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ON
DATA COLLECTION ISSUES IN RELATION TO THE REAUTHORIZATION OF THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

BEFORE THE
SUBCOMMITTEE ON FISHERIES, WILDLIFE, OCEANS AND INSULAR AFFAIRS
COMMITTEE ON NATURAL RESOURCES
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Introduction

Good morning, Mr. Chairman and Members of the Committee. Thank you for the opportunity to testify before you today on fisheries data collection. My name is Richard L. Merrick, and I am the Chief Science Advisor and Director of Scientific Programs for the National Marine Fisheries Service (NMFS) within the National Oceanic and Atmospheric Administration (NOAA). NMFS is dedicated to the stewardship of living marine resources through science-based conservation and management, and the promotion of healthy ecosystems. As a steward, NMFS conserves, protects, and manages living marine resources to ensure functioning marine ecosystems and recreational and economic opportunities for the American public.

NMFS is an acknowledged international leader in fishery science, rebuilding overfished stocks, and preventing overfishing. Today, we know more about our fish stocks than ever before, and it is vital that our science not regress, as this would inevitably lead to declines in our stocks and a loss in the economic and social values they provide.

Our progress in making fisheries management more effective is based on the principle that management is based on sound science. National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) mandates that all fisheries conservation and management measures must be based upon "the best scientific information available" (16 U.S.C. 1851(a)(2)). While we face challenges to securing accurate, precise, and timely data for stock assessments, on balance, our science-based management has consistently proven to provide better resource management than without this advice. This has, in turn, led to improved productivity and sustainability of fisheries and fishery-dependent businesses. In some fisheries, particular the Northeast, the science has indicated the need to rebuild stocks but uncertainty in the science has confounded finding exactly the level of fishery restrictions needed

to accomplish that rebuilding. In other fisheries, particularly in the Southeast, the large numbers of stocks exceed our current capacity to deploy surveys and conduct assessments of the status of these stocks. The quality and extent of our stock assessment enterprise has room for growth.

Sustainability of our Nation's fisheries is based on continual monitoring of fish catch and fish stock abundance. Because this data-intensive endeavor is costly, NMFS and our partners have always focused on getting the most of the highest-priority and highest-quality data by fully using the funding Congress has provided for this vital work. This funding and the work it supports enables us to sustain and enhance our fisheries. NMFS continues to make substantial progress toward improving the quality of the science available to effectively manage commercial and recreational fisheries, benefiting coastal communities and the United States (U.S.) economy both today and for generations to come. We greatly appreciate the increased funding that Congress has provided to make U.S. fishery management, and its preeminence worldwide, possible.

Today, I will discuss how our fisheries science is conducted and how this science underpins and provides for good management. In particular, I will focus on methods we use to collect the data, what types of data are collected, how these data are used in fishery management, and the importance of our partners in our collection of data. I will also describe some of the recent advances we have made in our science.

How fishery surveys are conducted—including through the use of Federal vessels, charter vessels, or through other cooperative arrangements

Long-term monitoring of fish abundance provides an indicator of the abundance of stocks over time, and as such are invaluable inputs to stock assessments. Abundance data tell us the number or weight of a particular stock of fish in the ocean. Information on fish abundance is best obtained from standardized, fishery-independent surveys covering the extensive geographic range of the fish stocks. The average catch rate of fish typically is measured using standardized methods at hundreds of sampling locations over the range of a suite of fish stocks. A diversity of conventional survey methods is employed, including bottom, mid-water, and surface trawls; longlines; gillnets; and traps, as appropriate for the particular target, habitat, and region. In addition, our surveys incorporate state-of-art technology, including various sonars and optical systems to survey reef fish in the Southeast and Atlantic sea scallops in the Northeast. These surveys are repeated, typically annually, to measure the change in catch rate over time, which is the cornerstone information of the fishery assessment models. In some cases, fishery-dependent data from fishermen's logbooks can be statistically processed to provide additional indicators of trends in fish abundance.

