



September 19, 2014

Congressional Requesters

Fish Stock Assessments: Prioritization and Funding

According to the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce, U.S. marine fisheries contribute over \$100 billion annually to the American economy and provide recreational fishing opportunities to millions of Americans.¹ To continue enjoying these benefits, NOAA manages marine fish stocks to ensure their sustainable use for current and future generations.² Specifically, NOAA's National Marine Fisheries Service (NMFS) is responsible for fishery conservation and management. As part of its responsibility, NMFS conducts fish stock assessments to estimate the size of the population of a fish stock. NMFS also conducts fish stock assessments to examine whether a stock is overfished and provide support for management measures, such as limits on how many fish can be caught annually, among other things.

Eight regional fishery management councils are responsible for fisheries conservation and management in specific geographic regions of the country. In addition, six NMFS regional fisheries science centers are responsible for conducting fish stock assessments for certain fish stocks in their geographic regions. The regional fishery management councils use NMFS' fish stock assessments as a key tool for setting annual catch limits to help manage fish stocks. According to NMFS, fish stock assessments can be expensive and time-consuming, and therefore, NMFS cannot assess every stock each year. Consequently, setting priorities to determine how often fish stocks should be assessed is important to ensure the efficient use of resources.

There are two primary levels at which fish stock assessments can be conducted. The most comprehensive level is known as a benchmark assessment, which may involve reviewing multiple data sources and conducting new analyses and require many months to a year or more to complete. A more streamlined, less time-consuming and costly level assessment is an update assessment, which updates established benchmark assessment calculations using additional data. The level of assessment needed for a particular fish stock is determined as part of regional fish stock assessment priority setting processes involving NMFS' regional fisheries science centers, NMFS' regional management offices, and the regional fishery management councils, among others.

¹Department of Commerce, National Oceanic and Atmospheric Administration, *Fisheries Economics of the United States, 2011*, NOAA Technical Memorandum NMFS-F/SPO-128 (Silver Spring, MD: December 2012).

²A "fish stock" refers to either one species or a complex of comparable species managed as an entity in a geographic area. Throughout this report, the term fish stock is used to mean one fish species or a fish stock complex.

You asked us to review issues related to NMFS' fish stock assessments. This report (1) identifies differences in the number and frequency of fish stock assessments conducted by NMFS' regional fisheries science centers and the causes of those differences, (2) identifies how NMFS sets priorities for conducting fish stock assessments, (3) determines the funding NMFS receives annually for conducting fish stock assessments and related activities, and (4) determines how NMFS makes funding decisions to support fish stock assessments and related activities. This report formally transmits the briefing slides presented to your staff on June 19, 2014 (see enclosure), and provides additional details.

To identify differences in the number and frequency of fish stock assessments conducted by NMFS' fisheries science centers, we reviewed and analyzed fish stock assessment data from NMFS' Species Information System database for calendar years 2005 through 2013, the years for which data was available. We interviewed knowledgeable officials about the reliability of that data and performed manual and electronic checks to identify any data limitations. We determined that the data were sufficiently reliable for our purposes. To identify the causes of the differences in the number and frequency of fish stock assessments across regions, we interviewed knowledgeable agency officials. To identify how NMFS sets priorities for conducting fish stock assessments, we reviewed agency policies, procedures, guidance, and other documentation, and we interviewed NMFS' headquarters officials responsible for overseeing the fish stock assessment prioritization process and officials involved with the prioritization process in three NMFS fisheries science centers and three regional fishery management councils, selected for geographic representation. To determine the funding NMFS receives annually for conducting fish stock assessments and related activities, we reviewed the most recent 6-year period of fish stock assessment funding information and documents for fiscal years 2008 through 2013, and we interviewed knowledgeable officials about the reliability of that data. We determined that the funding data were sufficiently reliable for our purposes. To determine how NMFS makes funding decisions to support fish stock assessments and related activities, we reviewed NMFS' procedures and other documents on how the agency makes funding decisions and interviewed knowledgeable agency officials.

We conducted this performance audit from June 2013 to September 2014 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.

In summary, we found the following:

- Differences exist in the number and frequency of regional fish stock assessments. For example, our analysis of NMFS data from 2005 through 2013 found that the Alaska Fisheries Science Center conducted 467 fish stock assessments, the Southeast Fisheries Science Center conducted 158 assessments, and the Pacific Islands Fisheries Science Center conducted 25 assessments and jointly participated in 17. According to NMFS officials, these differences are due to several factors, such as regional differences in the types of fish stock assessments conducted, data limitations, data complexity, workload, staff capacity, and fish stock biology and status.³ For instance, the majority of the fish stock assessments completed by the Alaska Fisheries Science Center between

³The need for frequent fish stock assessments may vary depending on biological characteristics of the fish stock or the level of fishing pressure. For example, some stocks with low natural mortality rates change slowly, so they require less frequent assessments, and some stocks that have been overfished may need more frequent assessments.

2005 and 2013 were update assessments, which are less time-consuming to conduct. In addition, according to NMFS officials, the Alaska Fisheries Science Center was able to complete more assessments because, in part, they have access to high-quality data covering long time periods for many of the fish stocks they assess. According to NMFS officials, the complexity of data sources also plays a role in how long it takes to complete stock assessments. For example, when fish catch data come from many states, it takes more time to assemble, review, and analyze the information. Data sources are the least complex in Alaska and the West Coast and are particularly complex in the Southeast and Northeast, according to NMFS officials.

