marine Fisheries Service (NMFS) documents and interviews with NMFS officials. | GAO-23-105172

Notes: If a Regional Fishery Management Council recommends an annual catch limit that is equal to the acceptable biological catch and the overfishing limit, the National Oceanic and Atmospheric Administration (NOAA) guidelines provide that NOAA may presume that the proposal would not prevent overfishing, in the absence of sufficient analysis and justification for the approach.

Scientific uncertainty refers to uncertainty in the information about a stock. Sources of scientific uncertainty can include uncertainty in stock assessment results, time lags in updating assessments, uncertainty in projections, longer-term uncertainties because of potential ecosystem and environmental effects, or other factors. Management uncertainty refers to uncertainty in the ability of fisheries managers to constrain catch so that

[33]The acceptable biological catch is a level of a stock or stock complex's annual catch, which is based on an acceptable biological catch control rule that accounts for the scientific uncertainty of the estimate of the overfishing limit, any other scientific uncertainty, and the Council's risk policy.

the annual catch limit is not exceeded, and the uncertainty in quantifying the true catch amounts. Sources of management uncertainty can include late catch reporting, misreporting, underreporting of catch, or other factors.

According to NMFS officials, there is variation in the manner and extent to which the Councils use buffers to account for these uncertainties. Officials from the Southeast Science Center reported that the Gulf of Mexico Council generally sets smaller buffers than those set by the South Atlantic or Caribbean Councils. According to officials from the Atlantic States Marine Fisheries Commission, in some regions the scientific and management buffers used by the Councils are generally not very large. In their opinion, this is mostly due to pressure that the Councils receive from fishing communities about the economic impacts of reducing catch levels. Officials from NMFS' Alaska Regional Office and Science Center stated that setting a buffer between the acceptable biological catch and the annual catch limit is not a significant focus in the Alaska region because of the region's robust observer participation program, in which NMFS observers collect firsthand information on fisheries activity both on land and sea. They noted that the presence of observers who provide real-time reporting helps limit the management uncertainty that the buffer is designed to address, including misreporting or underreporting of catch.

NMFS officials noted that some Councils have developed a tiered approach for how buffers and catch levels are set, based on how much data are available for a stock, as well as the status of the stock. Generally, the tiers with less data available have larger buffers between the overfishing limit and the acceptable biological catch, to reduce the risk of overfishing, according to NMFS officials. For example, the North Pacific Council established structured tiers of risk to guide its management decisions, while the New England Council has a more flexible approach to risk management and makes management decisions around risk on an individual stock basis. According to officials from the New England Council, establishing risk tiers is a challenging process that requires data to successfully implement.

Approaches for tracking progress in rebuilding overfished stocks. There is variation in the approaches that NMFS and the Councils use to track the progress of an overfished stock under a rebuilding plan. Under the Magnuson-Stevens Act and guidelines based on National Standard 1, NMFS is to review rebuilding plans at least every 2 years to determine whether the plans have resulted in adequate progress toward ending overfishing and rebuilding affected fish stocks. While the guidelines specify criteria that may be used for evaluating the adequacy of rebuilding

progress, they do not specify how they are to be conducted. In addition to these formal reviews, NMFS officials noted that more routine and ongoing monitoring of the progress of rebuilding plans is conducted.

We found that the nature of the reviews and the monitoring of rebuilding plans differs across NMFS regions, including who leads the review process. For example, officials from the Western Pacific Council reported that they take the lead in tracking the progress of rebuilding plans in the Pacific Islands Region. By contrast, according to officials from the New England Council, the NMFS Regional Office takes the lead in monitoring the progress of rebuilding plans in its region. Similarly, officials from the South Atlantic Council reported that NMFS reviews the plans and uses stock assessments to track progress toward rebuilding.

We also found variation across regions in instances when a stock has not rebuilt in the maximum time provided for in the rebuilding plan. Under NOAA national standards guidelines, if NMFS determines that a rebuilding plan has not resulted in adequate progress, NMFS is to immediately notify the appropriate Council and recommend further conservation and management measures. Then the Council is to develop and implement a new or revised rebuilding plan within 2 years. Additionally, the guidelines provide direction for the mortality rate to be maintained in the event that a stock has not rebuilt by the maximum time set forth in the rebuilding plan.[34] However, according to NMFS officials, the guidelines do not specify in further detail what is to happen when a stock has not rebuilt in the maximum time for rebuilding a stock set forth in the rebuilding plan. NMFS officials from the Southeast Regional Office and Science Center reported uncertainty about what is to happen when a stock is not rebuilt in the maximum time allotted in the plan and, therefore, the actions taken can vary across the Councils they support—Gulf of Mexico, South Atlantic, and the Caribbean. If a stock does not reach rebuilt status by the end of the maximum time frame, the existing rebuilding plan is updated in some cases; in other cases, a new rebuilding plan is initiated.

[34]Specifically, the guidelines implementing National Standard 1 note that if a stock or stock complex has not rebuilt by the maximum time for rebuilding the stock or stock complex, then the fishing mortality rate should be maintained at its current fishing mortality associated with rebuilding the stock or stock complex in the target time, or 75 percent of the maximum fishing mortality threshold, whichever is less, until the stock or stock complex is rebuilt, or the fishing mortality rate is changed as a result of NMFS finding that adequate progress is not being made.

The Number of Stock Assessments Conducted by Science Centers Varied, and the Availability of Data and Resources Contributed to This Variability

NMFS science centers conducted an average of 173 stock assessments per year for 2011 through 2020. The number of stock assessments conducted during that period, as well as the average number of stocks that were not assessed, varied by each science center. NMFS officials we interviewed stated that the availability and quality of fisheries data, including the lack of data from field research and poor recreational fishing data, are key sources of variability in the number and frequency of stock assessments conducted across science centers.

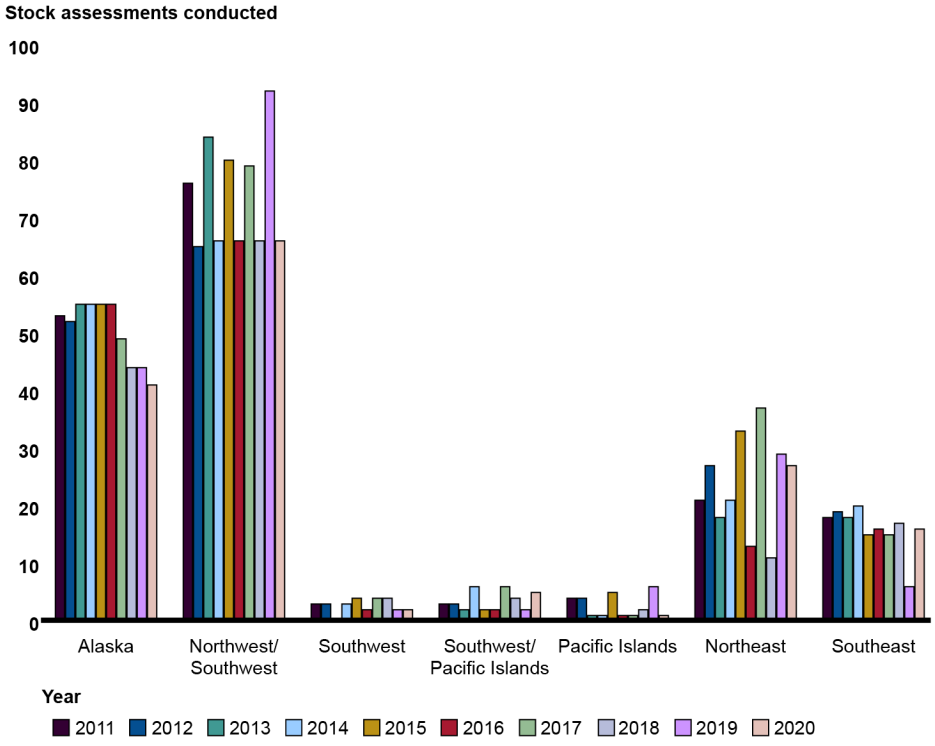
For 2011 through 2020, NMFS Conducted about 170 Stock Assessments Annually