NOAA surveys in support of stock assessments are conducted in every region; 62 fish surveys were conducted in FY 2012. These surveys are conducted on NOAA fishery survey vessels and on NOAA-owned small boats, as well as on chartered commercial fishing vessels, state-owned boats, and UNOLS (university-owned) ships.

NOAA survey vessels are a key source of fisheries-independent data. Seven ships in the NOAA fleet conduct many of the cruises to survey fish abundance. The fleet includes four new Dyson-class vessels with state-of-the art technological capabilities, with a fifth vessel in this class

becoming available in 2014. The timing of these cruises, survey designs, and sampling methodologies are adapted to the specific region and stocks.

We augment NOAA vessel surveys with cooperative surveys involving industry, academic, and state government partners. These surveys commonly use chartered commercial vessels and employ local fishermen, who provide critical local knowledge of the region's stocks and fisheries. The surveys conducted using chartered vessels provide important data streams from regions and time periods when NOAA ships are not available. For example, since the 1970s, NMFS has conducted its primary groundfish surveys in the Bering Sea, Gulf of Alaska, and the Pacific coast by chartering local fishing vessels of suitable characteristics to work with NMFS scientists on board, using standardized sampling gear and strict statistical protocols to collect the data to support some of our most valuable fisheries. In the Northeast, NMFS charters a commercial vessel from the region for the annual surf clam and quahog survey. In some surveys, the chartered fishing vessels may be partially funded through research set-asides or other forms of cooperative research. These collaborative surveys provide valuable data and enhance communication between assessment scientists and fishermen. Other surveys are conducted on commercial fishing vessels with universities (e.g., the NEAMAP or Northeast Area Marine Assessment Program with the Virginia Institute of Marine Science), and state agencies (e.g., the Maine-New Hampshire Surveys Inshore Groundfish Trawl Survey with the Maine Department of Marine Resources and New Hampshire Fish and Game Department).

NOAA also charters state vessels for some surveys. State vessels are generally smaller than the NOAA vessels, and can operate in shallower near-shore and estuarine areas. This is particularly important for providing data on stocks that occur in these habitats. For example, the Southeast Area Monitoring and Assessment Program, commonly known as SEAMAP, is a collaboration dating back to 1977 involving NMFS, the Gulf States Marine Fisheries Commission, and the states bordering the Gulf of Mexico. Through funds transferred to the Commission and individual states via grants and cooperative agreements to conduct the surveys, SEAMAP provides much of the fisheries-independent data used in Gulf of Mexico stock assessments.

How landings and other harvest-related data are gathered and used

The catch monitoring programs strive to measure total catch, or the amount of fish removed through fishing. Rarely are fishery catch monitoring programs focused on single species or fisheries; instead, they are generally designed to monitor multiple species and fisheries over large geographic areas. One component— landed catch information—is obtained by monitoring commercial landings, largely in partnership with the states and the marine fisheries commissions. In some Alaskan fisheries, where the catch is processed at sea, fishery observers provide catch data. Observers also conduct at-sea monitoring of bycatch and collect information on discards in numerous fisheries in all regions. For recreational fisheries, NMFS' Marine Recreational Information Program is applying new and improved methods to the difficult challenge of estimating total catch by the millions of recreational saltwater anglers nationwide.

NMFS has a strong partnership with the states and the interstate marine fisheries commissions to conduct efficient and cost-effective monitoring of commercial landings and recreational catches. The federally funded Fisheries Information Networks have provided a means through which

NMFS has been able to work collaboratively with its partners to design and implement well-integrated data collection programs that meet the management needs of both state-managed and federally managed fisheries. Cooperative regional programs—such as the Atlantic Coastal Cooperative Statistics Program, the Gulf Fisheries Information Network, the Pacific Fisheries Information Network, the Pacific Recreational Fisheries Information Network, the Western Pacific Information Network, and the Alaska Fisheries Information Network—have worked effectively to eliminate unnecessary overlaps, standardize data elements and collection methods, and improve the timeliness of data processing, statistical analysis, and dissemination of catch statistics to all partners. Much of the commercial landings and recreational catch data is actually collected, processed, and managed by state agency personnel in accordance with procedures developed in collaboration with NMFS. Continued funding of the Fisheries Information Networks will be crucial for maintaining our current capabilities for monitoring commercial and recreational catches.