- NMFS' regional fisheries science centers collaborate with regional partners to set regional priorities for fish stock assessments, and these regional partners have significant flexibility in setting fish stock assessment priorities in their regions, according to NMFS officials. Furthermore, our review of three regional fish stock assessment priority setting processes found that there was no standardized approach for how regional fisheries science centers set targets for the fish stock assessment level (i.e., how comprehensive the assessment needs to be) and frequency (i.e., how often the assessment needs to be updated) to help set priorities. However, NMFS issued a draft protocol to help standardize regional fish stock assessment prioritization processes in February 2014. Key features of this draft protocol include establishing an objective, standardized, and quantitative approach for setting regional fish stock assessment priorities and developing a national reporting system to compile and track the results of regional prioritization decisions.
- A major source of annual funding for fish stock assessments and related activities is the Expand Annual Stock Assessment budget line. In fiscal year 2013, NMFS received \$64 million for this budget line, which supports ongoing activities such as data collection, stock assessment modeling, staffing, and research to improve fish stock assessments. The Expand Annual Stock Assessment budget line has also been used to address critical regional needs. For example, in fiscal year 2010, NMFS provided additional funds to the Southeast Fisheries Science Center to initiate a new data collection effort offshore from the South Atlantic states and to hire additional assessment staff and biological technicians to process sample data. Funding for fish stock assessments and related activities also partially comes from several other budget lines. According to a senior NMFS official, the agency does not separately track how much of the funds from each of these budget lines are used solely to support stock assessments and related activities.
- NMFS considers several factors in making funding decisions to support fish stock assessments and related activities. For example, NMFS allocates funding based on past funding amounts and makes adjustments to address national fish stock assessment priorities and needs, critical gaps identified through program reviews, and needs identified in regional fish stock prioritization processes. According to NMFS' draft prioritization protocol, decisions about allocating national resources between regions can be guided indirectly by the results of regional fish stock assessment prioritization. For example, NMFS' draft prioritization protocol establishes a new quantitative scoring system to rank regional fish stock assessment priorities that may allow NMFS to determine the extent to which the regional fisheries science centers can meet their fish stock assessment needs with available resources.

Agency Comments

We provided a draft of this report to the Department of Commerce for review and comment. The Department of Commerce provided technical comments that were incorporated, as appropriate.

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

If you or your staff members have any questions concerning this report, please contact me at (202) 512-3841 or fennella@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were Stephen D. Secrist (Assistant Director), Leo Acosta, Mark Braza, Joseph Capuano, John Delicath, Richard Johnson, Dan Royer, and Arvin Wu.

A handwritten signature in black ink that reads "Anne-Marie Fennell". The signature is written in a cursive style with a horizontal line underneath the name.

Anne-Marie Fennell
Director, Natural Resources and Environment

Enclosure

List of Requesters

The Honorable Marco Rubio
Ranking Member
Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Thad Cochran
United States Senate

The Honorable Kay R. Hagan
United States Senate

The Honorable Mary L. Landrieu
United States Senate

The Honorable Jeff Sessions
United States Senate

The Honorable Richard Shelby
United States Senate

The Honorable David Vitter
United States Senate

The Honorable Roger F. Wicker
United States Senate

Enclosure

Briefing on Fish Stock Assessments: Prioritization and Funding



Fish Stock Assessments: Prioritization and Funding

**Briefing to
Congressional Requesters
June 19, 2014**

For more information, contact Anne-Marie Fennell at (202) 512-3841 or fennella@gao.gov Page 1

Introduction

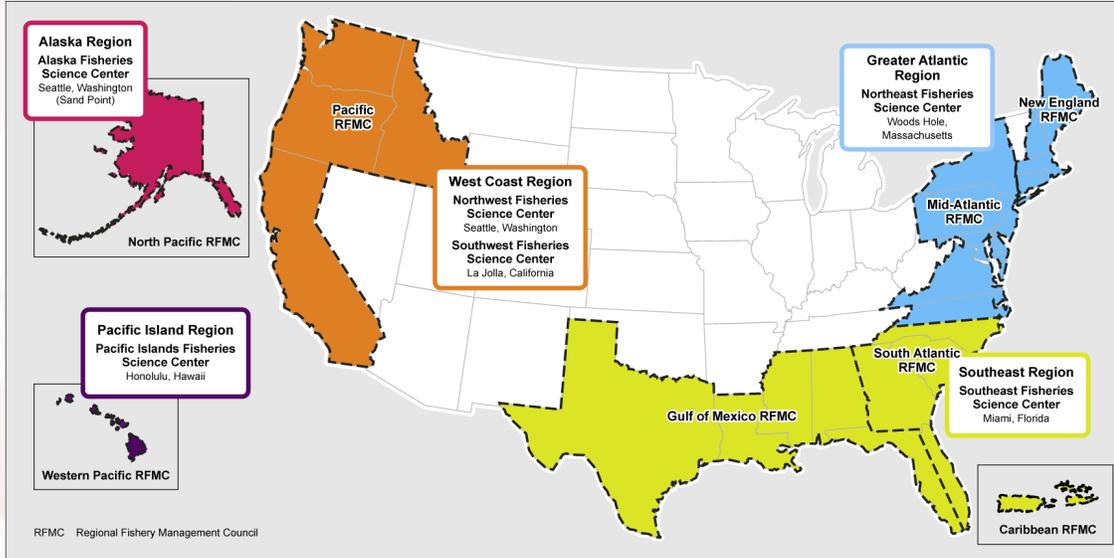
- According to the National Oceanic and Atmospheric Administration (NOAA), U.S. marine fisheries support over one million full and part-time jobs, contribute over \$100 billion to the American economy annually, and provide recreational fishing opportunities to millions of Americans. To continue enjoying these benefits, NOAA manages marine fish stocks to ensure sustainable use for current and future generations.
- NOAA's National Marine Fisheries Service (NMFS) is responsible for fishery conservation and management. As part of this responsibility, NMFS conducts fish stock assessments to
 - estimate the size (abundance) of a fish stock
 - examine whether a stock is overfished and provide support for management measures, such as limits on how many fish can be caught annually, among other things
- A “fish stock” refers to either one species or a complex of comparable species managed as an entity in a geographic area. Throughout this briefing, the term fish stock is used to mean one fish species or a fish stock complex.