According to our analysis of data from the Species Information System database, for 2011 through 2020, NMFS science centers collectively conducted an average of 173 stock assessments per calendar year.[35] Collectively, the total annual number of assessments conducted ranged from a low of 148 assessments in 2018 to a high of 194 assessments in 2015. The number of stock assessments conducted by each science center during this period varied. For example, the number of assessments conducted annually by the Southeast Science Center ranged from 6 to 20, with an average of 16 stock assessments per year. By contrast, the number of annual assessments conducted by the Northwest/Southwest Science Centers ranged from 65 to 92, with an average of 74 stock assessments per year.[36] Figure 5 shows the number of stock assessments conducted each year, by science center, for 2011 through 2020.

[35]NMFS conducts stock assessments on some fish stocks that do not receive status determinations. For this report, GAO's analysis of stock assessments was limited to fish stocks that do receive status determinations.

[36]These stocks are jointly supported by the Northwest and Southwest fisheries science centers, which are both under NMFS' West Coast Region.

Figure 5: Number of Stock Assessments Conducted by National Marine Fisheries Service (NMFS) Fisheries Science Centers per Year, for 2011 through 2020



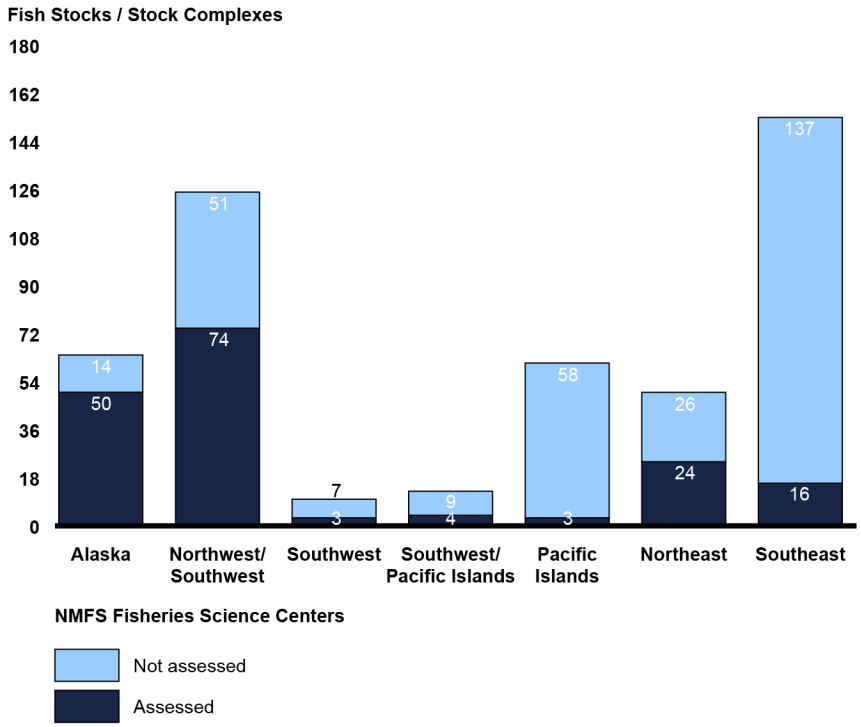
Source: GAO analysis of NMFS Species Information System data. | GAO-23-105172

Note: NMFS lists multiple fisheries science centers when they are jointly responsible for assessing an individual fish stock. NMFS conducts stock assessments on some stocks that do not receive status determinations. However, GAO's analysis of stock assessments is limited to fish stocks that do receive status determinations.

The average number of stocks that were not assessed for 2011 through 2020 also varied by science center. For example, of the 153 stocks, on average, that the Southeast Science Center was responsible for during that period, it did not assess an average of 137, or approximately 90 percent of stocks each year.[37] By contrast, of the 64 stocks, on average, that the Alaska Science Center supported each year, it did not assess 14, or approximately 22 percent of them. Figure 6 shows the average annual number of fish stocks assessed by NMFS compared to those not assessed for 2011 through 2020.

[37]NMFS and the eight Councils are responsible for managing approximately 460 fish stocks. The total number of stocks they are responsible for may change each year, so the total numbers of fish stocks in this paragraph are an average of the numbers of stocks managed by the NMFS Fisheries Science Centers per year for 2011 through 2020.

Figure 6: Average Annual Number of Fish Stocks Assessed and Not Assessed by National Marine Fisheries Service (NMFS) Fisheries Science Centers, for 2011 through 2020



Source: GAO analysis of NMFS Species Information System data. | GAO-23-105172

Notes: A stock of fish, or fish stock, means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. In this figure, the term fish stock is used to mean one fish species or a fish stock complex, which is a group of stocks similar enough to be managed as a single unit. NMFS lists multiple fisheries science centers when they are jointly responsible for assessing an individual fish stock. NMFS conducts some stock assessments on stocks that do not receive status determinations. However, GAO's analysis of stock assessments was limited to fish stocks that do receive status determinations.

The total number of stocks that NMFS science centers are responsible for changes each year, so the total numbers of fish stocks in this figure are an average of the numbers of stocks managed per year for 2011 through 2020. The averages in this figure do not total the amount noted in the body of the report, because of rounding.

Availability of Data and Resources Contributed to Variability in the Number of Stock Assessments Conducted

According to NMFS officials, the availability and quality of fisheries data is a key source of variability in the number of stock assessments conducted across regions. For example, the Southeast Science Center, where recreational fishing is high, has limited recreational fishing data because of the challenges inherent in collecting voluntarily reported catch data. Further, some regions reported not having enough data from field

research to conduct more stock assessments. For example, because the Pacific Islands Science Center oversees such a large geographical area, the science center faces challenges in conducting certain fish survey methods, such as trawl surveys. By contrast, one of the reasons the Alaska Science Center is able to assess most of its stocks annually is because it has reliable fisheries data from trawl surveys.