NMFS' National Fisheries Information System Program has provided a mechanism for cross-regional collaboration and sharing of ideas on how best to improve the timeliness, quality, and accessibility of commercial and recreational fishery catch information. The Fisheries Information System Program has been working to continue to develop electronic dealer reporting programs and electronic logbook reporting programs to provide more timely and accurate updates on commercial landings. The Fisheries Information System Program and the Fisheries Information Networks have also been working together to develop and implement information management architectures that will enable comprehensive access to complete and up-to-date state and federal catch statistics within each region, as well as at the national level. Cooperative efforts are now also focused on improving quality management of catch data collection programs through enhanced reviews and evaluations of the current procedures for quality assurance and quality control. Improving the timeliness, accessibility, and quality of catch information is extremely important to facilitate the work of fishery managers in monitoring the success of implemented fishery management regulations.

Fisheries observers are trained biologists placed on board commercial fishing and processing vessels, as well as in some shoreside processing plants. They are the most reliable and most unbiased source of data on the actual at-sea performance of commercial fisheries. They collect data on bycatch, enabling accurate estimations of total mortality, a key component of stock assessment modeling. In some fisheries, they provide data on catches. They also provide high-quality data on interactions with protected species. This information is important to ensure that protected species stocks remain healthy and their interactions with fisheries are minimized, so that harvest opportunities are affected as little as possible. In FY 2012, NMFS logged more than 83,000 observer days in 47 fisheries and employed 974 contracted observers. The observer programs were supported by a combination of government funds and industry funds.

Recreational fisheries are a significant, and sometimes the dominant, component of the total catch, particularly in the Gulf of Mexico and South Atlantic regions. NMFS has made a substantial effort to monitor those fisheries and incorporate data from recreational fisheries into fish stock assessments. These data are collected as part of NMFS' Marine Recreational Information Program.

Types of biological data collected and how the data are used for management purposes

Data on fish biology are collected to learn about fish longevity, growth, reproduction, movement, and other factors. The biological information we collect includes age data for many of our most important stocks. With the addition of fish age data, we are able to apply more complex and sophisticated stock-assessment models that provide better information on changes in fish abundance over time, more direct information on fish mortality rates caused by fishing, and more precise forecasts of future changes in fish abundance and potential annual catch limits. This provides important information about fluctuations in productivity and recruitment of new fish into the stock.

The sources of fish biology information are diverse, with important information coming from NMFS monitoring programs, academic studies, cooperative research, and other programs. Some important sources are fisheries-dependent, which provide key demographic information about the fish that are removed from the populations by fishing. For example, fisheries observers and dockside monitors take observations (e.g., length, weight, sex, and maturity) and collect otoliths (ear bones) from fish. The otoliths and their growth rings (similar to the annual growth rings in trees) are analyzed in on-shore laboratories. This suite of information provides important data for stock assessment models, and is vital for tracking changes in stock dynamics. Biological data are also collected on NMFS fishery-independent surveys where it can be matched to environmental data collected on those surveys. Other sources of data on fish biology include cooperative research and academic studies. Waiting to get these age data is one of the factors that adds time between conducting a survey and updating the assessment using the whole, longer time series of catch, abundance, and biological data.

How stock assessments are conducted

All of the data discussed here provide the inputs for stock assessments. Passage of the Magnuson-Stevens Fishery Reauthorization Act in 2006 resulted in the need for more timely stock assessments to ensure overfishing has ended, to set Annual Catch Limits that prevent overfishing, and to track progress toward rebuilding overfished stocks.