Introduction (cont.)

- Six NMFS regional fisheries science centers are responsible for conducting fish stock assessments for certain fish stocks in their regions, as shown in figure 1.
- Eight regional fishery management councils are responsible for the conservation and management of the fisheries in their regions, as shown in figure 1. These management councils use NMFS' fish stock assessments as a key tool for setting annual catch limits to help manage fish stocks.
- Five NMFS regional management offices administer fisheries programs in their geographic locations, as shown in figure 1.
- According to NMFS, fish stock assessments can be expensive and time-consuming, therefore fisheries science centers cannot assess every fish stock each year.
- Setting priorities to determine how often fish stocks should be assessed is important to ensure efficient use of resources.

Introduction (cont.)

Figure 1: Locations of NMFS' Fisheries Science Centers, NMFS' Regional Offices, and the Regional Fishery Management Councils (RFMCs)



Sources: National Marine Fisheries Service (NMFS); Map Resources (map). | GAO-14-794R

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

Objectives

We were asked to review issues related to NMFS' fish stock assessments. Our objectives were to

1. identify differences, if any, in the number and frequency of fish stock assessments conducted by NMFS' regional fisheries science centers and the causes of any differences.
2. identify how NMFS sets priorities for conducting fish stock assessments.
3. determine the funding NMFS receives annually for conducting fish stock assessments and related activities.
4. determine how NMFS makes funding decisions to support fish stock assessments and related activities.

Scope and Methodology

To address these objectives:

- We reviewed and analyzed data on fish stock assessments for calendar years 2005 through 2013 from NMFS' Species Information System database and interviewed knowledgeable officials about the reliability of that data. We determined that the data were sufficiently reliable for our purposes.
- We interviewed NMFS headquarters officials responsible for overseeing the fish stock assessment prioritization process and officials involved with the prioritization process in three NMFS fisheries science centers and three regional fishery management councils, selected for geographic representation.
- We reviewed fish stock assessment funding information and documents for fiscal years 2008 through 2013 and interviewed knowledgeable officials about the reliability of that data. We determined that the data were sufficiently reliable for our purposes.
- We reviewed NMFS' policies, procedures, guidance, and other documents on how the agency sets fish stock assessment priorities and makes funding decisions.
- We obtained comments from NMFS on the information in this briefing and incorporated their comments as appropriate.

Summary of Findings

- Our analysis of NMFS' data found that differences exist in the number and frequency of regional fish stock assessments, which, according to NMFS officials, is due to several factors, such as regional differences in the types of assessments conducted, data limitations, workload, and staff capacity.
- According to NMFS officials, NMFS' regional fisheries science centers collaborate with regional partners to set regional priorities for fish stock assessments and NMFS issued a draft protocol in February 2014 to help standardize regional fish stock assessment prioritization processes.
- According to NMFS officials, a major source of funding for fish stock assessments and related activities is the Expand Annual Stock Assessment budget line (\$64 million in fiscal year 2013), but funding for these activities partially comes from several other budget lines.
- According to a senior NMFS official, NMFS considers several factors in making funding decisions to support fish stock assessments and related activities and the results of NMFS' draft prioritization protocol can indirectly guide funding decisions.

Background

- There are two primary “levels” at which fish stock assessments can be conducted.
 - The most comprehensive level is known as a “benchmark” assessment, which may involve reviewing multiple data sources and conducting new analyses and require many months to a year or more to complete.
 - A more streamlined, less time-consuming and costly level that updates established benchmark assessment calculations using additional data is known as an “update” assessment.
- The level of assessment for a particular fish stock is determined as part of regional fish stock assessment priority setting processes that involve NMFS’ regional fisheries science centers, NMFS’ regional management offices, and the regional fishery management councils, among others.

Background (cont.)