Additionally, according to NMFS officials, challenges with the availability of resources and staff, as well as the number and characteristics of fish stocks and the complexity of management for those fish stocks that a science center is responsible for assessing, are key sources of variability in the number of stock assessments conducted across regions. Stock assessments are complicated and time-consuming endeavors, and NMFS officials stated that the science centers are generally understaffed, considering the number of stock assessments they need to conduct. See appendix II for tables of fish stock numbers, full-time equivalent staff, and funding for each NMFS Fisheries Science Center for 2012 through 2020.

The Number of Overfishing and Overfished Stocks Varied by Science Center, and Data Limitations and Changing Environmental Conditions Complicate Management

An average of 28 stocks per year were determined to have experienced overfishing for 2011 through 2020, and an average of 41 stocks per year were determined to be overfished.[38] During the same period, an average of about 131 stocks per year had an unknown overfishing status, and about 203 stocks per year had an unknown overfished status.[39] These

[38]NMFS and the eight Councils are responsible for managing approximately 460 fish stocks. The total number of stocks they are responsible for may change each year.

[39]We do not include the number of stocks that were not experiencing overfishing, as those stocks are not mutually exclusive of those that could be overfished. Likewise, we do not include a count of the number of stocks that were not overfished, as those stocks are not mutually exclusive of those that could be experiencing overfishing.

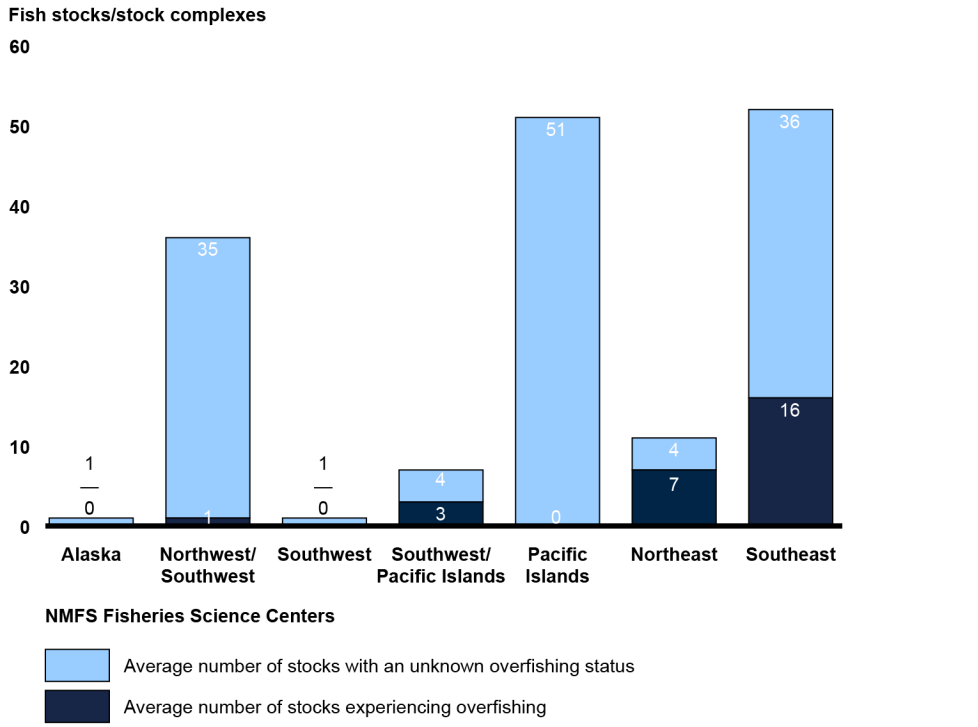
numbers varied by science center.[40] NMFS' ability to make status determinations is complicated by challenges related to the availability and quality of fisheries data, as well as changing environmental conditions. Additionally, the manner in which data are recorded and organized in the Species Information System database hinders NMFS' ability to track and report on trends in stock status and stock assessments over time.

For 2011 through 2020, an Average of 28 Fish Stocks Experienced Overfishing, and 41 Were Overfished per Year; a Larger Number Had Unknown Status

According to our analysis of data from the Species Information System database, an average of 28 stocks per year were determined to have experienced overfishing for 2011 through 2020, and the overfishing status of about 131 stocks per year was unknown. NMFS officials told us that a fish stock's status is determined to be unknown when there are not enough data available to make an overfishing or overfished status determination. The number of stocks experiencing overfishing, or with an unknown overfishing status, varied by science center. For 2011 through 2020, the Southeast and Northeast Science Centers had the highest average annual number of stocks determined to be experiencing overfishing. Meanwhile, the Alaska and Pacific Islands Science Centers had very few stocks determined to be experiencing overfishing during the period, as shown in figure 7. The number of stocks with an unknown overfishing status also varied by science center, with the Northwest/Southwest, Pacific Islands, and Southeast Science Centers all having an average of more than 30 stocks with an unknown overfishing status each year, as shown in figure 7.

[40]We are reporting overfishing and overfished numbers by NMFS science center, but it is the Assistant Administrator for NMFS who makes the formal overfishing and overfished status determinations based on the evaluations conducted by the science centers.

Figure 7: Average Annual Number of Fish Stocks Experiencing Overfishing, and Average Number with an Unknown Overfishing Status, by National Marine Fisheries Service (NMFS) Fisheries Science Centers, for 2011 through 2020



Source: GAO analysis of NMFS Species Information System data. | GAO-23-105172

Notes: A stock of fish, or fish stock, means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. In this figure, the term fish stock is used to mean one fish species or a fish stock complex, which is a group of stocks similar enough to be managed as a single unit.

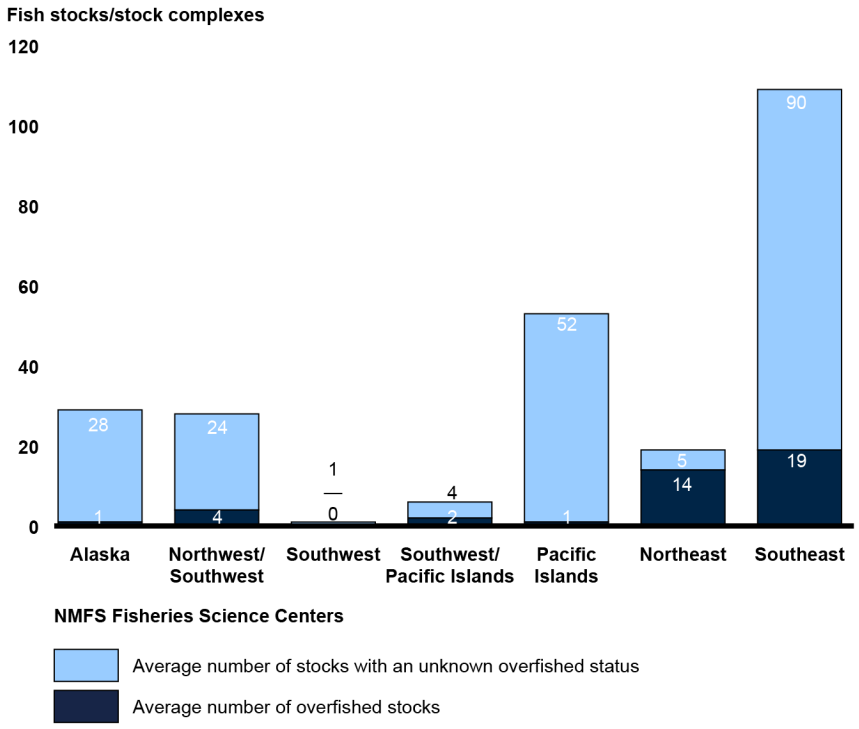
NMFS lists multiple fisheries science centers when they are jointly responsible for assessing an individual fish stock. The total number of stocks that NMFS science centers are responsible for changes each year, so the total numbers of fish stocks in this figure are an average of the numbers of stocks managed per year for 2011 through 2020. The averages in this figure do not total the amount noted in the body of the report, because of rounding.