NMFS manages 500-plus stocks; however, we had the data and capacity to assess an average of only 108 stocks each year from 2008 to 2012. Stocks without quantitative assessments have Annual Catch Limits set through alternative methods (e.g., averages of recent catches). Of these 500-plus stocks, 230 have been identified for inclusion in the Fish Stock Sustainability Index. These Fish Stock Sustainability Index stocks constitute over 90 percent of U.S. commercial landings, and many are important to recreational fisheries. For the Fish Stock Sustainability Index stocks, NMFS has been able to assess about 80 per year, including annual or biannual updating of important assessments, which maintains their status as adequate assessments, as well as some first-time assessments. These efforts have increased the number of FSSI stocks with adequate assessments from 119 in 2005 to 132 in 2012. For the purpose of tracking performance, an assessment is considered to be adequate for five years after its most recent update. The overall FSSI score—which tracks our knowledge about the stocks and about our progress in ending overfishing and rebuilding stocks—has increased by 63 percent since 2000. That substantial

increase shows that investment in both science and management improves the sustainability of fisheries.

Assessment Process - Typically a major "benchmark" stock assessment involves two sets of workshops culminating in a peer-reviewed assessment. These workshops are open to the public, and constituents are encouraged to participate. The first workshop typically focuses on data—specifically the catch, abundance, and biology data used to calibrate the assessment models. Agency and university researchers, fisheries management council representatives, and partners get together to summarize and evaluate data sources, collection methods, reliability, and applicability of data for population modeling. Through a collaborative process, the workshop participants develop recommendations on which data inputs to include in assessments. Participation by fishermen is extraordinarily important, because their on-the-water observations of fish behavior help scientists correctly interpret factors such as unexpected changes in standardized index surveys.

The second workshop is held to calibrate the mathematical computer model, which generates a simulation of the fish population over time. NOAA has several standardized models that it maintains in a Toolbox. These models use sophisticated statistical approaches for dealing with data gaps and uncertainties, to blend the available data, and to forecast results with appropriate confidence intervals. Conceptually, this is similar to NOAA's National Weather Service dynamic models, which use multiple observations to calibrate complex atmospheric models that predict the weather. Even though fish stock assessments operate on much longer time scales than weather models—months and years rather than hours and days—they similarly combine and incorporate many different complex observations into a holistic picture of the situation. NOAA scientists run the model with inputted abundance, biological, and catch data, which gives us the information to develop a stock assessment report that is the basis for a catch limit.

Independent external scientists review the stock assessment report and evaluate the quality of the assessment. They may conclude that the science is sound, recommend changes to improve the stock assessment, or, in some cases, reject some or all of the attempted analyses in the assessment. The peer-review process provides fishery managers and constituents with confidence in the integrity of assessments and assurance that they represent the best available science. The Magnuson-Stevens Act clarifies that such peer reviews are a valuable part of the management process. The Regional Fishery Management Councils' Scientific and Statistical Committees use the peer-reviewed stock assessment results as the basis for providing fishing level recommendations to their respective Councils. NMFS is working with the Councils and their Scientific and Statistical Committees as each Council works to implement regionally relevant protocols for peer reviews and to expand the role of Scientific and Statistical Committees in providing fishing level recommendations.

Stock Assessment Quality – In addition to the peer review of assessments, NMFS is working to improve the quality of the data and analyses used in stock assessments. This is vital for maintaining and enhancing the accuracy and precision of our stock assessments and the credibility of the management actions that depend on them.

The agency complies with the requirements of the Information Quality Act, including OMB's guidance on transparency and balanced review of the influential science that is conducted. We have embarked on a lengthy process for a comprehensive update of National Standard 2 of the Magnuson-Stevens Act, which provides guidance on the scientific integrity of information used for the conservation and management of living marine resources. We anticipate publishing the final rule in the *Federal Register* soon.