- A fish stock that is *subject to overfishing* has a fishing mortality (harvest) rate that is too high to meet long-term sustainable catch level targets under current conditions.
 - A determination that overfishing has occurred recently does not necessarily mean that the stock has already experienced substantial reductions in fish stock size.
- A fish stock that is *overfished* has been depleted to a degree that the fish stock's capacity to meet long-term sustainable catch level targets is jeopardized.
 - In some cases overfishing is the main cause for depletion of the fish stock, but other factors can affect the abundance of a fish stock and lead to a NMFS designation of being overfished. These factors include abnormal levels of disease, extreme cycles of natural population fluctuations, habitat degradation, and environmental changes such as climate change, ocean acidification, and land-based pollution.

Background (cont.)

According to NMFS officials, NMFS developed a Fish Stock Sustainability Index (FSSI) in 2005.

- NMFS selected fish stocks in each region based on factors such as their economic importance to commercial and recreational fisheries and whether they had experienced overfishing or were overfished.
- Currently, 230 of the 481 fish stocks in federal fishery management plans are reported on the FSSI.
- These fish stocks represent more than 90 percent of the total U.S. commercial catch (by weight).
- NMFS tracks whether these stocks are being overfished, whether overfishing is occurring, and the progress made, if any, in sustainably managing these fish stocks over time.

Objective 1: Differences in the Number and Frequency of Fish Stock Assessments

Our review of NMFS' data found that from 2005 to 2013, the number of fish stock assessments conducted annually and in total has varied significantly among NMFS' regional fisheries science centers.¹ For example, as shown in table 1:

- In 2013, the Alaska Fisheries Science Center conducted 60 assessments and the Southeast Fisheries Science Center conducted 18 assessments.
- In total, the Alaska Fisheries Science Center conducted 467 fish stock assessments, the Southeast Fisheries Science Center conducted 158 assessments, and the Pacific Islands Fisheries Science Center conducted 25 assessments and jointly participated in 17 assessments.

¹ Benchmark and update assessments are counted equally as one assessment in our analysis.



Objective 1: Number and Frequency of Fish Stock Assessments

Table 1: Number of Fish Stock Assessments Conducted by NMFS' Fisheries Science Centers, 2005-2013

Fisheries science center	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Alaska Fisheries Science Center	44	37	35	56	58	59	59	59	60	467
Northeast Fisheries Science Center	29	15	5	31	18	10	14	27	18	167
Northwest Fisheries Science Center/ Southwest Fisheries Science Center	21	1	16	1	22	1	13	21	43	139
Pacific Islands Fisheries Science Center	4	2	5	1	1	1	5	5	1	25
Southeast Fisheries Science Center	9	17	17	22	23	16	19	17	18	158
Southwest Fisheries Science Center	3	6	4	4	3	1	4	3	0	28
Southwest Fisheries Science Center/ Pacific Islands Science Center	2	3	1	1	3	2	2	2	1	17
Total	112	81	83	116	128	90	116	134	141	1,001

Source: GAO analysis of National Marine Fisheries Service (NMFS) Species Information System data. | GAO-14-794R

Note: According to a senior NMFS official, NMFS lists two fisheries science centers whenever both have a responsibility to jointly participate in assessing an individual fish stock. In addition, data from 2005-2007 may not be as complete as data from 2008-2013 because the data collection reporting system was in the initial stages of implementation. Furthermore, reporting to the Species Information System has evolved over time. For example, the Northwest Fisheries Science Center/Southwest Fisheries Science Center began reporting certain additional stock assessments in 2012 that they had not previously reported.



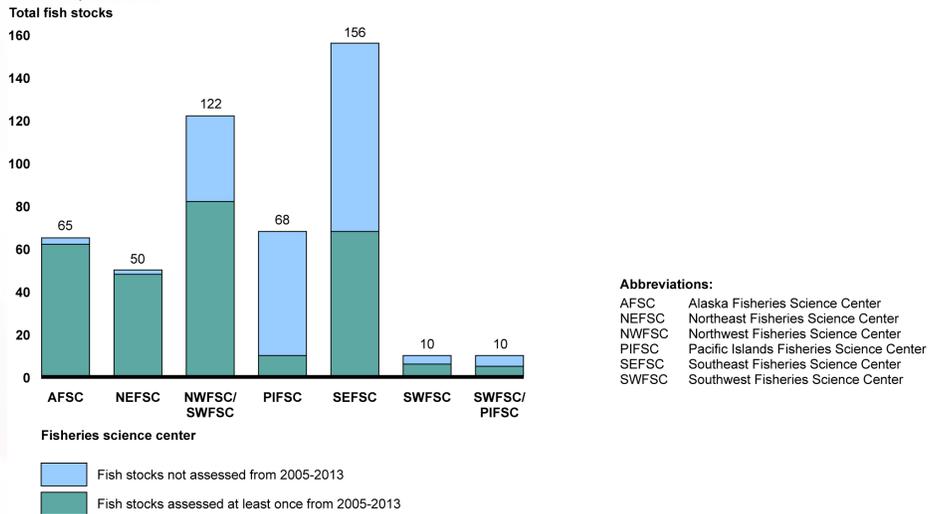
Objective 1: Number and Frequency of Fish Stock Assessments

Our analysis of NMFS' data found that from 2005 to 2013, the number of fish stocks that each of NMFS' fisheries science centers is responsible for assessing and the number of those fish stocks that were assessed at least once varied significantly among NMFS' fisheries science centers. For example, as shown in figure 2:

- The Northeast Fisheries Science Center is responsible for 50 fish stocks and the Southeast Fisheries Science Center is responsible for 156.
- The Alaska Fisheries Science Center assessed 62 of its 65 (95 percent) fish stocks and the Pacific Islands Fisheries Science Center assessed 10 of its 68 (15 percent) fish stocks.