We do not include the number of stocks that were not experiencing overfishing, as those stocks are not mutually exclusive of those that could be overfished.

According to our analysis, an average of 41 stocks per year were determined to be overfished for 2011 through 2020, and the overfished status of about 203 stocks per year was unknown, on average. The number of overfished stocks varied by science center. Similar to overfishing determinations, on average, the Southeast and Northeast Science Centers had the highest number annually of stocks determined to be overfished, with an average of 19 per year in the Southeast and 14 per year in the Northeast, as shown in figure 8. By contrast, the rest of the science centers had four or less stocks determined to be overfished each

year, on average. The number of stocks with an unknown overfished status also varied by science center, with the Southeast and Pacific Islands Science Centers having the highest average number of stocks with an unknown overfished status each year, and the Northeast, Southwest, and Southwest/Pacific Islands Science Centers having the smallest number with an unknown status.

Figure 8: Average Annual Number of Overfished Stocks, and Average Number with an Unknown Overfished Status, by National Marine Fisheries Service (NMFS) Fisheries Science Centers, for 2011 through 2020



Source: GAO analysis of NMFS Species Information System data. | GAO-23-105172

Notes: A stock of fish, or fish stock, means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. In this figure, the term fish stock is used to mean one fish species or a fish stock complex, which is a group of stocks similar enough to be managed as a single unit. NMFS lists multiple fisheries science centers when they are jointly responsible for assessing an individual fish stock. We do not include the number of stocks that were not overfished, as those stocks are not mutually exclusive of those that could be experiencing overfishing.

Our data analysis found that the Councils implemented at least one rebuilding plan for each of 57 individual stocks for 2001 through 2020. Of these 57 fish stocks, NMFS declared 23 stocks rebuilt for 2001 through

2020.[41] The extent to which rebuilding plans were initiated and stocks were rebuilt varied by region, with more plans initiated in the Northeast and Southeast, at 26 and 22, respectively, and more stocks rebuilt in the Northeast and Northwest/Southwest, at 13 and 6, respectively. For 2001 through 2020, almost all of the fish stocks (21 of 23) for which a rebuilding plan was initiated and were declared rebuilt were on the Fish Stock Sustainability Index list at the time they were rebuilt. See appendix III for the status of rebuilding plans initiated for 2001 through 2020.

Limited Data and Changing Environmental Conditions Complicated Stock Status Determinations and the Management of Overfishing and Overfished Stocks

NMFS' ability to make stock status determinations and the Councils' ability to monitor progress toward rebuilding overfished stocks is complicated by the availability and quality of fisheries data, according to NMFS officials. When NMFS lacks sufficient data to make status determinations regarding whether a stock is experiencing overfishing or is overfished, the agency lists the status of such stocks as unknown. In other cases, when a status determination has been based on a previous stock assessment, but a new stock assessment has not been conducted, the status determination from the prior year is carried forward until a new stock assessment is available. Further, when there are limitations on the data from the stock assessments, the Councils' ability to make management decisions based on these determinations, or lack thereof, is also limited.

NMFS' ability to make stock status determinations is also complicated by changing environmental conditions, according to NMFS officials.[42] For example, changes such as warming ocean temperatures can result in changes to fish habitat, fish distribution, and fish productivity in certain regions. These changes can, in turn, alter the baseline ocean environment such that the reference levels for determining whether a stock is experiencing overfishing or is in overfished status are less reliable and predictive. This is because reference levels are based on the assumption that past conditions can be used to predict current and future conditions. When these assumptions about environmental conditions have changed, NMFS faces greater challenges in being able to estimate stock status reference levels and, ultimately, a greater likelihood of having

[41]NMFS declared a total of 47 stocks rebuilt for 2001 through 2020. This total includes stocks that had rebuilding plans in place before 2001, as well as stocks rebuilt without a formal rebuilding plan. For the purposes of our analysis, we excluded such stocks; therefore, of the stocks within our scope, NMFS declared 23 rebuilt for 2001 through 2020.

[42]See GAO, *Federal Fisheries Management: Opportunities Exist to Enhance Climate Resilience*, GAO-22-105132 (Washington, D.C.: Aug. 18, 2022) for more about how fisheries management is affected by climate change.

to report the stock status as unknown.

Changing environmental conditions can also complicate efforts to rebuild overfished stocks. For example, NMFS officials said that it is difficult to rebuild cod stocks in the Northeast that are overfished because warming ocean temperatures are likely affecting the productivity of cod in a negative way. There is an assumption that if fishing is curtailed in an area with a stock subject to a rebuilding plan, the stock will recover. However, this is not always the case because of changing environmental factors. For example, fishing for Georges Bank yellowtail flounder in New England has been greatly reduced for years, but the stock is still considered overfished.

Aspects of NMFS' Database Limit Its Effectiveness, and Plans to Improve It Do Not Include Some Key Elements of Project Management

NMFS' ability to track and report on trends in stock status and stock assessments over time is hindered because of the manner in which stock assessment and status determination data are recorded and organized in the Species Information System database. For example, to analyze the number of times that certain stocks had an overfishing or overfished status determination over time, NMFS staff must manually edit and reorganize reports retrieved from the database. This includes, for example, manually editing the names of stocks for which different names were used in various years.[43] Without this manual manipulation, we found that our analysis of stock assessments over time for a given stock would inadvertently overcount the number of certain stocks. The process of needing to edit and reorganize reports retrieved from the Species Information System database before tracking and reporting multiyear trends creates an additional burden for staff and increases the potential for reporting inaccuracies.