NMFS has also embarked on a systematic process of science program reviews to identify strengths, weaknesses, and opportunities for improvement. These reviews will be repeated on a five-year cycle. The process began in FY 2012, with every NMFS Science Center and the Office of Science and Technology conducting a comprehensive strategic review of their programs. Now in our second year in FY 2013, the agency has initiated a comprehensive review of the programs that contribute data to stock assessments. The Science Center reviews of data collection processes will be complete this year.

How federal fishery surveys and assessments are prioritized

Surveys are prioritized and scheduled to ensure data are available on a timely basis to support scheduled assessments. However, most surveys are repeated either annually or biennially to ensure a time-series is available to support the stock assessments. A single survey is difficult to use in assessment models. Note also that most surveys collect data on multiple species. For example, bottom trawl surveys in the Northeast simultaneously collect data on all 20 stocks in the Multispecies Groundfish assemblage, as well as numerous other species. Even highly specialized surveys provide information on stocks other than the target stock. For example, the annual scallop dredge surveys are used to provide the scallop abundance data needed for scallop stock assessments, and they also provide data on yellowtail flounder used in the latter's assessment.

Stock assessments are prioritized and scheduled regionally through discussions between the Councils and NMFS Regional Office and Science Center staffs. Priorities are established by evaluating the commercial importance of a stock, the age and quality of the existing stock assessment, and biological characteristics of the stock. Schedules are usually set annually on a three-year rolling basis, and are posted online (see http://www.sefsc.noaa.gov/sedar/ for an example).

The amount and quality of data has a direct effect on the precision of the stock assessment result. For example, an economic study in Alaska showed that maintaining annual frequency of surveys, compared to slowing to biennial surveys, allowed for rapid detection of increases in stock abundance and tens of millions of dollars in added value of the catch.

How socio-economic data are collected and used

NMFS' socio-economic data collection program directly supports Agency efforts to identify management options that achieve conservation objectives while minimizing impacts to fishery participants. These efforts result in a management strategy that is consistent with the long-term sustainability of the resource as well as the fishery and fishing communities. Underpinning this

capability are the economic and sociocultural data collection programs and surveys that provide the information base for meeting statutory mandates for cost-benefit analysis and social impact assessments of regulatory actions (e.g., fishing ground closures, gear prohibitions, effort reductions, catch quotas, etc.). On the commercial side, economic questions are added to logbook programs, observer programs, and permit programs to provide cost-effective survey vehicles in a number of fisheries. This information is used to help estimate the economic value of those fisheries. In other commercial fisheries, NMFS relies upon one-time surveys that are updated periodically but, ideally, within three to five years depending upon survey type. In terms of recreational fisheries, NMFS routinely collects expenditure data from saltwater anglers every five years and conducts occasional surveys of for-hire operations, as well as other angler surveys deemed essential for assessing the economic effects of regulations on this group of stakeholders.

In addition to supporting the required management assessments for implementing stewardship regulations, the socio-economic data are increasingly used to support integrated analyses. For example, BLAST (Bioeconomic Length-structured Angler Simulation Tool) is a fully integrated and dynamic decision support tool for assessing the benefits associated with recreational fishing management options, including changes in bag limits, season length, and rebuilding plans. Initial applications have been to cod and haddock in the Northeast. A key feature of the model is that it integrates recreational fishing behavior with age-structured stock assessment models, enabling NMFS to realistically project future economic and biological conditions. This ecosystem approach to fisheries management provides insight into the short- and long-run effects of alternative fisheries policy on both the economic and biological health of important recreational fisheries.

Socio-economic analyses are then used to evaluate the societal impacts of management options, which enables fishing regulations to be developed that meet requirements to sustain fish stocks while minimizing impacts to employment and economic benefits. The Agency is also working to develop improved methods for balancing the prevention of overfishing against the short-term loss of fishing opportunity.