Objective 1: Number and Frequency of Fish Stock Assessments

Figure 2: Number of Fish Stocks NMFS' Fisheries Science Centers Are Responsible for Assessing and the Number Assessed and Not Assessed, 2005-2013



Source: GAO analysis of National Marine Fisheries (NMFS) Service Species Information System data. | GAO-14-794R

Note: According to a senior NMFS official, NMFS lists two fisheries science centers whenever both have a responsibility to jointly participate in assessing an individual fish stock. In addition, data from 2005-2007 may not be as complete as data from 2008-2013 because the data collection reporting system was in the initial stages of implementation. Furthermore, reporting to the Species Information System has evolved over time. For example, the Northwest Fisheries Science Center/Southwest Fisheries Science Center began reporting certain additional stock assessments in 2012 that they had not previously reported.

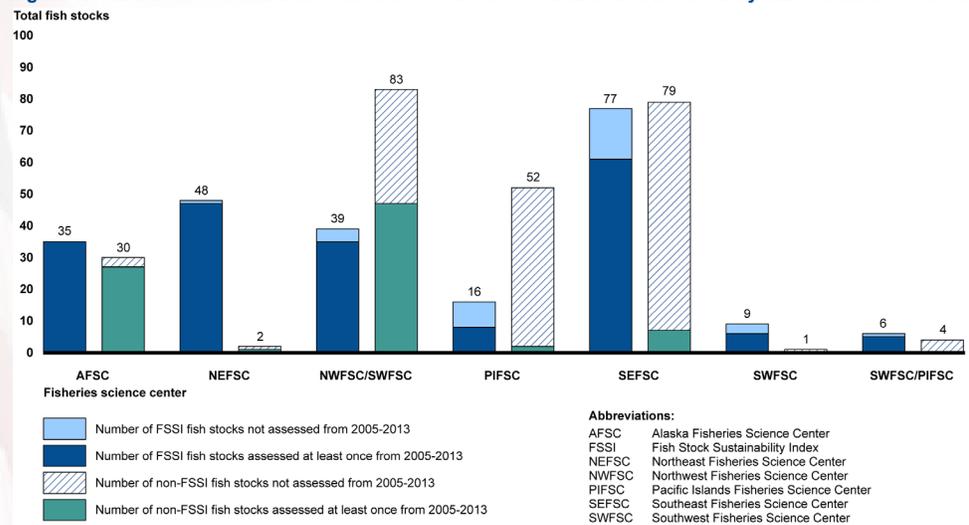
Objective 1: Number and Frequency of Fish Stock Assessments

Our analysis of NMFS' data found that from 2005 to 2013, there were differences among NMFS' fisheries science centers in the number of fish stocks assessed that were either on or off the FSSI list. For example, as shown in figure 3:

- The Alaska Fisheries Science Center assessed 100 percent of its fish stocks on the list and 27 out of 30 (90 percent) of its fish stocks that were not on the list.
- The Southeast Fisheries Science Center assessed 61 out of 77 (79 percent) of its fish stocks on the list and 7 of 79 (9 percent) of its fish stocks that were not on the list.

Objective 1: Number and Frequency of Fish Stock Assessments

Figure 3: Number of FSSI and non-FSSI Fish Stocks Assessed and Not Assessed by NMFS' Fisheries Science Centers, 2005-2013



Source: GAO analysis of National Marine Fisheries Service (NMFS) Species Information System data. | GAO-14-794R

Notes: According to a senior NMFS official, NMFS lists two fisheries science centers whenever both have a responsibility to jointly participate in assessing an individual fish stock. In addition, data from 2005-2007 may not be as complete as data from 2008-2013 because the data collection reporting system was in the initial stages of implementation. Furthermore, reporting to the Species Information System has evolved over time. For example, the Northwest Fisheries Science Center/Southwest Fisheries Science Center began reporting certain additional stock assessments in 2012 that they had not previously reported.

The FSSI is a NMFS list of 230 key fish stocks based on their importance to commercial and recreational fisheries.

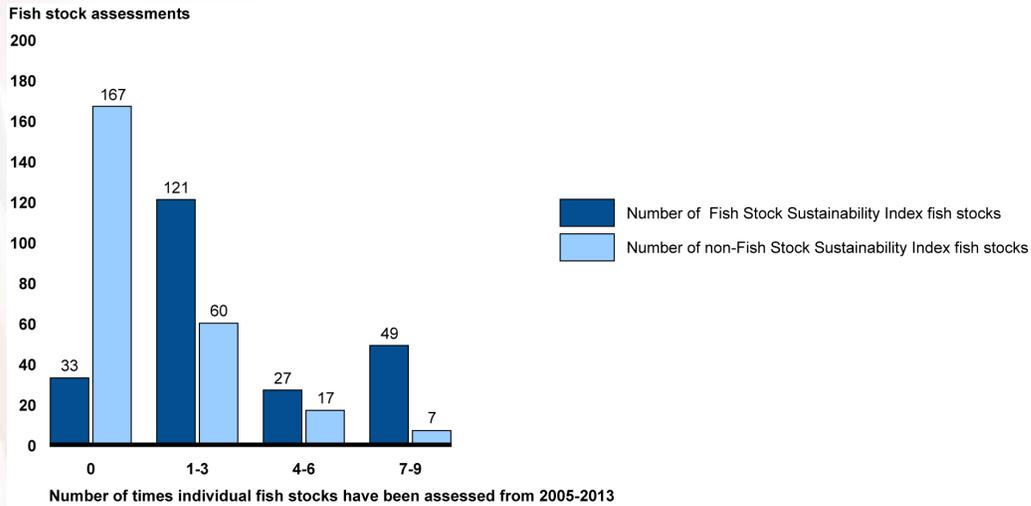
Objective 1: Number and Frequency of Fish Stock Assessments