NMFS does not have written documentation of these limitations with the database, or general guidelines for how to manually edit and reorganize reports retrieved from the database. Instead, there are a select few NMFS officials with institutional knowledge who conduct the manual edits and reorganization. Federal internal control standards state that effective documentation provides a means to retain organizational knowledge and mitigate the risk of having that knowledge limited to a few personnel, as well as a means to communicate that knowledge, as needed, to external

[43]For example, the Nassau grouper stock in the Southeast is tracked using four different names in the Species Information System database: "Nassau grouper – Gulf of Mexico," "Nassau grouper – Southern Atlantic Coast," "Nassau grouper – Southern Atlantic Coast / Gulf of Mexico," and "Nassau grouper – Southern Atlantic Coast / Gulf of Mexico | Status."

parties.[44] As we discuss below, NMFS is working on two projects to improve the functionality of the database, but it is unclear when these projects will be completed and if they will address all of the database issues. In the meantime, by developing written documentation of the structural limitations of the database, as well as general guidelines on how to conduct the manual editing and reorganization needed for multiyear trend analysis and reporting, institutional knowledge could be retained and passed along to incoming staff and could reduce the likelihood of reporting inconsistencies.

Agency officials we interviewed told us that NMFS is currently working on two projects to make changes to the database to improve the agency's ability to track and report multiyear trends in stock assessment and stock status information. The projects will add features to the database such that linkages between stocks whose names have changed are accessible via multiyear trend reports for stock assessment and stock status data. According to NMFS officials, completing these projects will remove the current need for the manual manipulation required to complete and report on certain multiyear trend analyses. NMFS officials told us that completing these projects will improve the ability to conduct multiyear analyses for specific stocks with the Species Information System database. Officials noted that multiyear analyses can be useful for tracking changes in stock status, as well as the frequency with which individual stocks have been assessed, over time. Regarding multiyear analyses, one official noted, "It is helpful for us in figuring out where we need to go if we can see where we have been." According to NMFS officials, both projects are ongoing, as resources allow, and are anticipated to be completed in 2023.

In carrying out these projects, we found that NMFS is following some key elements of project management leading practices but is not following other key elements. Specifically, NMFS has defined the scope of the projects and has designated a project manager to lead the projects. However, NMFS officials were unable to provide written documentation of the projects' goals, timelines, and status. NMFS officials stated that the absence of this documentation was on account of a number of factors, including organizational culture, resource constraints, and project complexity. The Project Management Institute's *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 6th* edition,

[44]Principle 3 – Establish Structure, Responsibility, and Authority; GAO, *Standards for Internal Control in the Federal Government,* GAO-14-704G (Washington, D.C.: September 2014).

recommends establishing a project execution plan with policies and procedures to manage and control project planning.[45] According to the Project Management Institute, the key benefit of this process is the production of a comprehensive document that defines the basis of all project work and how the work will be performed. By developing a written plan for executing the Species Information System database improvement projects, including the project goals, the procedures to be followed, the timeline for completion, and a schedule for providing status updates, the agency could help ensure the projects' completion and success. In turn, this could help NMFS conduct additional analyses to support management measures to prevent overfishing and manage overfished stocks.

Conclusions

NMFS is the lead federal agency responsible for managing commercial and recreational fisheries that are critical to our nation's economy. In this role, the NMFS science centers conduct stock assessments to help determine whether stocks are in overfishing or overfished status. Stock assessments are complicated and time-consuming endeavors, and we found that the availability and quality of fisheries data is a key source of variability in the number of stock assessments conducted across regions. Challenges related to the availability and quality of data on certain fisheries also affect NMFS' ability to make stock status determinations and the Councils' ability to monitor progress toward rebuilding overfished stocks. For example, we found that a large number of stocks have an unknown stock status.

NMFS officials reported that multiyear analyses can be useful for tracking changes in stock status, as well as the frequency with which individual stocks have been assessed over time. NMFS' ability to track and report on these trends is hindered because of structural issues in the Species Information System database. These database limitations require NMFS officials with institutional knowledge to manually edit and reorganize reports retrieved from the database to complete certain multiyear analyses. Moreover, NMFS does not have written documentation on these limitations, or general guidelines on how to complete the manual editing and reorganization needed for multiyear trend analyses and reports. By documenting these limitations and developing general guidelines for how to complete these analyses and reports, NMFS could

[45]Project Management Institute Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 6th ed. (2017). *PMBOK* is a trademark of the Project Management Institute, Inc. The *PMBOK® Guide* presents a broad description of project management-related knowledge and practices, which can be tailored to fit the needs of different projects.

help ensure the transfer of relevant institutional knowledge to new employees.

NMFS is working on two database projects to improve the agency's ability to track and report multiyear trends for stock assessment and status information, but current project plans do not include some key elements of project management, including written goals and timelines. Developing a written plan for executing the Species Information System database improvement projects could help enhance NMFS' ability to carry out these projects more effectively.

Recommendations for Executive Action

We are making the following two recommendations to NMFS:

The Assistant Administrator for NMFS should develop written documentation of the structural limitations of the Species Information System database, as well as general guidelines on how to conduct the manual editing needed for multiyear trend analysis and reporting purposes. (Recommendation 1)

The Assistant Administrator for NMFS should develop a written plan for executing the Species Information System database improvement projects, including the project goals, the procedures to be followed, a timeline for completion, and a schedule for providing status updates. (Recommendation 2)

Agency Comments

We provided a draft of this report to the Department of Commerce for review and comment. In written comments (reproduced in app. IV), the Department of Commerce and NOAA agreed with our recommendations. NOAA commended GAO for its thorough review of a complicated subject, and stated that it concurs with our report's findings. In particular, NOAA noted that GAO highlighted the necessary role of flexibility in fisheries management.

NOAA agreed with GAO's assessment of the Species Information System database. Specifically, NOAA agreed with our recommendation that NMFS develop written documentation of the structural limitations of the database, as well as general guidelines on how to conduct the manual editing needed for multiyear trend analysis and reporting purposes. NOAA said that this documentation will help to reduce reliance on institutional knowledge to conduct these analyses.

In addition, NOAA agreed with our recommendation that NMFS develop a written plan for executing the improvement projects for the Species Information System database, including goals and timelines. NOAA said that more comprehensive project planning documentation would help to

ensure completion of the projects in a timely manner. NOAA also provided technical comments, which we incorporated as appropriate.

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 https://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or JohnsonCD1@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix V.

Sincerely yours,

Cardell D. Johnson
Acting Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

This report examines (1) the processes the National Marine Fisheries Service (NMFS) and the Regional Fishery Management Councils (Council) use to prevent overfishing and manage overfished stocks; (2) the number of stock assessments conducted by the NMFS science centers for 2011 through 2020; and (3) the number and status of overfishing and overfished stocks for 2011 through 2020, as well as the number of rebuilding plans for overfished stocks for 2001 through 2020.

To examine the processes that NMFS and the Councils use to prevent overfishing and manage overfished stocks, we reviewed relevant laws, including the Magnuson-Stevens Act, and the national standards it sets forth for fishery conservation and management.[1] We also reviewed relevant regulations, including the guidelines, based on the national standards, established by the National Oceanic and Atmospheric Administration (NOAA) to assist with fisheries management.[2] While all of the national standards are important for fisheries conservation and management and are required to be followed when preparing fisheries management plans, we focused on National Standards 1 and 2, and the guidelines based on them, which relate to preventing overfishing, optimum yield and scientific information.

We also reviewed various agency documents related to the steps that NMFS and the Councils take to prevent and manage overfishing and overfished stocks, including NMFS guidelines, procedures, and technical memorandums. This included reviewing NMFS' *Procedures to Determine Stock Status and Rebuilding Progress and Procedural Guidance for Changing Assessed Stock Status from Known to Unknown.*[3]

[1]See 16 U.S.C. §§ 1801 et seq. (Magnuson-Stevens Act). The national standards are set forth in § 1851(a).

[2]50 C.F.R. pt. 600, subpt. D (guidelines based on the national standards). The act called for NOAA to establish advisory guidelines, which are not to have the force and effect of law, based on the national standards, to assist in the development of fishery management plans. 16 U.S.C. § 1851(b).

[3]National Marine Fisheries Service, *Procedures to Determine Stock Status and Rebuilding Progress,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Procedure 01-101-09 (August 2017); *Procedural Guidance for Changing Assessed Stock Status from Known to Unknown,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Procedure 01-101-11 (November 2020); and *Technical Guidance on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act,* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-F/SPO-31 (July 1998).

We also interviewed officials from NMFS' headquarters and all five NMFS regions (including officials from the five regional offices and six corresponding fisheries science centers (science centers)), about steps taken to prevent overfishing and to manage overfished stocks. Similarly, we interviewed officials from the eight Councils responsible for fisheries management in their respective regions (New England, Mid-Atlantic, South Atlantic, Gulf of Mexico, Caribbean, North Pacific, Pacific, and West Pacific), as well as the Atlantic States Marine Fisheries Commission. Additionally, we interviewed stakeholders from eight organizations—including representatives from academia, environmental organizations, and commercial and recreational fishing groups—about NMFS' and the Councils' efforts to prevent and to manage overfishing and overfished stocks. On the basis of a review of relevant documents and discussions with NMFS, we selected stakeholders that were familiar with different regions of the U.S. and different aspects of the fisheries management process and that could provide a range of views. Stakeholders we interviewed were affiliated with the following organizations: American Saltwater Guides Association, American Sportfishing Association, Cape Cod Commercial Fishermen's Alliance, Environmental Defense Fund, Ocean Conservancy, Responsible Offshore Development Alliance, University of Washington, and University of Wisconsin. Views from selected stakeholders cannot be generalized to those we did not select and interview.

To examine the number of stock assessments conducted by the science centers for 2011 through 2020, we analyzed data from NMFS' Species Information System database. To determine the reliability of these data, we conducted electronic testing, interviewed agency officials familiar with the data, and reviewed documentation about NMFS' Species Information System database. In the course of reviewing the data, we identified some inconsistencies in the data, including the use of different names for the same stocks over various years. After further review and discussion with NMFS, we concluded that the inconsistencies precluded us from conducting certain multiyear analyses of stock assessments. For annual analyses, however, we determined that the data were sufficiently reliable for our purposes.

Using this information, we chose to conduct analyses of the number of stock assessments conducted by science center, per year, for 2011 through 2020, as well as the average annual number of fish stocks assessed and not assessed, by science center, for 2011 through 2020. We also reviewed our prior work on stock assessments, including GAO's

2014 report on prioritization of, and funding for, stock assessments.[4] To provide additional context related to the number of stock assessments conducted for 2011 through 2020, we collected information on stock assessments during our interviews with the NMFS offices, Councils, and stakeholders described above.

To examine the number of stocks experiencing overfishing or in overfished status for 2011 through 2020, as well as the number of rebuilding plans for overfished stocks that were initiated during calendar years 2001 through 2020, we analyzed data from NMFS' Species Information System database.[5] To determine the reliability of these data, we conducted electronic testing, interviewed agency officials familiar with the data, and reviewed documentation about NMFS' Species Information System database. In the course of reviewing the data, we identified some inconsistencies, including the use of different names for the same stocks over various years. After further review and discussion with NMFS, we concluded that the inconsistencies precluded us from conducting certain multiyear analyses of overfishing and overfished determinations. For annual analyses, however, we determined that the data were sufficiently reliable for our purposes.

Using this information, we chose to conduct analyses of the average number of stocks with an overfishing determination or an unknown overfishing determination for 2011 through 2020, by science center, as well as the average number of stocks with an overfished determination or an unknown overfished determination for 2011 through 2020, by science center.

To provide additional context related to overfishing and overfished determinations for 2011 through 2020, as well as rebuilding plans initiated during 2001 through 2020, we collected information on agency officials' and stakeholders' views during our interviews with the NMFS offices, Councils, and stakeholders described above. During these interviews, NMFS, the Councils, and stakeholders provided information on the challenges associated with evaluating stock status in order to make overfishing and overfished determinations, as well as rebuilding plans.

To assess the extent to which NMFS has followed selected leading practices in managing the Species Information System database

[4] See GAO, *Fish Stock Assessments: Prioritization and Funding*, GAO-14-794R (Washington, D.C.: Sept. 19, 2014).

[5]We chose to review data on rebuilding plans for a more extended time frame in order to better account for the fact that rebuilding plans can last 10 years or more.

improvement projects, we reviewed agency documentation related to the projects and interviewed relevant NMFS officials for additional information. We then assessed NMFS' management of the database improvement projects against key project management standards presented in the Project Management Institute's *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 6th* edition.[6] We focused our review on leading practices related to areas of project management that we determined were most relevant for the purposes of our review.

In addition, for this objective, we determined that the control environment component of federal standards for internal control was significant to this objective, along with the underlying principles that management should establish structure, responsibility, and authority through effective documentation to achieve the agency's objectives. During our review, we assessed the extent to which NMFS implemented this principle as part of its fisheries management activities.

We conducted this performance audit from April 2021 to October 2022, 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.

[6]Project Management Institute, Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide),* 6th ed. (2017). *PMBOK* is a trademark of the Project Management Institute, Inc. The *PMBOK® Guide* presents a broad description of project management-related knowledge and practices, which can be tailored to fit the needs of different projects.

Appendix II: Funding, Staffing, and Fish Stock Responsibilities, by National Marine Fisheries Science Center

This appendix contains several tables that show levels of funding, staffing, and number of fish stocks supported by each of the National Marine Fisheries Service's (NMFS) Fisheries Science Centers (science center). The following tables and information are included in this appendix:

- **Table 1:** Funding levels for data collections, surveys, and assessments for each of the NMFS Fisheries Science Centers for fiscal years 2012 through 2020.
- **Table 2:** Staffing levels for data collections, surveys, and assessments at each of the NMFS Fisheries Science Centers for fiscal years 2012 through 2020
- **Table 3:** Number of fish stocks or stock complexes supported by each of the NMFS Fisheries Science Centers for calendar years 2012 through 2020

Stock assessments are scientific efforts that involve data collection, data processing, and mathematical modeling in order to estimate the health and size of a fish stock; measure how fishing affects the stock; and project harvest levels that achieve the largest, sustainable long-term yield. See table 1 below for a breakdown of funding for data collections, surveys, and assessments by science center, for fiscal years 2012 through 2020.