Our analysis of NMFS' data found that from 2005 to 2013, some fish stocks were assessed much more frequently than others. For example, as shown in figure 4:

- 200 of the 481 fish stocks that the NMFS' fisheries science centers are responsible for assessing were never assessed. In contrast, 100 fish stocks were assessed between 4 and 9 times.
- 33 stocks on the FSSI list were never assessed and 24 stocks not on the list were assessed between 4 and 9 times.

Objective 1: Number and Frequency of Fish Stock Assessments

Figure 4: Frequency of Fish Stock Assessments, 2005-2013



Source: GAO analysis of National Marine Fisheries Service (NMFS) Species Information System data. | GAO-14-794R

Notes: The Fish Stock Sustainability Index is a NMFS list of 230 key fish stocks based on their importance to commercial and recreational fisheries. There are 251 fish stocks not on the list.

According to a senior NMFS official, data from 2005-2007 may not be as complete as data from 2008-2013 because the data collection reporting system was in the initial stages of implementation. Furthermore, reporting to the Species Information System has evolved over time. For example, the Northwest Fisheries Science Center/Southwest Fisheries Science Center began reporting certain additional stock assessments in 2012 that they had not previously reported.



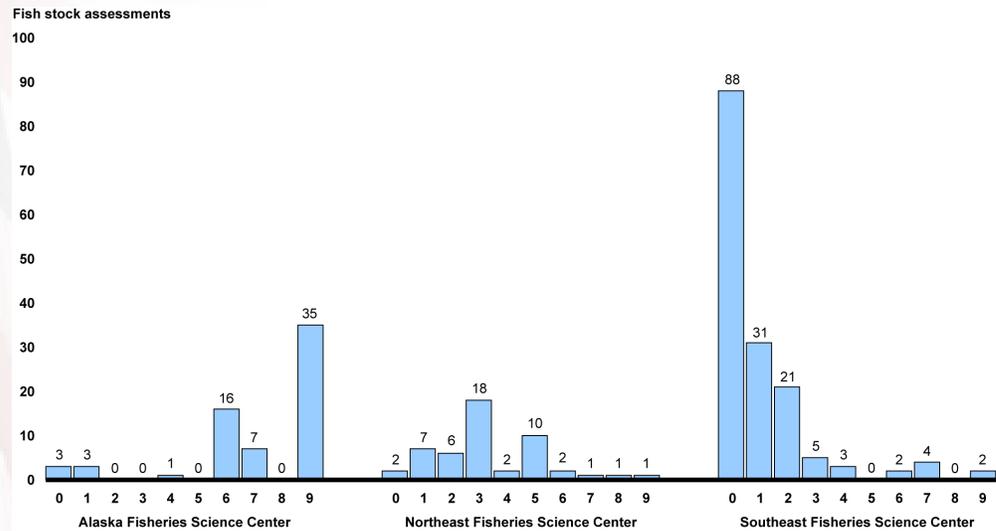
Objective 1: Number and Frequency of Fish Stock Assessments

Our analysis of NMFS' data found that from 2005 to 2013, there were significant differences in the frequency that fish stocks were assessed among NMFS' fisheries science centers. For example, as shown in figure 5:

- The Alaska Fisheries Science Center assessed 35 of its 65 fish stocks nine different times. In contrast, the Southeast Fisheries Science Center assessed 2 of its 156 fish stocks nine different times.
- The Alaska Fisheries Science Center never assessed 3 stocks. In contrast, the Southeast Fisheries Science Center never assessed 88 fish stocks.

Objective 1: Number and Frequency of Fish Stock Assessments

Figure 5: Frequency of Fish Stock Assessments by Select NMFS' Fisheries Science Centers, 2005-2013



Source: GAO analysis of National Marine Fisheries Service (NMFS) Species Information System data. | GAO-14-794R

Note: According to a senior NMFS official, data from 2005-2007 may not be as complete as data from 2008-2013 because the data collection reporting system was in the initial stages of implementation. Furthermore, reporting to the Species Information System has evolved over time. For example, the Northwest Fisheries Science Center/Southwest Fisheries Science Center began reporting certain additional stock assessments in 2012 that they had not previously reported.

Objective 1: Number and Frequency of Fish Stock Assessments

According to NMFS officials, several key factors individually or in combination account for the differences in the number and frequency of fish stock assessments, such as:

- *Types of fish stock assessments* – The number of benchmark and update fish stock assessments conducted, which require different amounts of time and effort, varies across regions.
- *Data limitations* – Variations across regions exist in data collection costs, and data availability, quality, and timeliness. For example, in places where the fish stock's habitat is complex, multiple surveys may be required to cover the geographic range of the fish stock. In addition, some regions have access to high quality data over long time periods while others do not. Furthermore, when fish catch data come from many states, it takes more time to assemble, review, and analyze the information.
- *Staff capacity* – Differences exist in the number and skills of personnel available across regions.