Table 1: Funding for Data Collections, Surveys, and Assessments, by National Marine Fisheries Service (NMFS) Fisheries Science Center, for Fiscal Years 2012 through 2020 (Dollars in thousands)

Fisheries Science Center	2012	2013	2014	2015	2016	2017	2018	2019	2020
Alaska	19,108	16,523	19,985	20,687	20,450	20,779	21,421	22,484	23,242
Northwest / Southwest	27,160	24,751	27,122	26,596	28,046	26,656	26,380	27,416	29,277
Pacific Islands	7,685	8,069	9,292	9,280	9,018	8,226	8,477	8,900	9,302
Northeast	10,877	13,154	15,968	14,915	13,824	13,160	13,570	13,292	16,578
Southeast	32,900	29,723	31,269	31,063	30,868	30,152	36,353	33,145	32,632

Source: GAO presentation of NMFS Office of Management and Budget information. | GAO-23-105172

Note: For simplicity, the funding numbers for the Northwest and Southwest Fisheries Science Centers are combined, as the majority of their stocks are jointly managed.

NMFS science centers employ a range of staff to gather fisheries data and conduct scientific analyses used to inform fisheries management decisions, among other things. See table 2 below for a breakdown of full-time equivalent staff for data collections, surveys, and assessments, by science center, for fiscal years 2012 through 2020.

Table 2: Full-Time Equivalent Staff for Data Collections, Surveys, and Assessments, by National Marine Fisheries Service (NMFS) Fisheries Science Center, for Fiscal Years 2012 through 2020

Fisheries Science Center	2012	2013	2014	2015	2016	2017	2018	2019	2020
Alaska	94	82	85	83	83	89	93	103	107
Northwest / Southwest	83	82	71	69	69	72	69	63	67
Pacific Islands	14	19	19	15	18	22	24	24	23
Northeast	36	55	48	49	45	51	53	46	44
Southeast	117	115	120	114	114	113	109	104	104

Source: GAO presentation of NMFS and Office of Management and Budget information. | GAO-23-105172

Note: For simplicity, the full-time equivalent staff numbers for the Northwest and Southwest Fisheries Science Centers are combined, as the majority of their stocks are jointly managed.

The number of fish stocks or stock complexes that science centers are responsible for supporting through data collection and stock assessments varies across each of the NMFS science centers. See table 3 below for a breakdown of the number of stocks supported by science center, for calendar years 2012 through 2020.

Table 3: Number of Fish Stocks Supported by National Marine Fisheries Service (NMFS) Fisheries Science Center, for Calendar Years 2012 through 2020

Fisheries Science Center	2012	2013	2014	2015	2016	2017	2018	2019	2020
Alaska	64	65	65	65	65	65	63	63	61
Northwest / Southwest	127	132	129	129	129	129	135	137	136
Southwest / Pacific Islands	10	12	12	13	14	14	14	14	14
Pacific Islands	64	66	66	66	66	66	66	40	40
Northeast	50	50	50	50	50	50	50	50	51
Southeast	131	153	147	150	150	150	151	157	158

Source: GAO analysis of NMFS' Species Information System database. | GAO-23-105172

Note: A stock of fish, or fish stock, means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. In this table, the term fish stock is used to mean one fish species or a fish stock complex, which is a group of stock similar enough to be managed as a single unit. NMFS lists multiple fisheries science centers when they are jointly responsible for assessing an individual fish stock.

Appendix III: Status of Rebuilding Plans Initiated for 2001 through 2020

This appendix contains a list of rebuilding plans initiated by the National Marine Fisheries Service (NMFS) for calendar years 2001 through 2020. Table 4 shows the status of each rebuilding plan as of November 2021.

Table 4: Status of Rebuilding Plans Initiated by National Marine Fisheries Service (NMFS) Fisheries Science Centers for Calendar Years 2001 through 2020, as of November 2021

Fish stock or stock complex	Regional Fishery Management Council	Rebuilding plan start year[a]	Year stock declared rebuilt[b]	Target rebuilding year[c]
Alaska Fisheries Science Center				
Blue King Crab – Pribilof Islands	North Pacific	2015*	-	Unknown
Northeast Fisheries Science Center				
Acadian Redfish – Gulf of Maine / Georges Bank	New England	2004	2012	-
American Plaice – Gulf of Maine / Georges Bank	New England	2004	2019	-
Atlantic Cod – Georges Bank	New England	2004	-	2027
Atlantic Cod – Gulf of Maine	New England	2014*	-	2024
Atlantic Halibut	New England	2004	-	2055
Atlantic Mackerel	Mid-Atlantic	2019	-	2024
Atlantic Wolffish – Gulf of Maine / Georges Bank	New England	2010	-	Unknown
Barndoor Skate – Georges Bank / Southern New England	New England	2003	2016	-
Butterfish – Gulf of Maine / Cape Hatteras	Mid-Atlantic	2010	2014	-
Bluefish – Atlantic Coast	Mid-Atlantic	2001	2008	-
Haddock – Georges Bank	New England	2004	2010	-
Haddock – Gulf of Maine	New England	2004	2011	-
Ocean Pout – Northwestern Atlantic Coast	New England	2019*	-	2029
Pollock – Gulf of Maine / Georges Bank	New England	2004	2010	-
Scup – Atlantic Coast	Mid-Atlantic	2008	2009	-
Smooth Skate – Georges Bank / Southern New England	New England	2010	2018	-
Thorny Skate – Gulf of Maine	New England	2003	-	2028
Tilefish – Mid-Atlantic Coast	Mid-Atlantic	2001	2014	-
White Hake – Gulf of Maine / Georges Bank	New England	2004	-	2031
Windowpane – Gulf of Maine / Georges Bank	New England	2019*	-	2029
Windowpane – Southern New England / Mid-Atlantic	New England	2004	2012	-
Winter Flounder – Southern New England / Middle Atlantic	New England	2013*	-	2023

Witch Flounder – Northwestern Atlantic Coast	New England	2019*	-	2042
Yellowtail Flounder – Cape Cod / Gulf of Maine	New England	2004	-	2023
Yellowtail Flounder – Georges Bank	New England	2006	-	2032
Yellowtail Flounder – Southern New England /Mid- Atlantic	New England	2004*	2012*	-
Northwest / Southwest Fisheries Science Center				
Canary Rockfish – Pacific Coast	Pacific	2001	2015	-
Chinook Salmon – California Central Valley: Sacramento River Fall	Pacific	2019*	2021*	-
Coho Salmon – Puget Sound: Snohomish	Pacific	2018	-	2020
Cowcod – Southern California	Pacific	2001	2019	-
Darkblotched Rockfish – Pacific Coast	Pacific	2002	2017	-
Petrale Sole – Pacific Coast	Pacific	2012	2015	-
Widow Rockfish – Pacific Coast	Pacific	2001	2011	-
Yelloweye Rockfish – Pacific Coast	Pacific	2004	-	2074
Southeast Fisheries Science Center				
Albacore – North Atlantic	Highly Migratory Species (HMS)	2006	2016	-
Black Sea Bass – Southern Atlantic Coast	South Atlantic	2006	2013	-
Blacknose Shark – Atlantic	HMS	2013	-	2043
Blue Marlin – North Atlantic	HMS	2001	-	2028
Caribbean Goliath Grouper	Caribbean	2005	-	2035
Caribbean Nassau Grouper	Caribbean	2005	-	2030
Dusky Shark – Atlantic / Gulf of Mexico	HMS	2008	-	2108
Gag – Gulf of Mexico	Gulf of Mexico	2012	2014	-
Gray Triggerfish – Gulf of Mexico	Gulf of Mexico	2018*	-	2027
Greater Amberjack – Gulf of Mexico	Gulf of Mexico	2018*	-	2027
Hogfish – Southeast Florida	South Atlantic	2017	-	2027
Porbeagle – Atlantic	HMS	2008	-	2108
Queen Conch – Caribbean	Caribbean	2005	-	2020
Red Grouper – Gulf of Mexico	Gulf of Mexico	2004	2007	-
Red Grouper – Southern Atlantic Coast	South Atlantic	2012	-	2022
Red Snapper – Gulf of Mexico	Gulf of Mexico	2005	-	2032
Red Snapper – Southern Atlantic Coast	South Atlantic	2010	-	2045
Sandbar Shark – Atlantic / Gulf of Mexico	HMS	2005	-	2070
Scalloped Hammerhead – Atlantic	HMS	2013	-	2023
Shortfin Mako – North Atlantic	HMS	2019	-	Unknown
Snowy Grouper – Southern Atlantic Coast	South Atlantic	2006	-	2039

White Marlin – North Atlantic	HMS	2001	-	Unknown

Source: GAO analysis of NMFS Species Information System data. | GAO-23-105172

Note: A stock of fish, or fish stock, means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. In this table, the term fish stock is used to mean one fish species or a fish stock complex, which is a group of stocks similar enough to be managed as a single unit.

[a]Some fish stocks may have had more than one rebuilding plan started or revised during this period. In these cases, we used the date of the most recent rebuilding plan start or revision date (of those occurring for 2001 through 2020). The stocks that had more than one rebuilding plan start date are marked with an asterisk in the rebuilding plan start year column.

[b]Some fish stocks may have been rebuilt more than one time during this period. In these cases, we used the date of the most recent date that the stock was declared rebuilt (of those occurring for 2001 through 2020). The stocks that had more than one rebuilt date are marked with an asterisk on the year stock declared rebuilt column.

[c]There is not enough information to project when some fish stocks will be rebuilt. These stocks are marked as “Unknown” in the target rebuilding year column.

Appendix IV: Comments from the Department of Commerce

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Acting Chief Financial Officer and
Assistant Secretary for Administration
Washington, D.C. 20230

September 27, 2022

Mr. Cardell Johnson
Acting Director
Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Johnson:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report, *Federal Fisheries Management: Overfishing Determinations Vary Across Regions and Data Challenges Complicate Management Efforts* (GAO-23-105172).

The Department of Commerce agrees with GAO's two recommendations directed to the National Oceanic and Atmospheric Administration. Enclosed is our response to the draft report.

Should you have any questions, please contact MaryAnn Mausser, GAO Liaison, at (202) 482-8120 or mmausser@doc.gov.

Sincerely,

JEREMY PELTER
Digitally signed by JEREMY PELTER
Date: 2022.09.27 16:25:10 -04'00'

Jeremy Pelter
Acting Chief Financial Officer
and Assistant Secretary for Administration

Enclosure

Department of Commerce
National Oceanic and Atmospheric Administration
Response to the GAO Draft Report Entitled
Federal Fisheries Management: Overfishing Determinations Vary Across Regions and Data Challenges Complicate Management Efforts
(GAO-23-105172, October 2022)

General Comments

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) report on Federal fisheries management. NOAA appreciates the thorough review of this complicated subject and efforts to understand the challenging datasets available for analysis. The GAO team's efforts to interview a range of stakeholders (as described in Appendix 1) has ensured a balanced viewpoint as presented in their report.

The report recognizes the significant progress NOAA has made in both providing science to its management partners and working with those partners to sustainably manage the fisheries that provide substantial tangible and intangible benefits to our Nation. Importantly, the report highlights the necessary role of flexibility in achieving fisheries management success.

The report points out areas needing improvement, and the GAO team investigated contributing factors to these remaining issues. For instance, the report highlights data issues as a chief concern affecting frequency and quality of stock assessments as well as the ability to produce known stock status determinations. It is important to note that the root causes of these data issues vary regionally and can include many factors such as the geographic area covered, number and type of species managed, history of fisheries and data management systems, and bathymetry and ocean floor topography.

The report also identifies process improvements related to the NOAA Species Information System database, which is used to support tracking and reporting on assessments and status. NOAA agrees with GAO's assessment and is in the process of addressing some of the GAO team's concerns, as evidenced by the two development projects mentioned in the report.

NOAA Response to GAO Recommendations

The draft report made two recommendations pertaining to NOAA's National Marine Fisheries Service (NMFS):

Recommendation 1: "The Assistant Administrator for NMFS should develop written documentation of the structural limitations of the Species Information System database, as well as general guidelines on how to conduct the manual editing needed for multiyear trend analysis and reporting purposes."

NOAA Response: NOAA agrees with this recommendation. Moving forward, in the Species Information System (SIS) User Guide, NOAA will carefully document database limitations and

how to conduct manual editing to reduce reliance on institutional knowledge. Specific limitations described in this recommendation will be addressed with two ongoing SIS database development projects referenced in the report, which are both scheduled for completion in Fiscal Year 2023.

Recommendation 2: "The Assistant Administrator for NMFS should develop a written plan for executing the Species Information System database improvement projects, including the project goals, the procedures to be followed, a timeline for completion, and a schedule for providing status updates."

NOAA Response: NOAA agrees with this recommendation. More comprehensive project planning documentation for SIS development projects would help ensure project timeliness and successful completion. NOAA will expand existing project planning for SIS development projects, which currently describe project goals, scope, and requirements, and more explicitly incorporates sections focused on process and procedures, project reporting, as well as a project timeline. Project plans will be tailored according to project scope following project management principles. Tracking of project tasking SIS development projects will continue via Jira software.

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact

Cardell D. Johnson, (202) 512-3841 or JohnsonCD1@gao.gov.

Staff Acknowledgments

In addition to the contact named above, Scott Heacock (Assistant Director), Rebecca Sandulli (Analyst-in-Charge), and Grace Haskin made key contributions to this report. Also contributing to the report were Adrian Apodaca, Xiang Bi, John Delicath, Cindy Gilbert, Ying Long, Patricia Moye, and Edward Rice.

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