Objective 1: Number and Frequency of Fish Stock Assessments

- *Workload* – The workload varies across regions for a variety of reasons. For example, the number of fish stocks, the number of species included in each stock, and the number and complexity of assessments that need to be conducted in each region varies. There are also differences in regional stock assessment processes. For example, conducting assessments in collaboration with international partners greatly extends the time and effort needed to complete an assessment.
- *Fish stock biology and status* – The need for frequent fish stock assessments may vary depending on biological characteristics of the fish stock or the level of fishing pressure. For example, some fish stocks that have been overfished may need more frequent assessments.



Objective 2: Current Fish Stock Assessment Prioritization Process

According to NMFS officials, NMFS' regional fisheries science centers collaborate with other partners to set regional priorities for fish stock assessments. Our review of three regional fish stock assessment priority setting processes found that:

- NMFS' regional fisheries science centers and regional fishery management councils are the key partners that establish regional priorities for fish stock assessments;
- Regional partners have significant flexibility in setting fish stock assessment priorities in their regions;
- Regional partners do not employ a standardized method to quantitatively assess various factors, such as a fish stock's economic importance, in prioritizing which fish stocks to assess; and
- NMFS' regional fisheries science centers do not have a standardized approach for setting targets for the fish stock assessment level (how comprehensive the assessment needs to be) and frequency (how often the assessment needs to be updated) to help set priorities.



Objective 2: Proposed Fish Stock Assessment Prioritization Protocol

NMFS issued a draft protocol to help standardize regional fish stock assessment prioritization processes in February 2014. Key features of the draft protocol include:

- Establishing an objective, standardized, and quantitative approach to setting regional fish stock assessment priorities.
 - Directing regional partners to examine all fish stocks that have never been assessed to determine which ones require a first time assessment.
 - Directing regional partners to set a target assessment level and frequency for all fish stocks that have been previously assessed.
 - Defining standardized factors and a quantitative scoring system for regional partners to rank fish stock assessment priorities.
 - Creating a database that includes information on the same factors for all fish stocks to help provide consistency in scoring the fish stocks.
 - Providing access to scoring results and supporting data to regional partners and NMFS to help promote transparency and standardize regional fish stock assessment priority setting.
- Developing a national reporting system to compile and track the results of regional prioritization decisions.



Objective 2: Proposed Fish Stock Assessment Prioritization Protocol

According to NMFS' draft protocol:

Setting a target assessment level

- allows a fishery science center to determine if it has the data needed to conduct a fish stock assessment at the target level and if not, make plans, if necessary, to invest in additional data collection.
- promotes efficient use of resources by not conducting assessments that are more comprehensive than they need to be. For example, some lightly fished stocks may need no assessment beyond monitoring of catch, while more heavily fished stocks may require a greater investment in data collection.

Setting a target assessment frequency

- helps identify stocks that are important to commercial or recreational fisheries and that may need more frequent updates to provide quick access to increased fish abundance, while assuring prevention of overfishing.
- promotes efficient use of resources by not conducting assessments more frequently than is needed, for example, for stocks whose population is stable and that are not heavily fished.

Objective 2: Proposed Fish Stock Assessment Prioritization Protocol

According to NMFS, several factors are to be considered in the proposed quantitative scoring system to determine fish stock assessment priorities, such as:

- Fishery importance – commercial and recreational value of the fish stock to regional fishing communities;
- Ecosystem importance – role of the fish stock in the ecosystem and the strength of its interactions with other species;
- Stock status – whether the fish stock is at a sustainable level of abundance, is overfished and/or is experiencing overfishing; and
- Stock biology – how much change is expected to the fish stock per year, on average, due to natural variations (deaths and births) and as the result of fishing.



Objective 2: Proposed Fish Stock Assessment Prioritization Protocol – Next Steps

Key next steps for implementing the draft protocol, according to a senior NMFS official:

- Summarize and incorporate comments received from regional partners, by Summer 2014;
- Test prioritization protocol, by Fall 2014, to determine if adjustments are needed; and
- Begin using protocol, by Winter 2015, to develop regional fish stock assessments priorities.

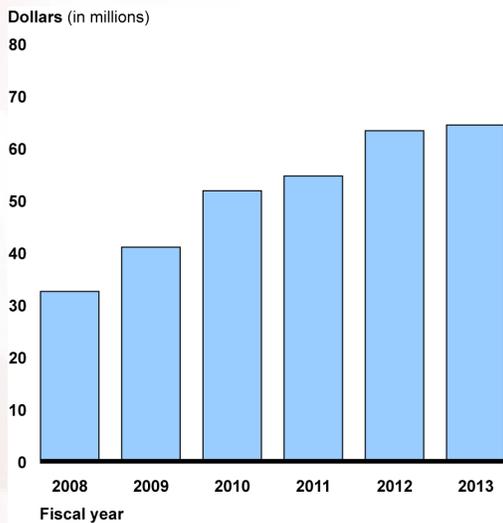
Objective 3: Fish Stock Assessment Funding

According to a senior NMFS official, the major funding source for fish stock assessments and related activities is the Expand Annual Stock Assessment budget line, which

- doubled from \$32 million in fiscal year 2008 to \$64 million in fiscal year 2013, as shown in figure 6;
- supports on-going activities such as data collection, stock assessment modeling, staffing, and research to improve fish stock assessments; and
- has also been used to address critical regional needs. For example, NMFS provided additional funds to the Southeast Fisheries Science Center in fiscal year 2010 to initiate a new data collection effort offshore from the South Atlantic states and to hire additional assessment staff and biological technicians to process sample data.
- has provided the Southeast Fisheries Science Center the most funding among all of the fisheries science centers between fiscal years 2010 and 2013, as shown in figure 7.

Objective 3: Fish Stock Assessment Funding

Figure 6: Expand Annual Stock Assessment Budget Line, Fiscal Years 2008-2013

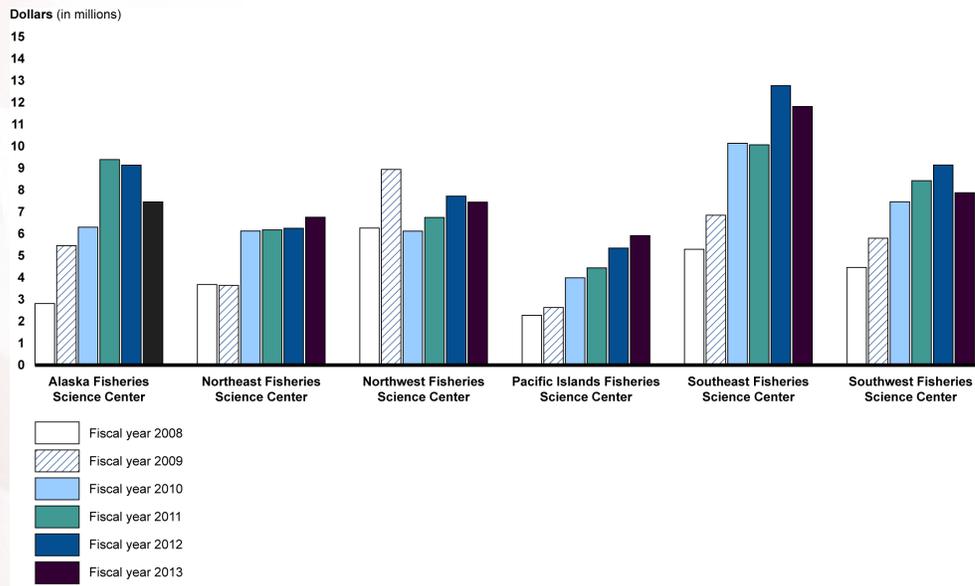


Source: GAO analysis of National Marine Fisheries Service (NMFS) information. | GAO-14-794R

Note: In addition to funding the six fisheries science centers, NMFS headquarters Office of Science and Technology also receives some funds from the Expand Annual Stock Assessment budget line for staff support, corporate services, programs managed by this office, and to address annual science priority gaps across the regions.

Objective 3: Fish Stock Assessment Funding

Figure 7: Expand Annual Stock Assessment Budget Line Funding for NMFS' Fisheries Science Centers, Fiscal Years 2008-2013



Source: GAO analysis of National Marine Fisheries Service (NMFS) information. | GAO-14-794R

Objective 3: Fish Stock Assessment Funding

- Other NMFS budget lines, such as Survey and Monitoring and Fisheries Research and Management, support both fish stock assessments and related activities and fisheries activities not directly related to fish stock assessments.
- According to a senior NMFS official, they do not separately track how much of the funds from each of these budget lines are used only to support stock assessments and related activities.

Objective 4: How NMFS Makes Funding Decisions

According to a senior NMFS official, several factors are considered in making funding decisions to support fish stock assessments and related activities.

- NMFS allocates funding based on past funding amounts, with adjustments based on three key factors:
 - *National fish stock assessment priorities and needs* – For example, NMFS directs funding on an ongoing basis to support fish stock assessment data collection, modeling, and research to improve fish stock assessment methods.
 - *Critical gaps identified through program reviews* – For example, in fiscal year 2013, NMFS conducted a review of its stock assessment data collection and management programs in each fisheries science center and provided funding to the centers in fiscal year 2014 to improve data processing.
 - *Regional fish stock assessment priorities* – For example, in fiscal year 2010, NMFS began funding a reef survey to obtain data on fish stocks that NMFS anticipates will lead to an increase in the number of fish stock assessments conducted by the Southeast Fisheries Science Center over time.

Objective 4: Draft Prioritization Protocol Could Inform Funding Decisions

According to the draft protocol, decisions regarding allocation of national resources between regions can be guided indirectly by the results of regional fish stock assessment prioritization. For example, our review found that NMFS' draft prioritization protocol is designed to

- create a database that includes information on the same factors for all fish stocks to support the scoring process that may help to highlight regional gaps in data availability, quality, and timeliness.
- establish a new scoring system that may allow NMFS to determine the extent to which the regional fisheries' science centers can meet their fish stock assessment needs with available resources.
- set targets for fish stock assessment frequencies and levels that may promote efficiencies by identifying fish stocks that have been either over or under assessed.

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