How federal funding is being used for data collection purposes

NOAA uses appropriated funds from several budget lines to support its data collection, including the following PPAs:

NMFS:

- Fishery research and management (staff support for all areas)
- National Catch Share Programs (observers and landings data)
- Expand Annual Stock Assessments (surveys and stock assessment support)
- Economics and Social Science Research (social science data and analyses)
- Fishery Statistics (landings data, MRIP, bio-sampling)
- Fishery Information Networks (landings data, MRIP)
- Survey and Monitoring (surveys)
- Reducing Bycatch (observers)
- Enforcement and Observers (observers)
- Cooperative Research (bio-sampling, surveys)

- Regional Studies (surveys)

Office of Marine and Aviation Operations:

- Marine Operations and Maintenance (surveys)

Has the new recreational statistics data program been fully developed and implemented, and does the program meet the goals envisioned by Congress?

Under the Marine Recreational Information Program, revised methods were developed that are being incorporated to substantially reduce sources of error and improve the accuracy of effort and catch estimates based on a combination of telephone, mail, and access point surveys. An improved estimation method was developed and implemented in 2012 to provide more accurate 2004–2011 recreational catch statistics for the Atlantic coast and Gulf of Mexico. In addition, a new sampling design for the Atlantic and Gulf on-site surveys of angler catch was implemented in 2013. These revised recreational data sets have already been incorporated into stock assessments.

The Marine Recreational Information Program has also been working with our state partners—including Florida, North Carolina, and Louisiana—to develop and test new methods that use angler registries to survey anglers for production of trip estimates. Following completion of major pilot efforts underway in calendar years 2012 and 2013, a new survey design to replace the coastal household telephone survey will be selected and implemented, beginning in 2014, for the Atlantic and Gulf coasts. The Marine Recreational Information Program and our partners are also developing and testing a number of other possible improvements to the current suite of surveys, including:

- Implementing electronic reporting and conducting pilot projects to improve sampling for validation in the Southeast Headboat Survey.
- Pilot testing of electronic logbook reporting with dockside validation for the Gulf of Mexico Charterboat fishery.
- Pilot projects to test improved survey designs that reduce sources of potential error and improve survey coverage in Washington, Oregon, and California.
- Development and testing of new survey methods and improved designs that will enhance data collection and catch statistics in Hawaii, Puerto Rico, and the Virgin Islands, and in Atlantic highly migratory species fisheries.
- Development of methods to produce preliminary estimates more frequently than bi-monthly, which will improve in-season management.

How can new technologies help fishery managers achieve better and more timely information for management purposes?

NMFS is continually striving to improve and augment its processes, methods, and programs for commercial fishery data collection and analysis. For example, in the Gulf of Mexico, commercial landings data are collected in cooperation with the five Gulf states and the Gulf States Marine Fisheries Commission, and are used to track progress toward reaching the Annual Catch Limits of managed stocks. By shifting from paper dealer reports, submitted semi-monthly, to electronic dealer reporting, submitted weekly, more timely data are generated to more accurately project when a fishery will reach the Annual Catch Limit. This will enable commercial fishermen to

more efficiently plan their fishing activities, and reduce the risks of exceeding an Annual Catch Limit.

Two fisheries in the Bering Sea-Aleutian Islands Groundfish Fishery Management Plan in Alaska currently employ video compliance monitoring. The technical requirements for these applications are relatively simple; for example, they do not involve complex requirements for species identification or measurements. Under Amendment 80, video monitoring is used by about half of the vessels in the Alaska head and gut catch processor and pollock catcher processor fleets to meet the regulations that ensure that no pre-sorting activities occur prior to observer sampling. The regulations for Amendment 91 to this Fishery Management Plan contain the second electronic monitoring requirement that NMFS has implemented in Alaska. Amendment 91 created Chinook salmon prohibited species catch limits on the Bering Sea pollock fishery for the first time. To monitor the Chinook salmon limits, NMFS is striving for a census, or a full count, of Chinook salmon bycatch in each haul by a catcher/processor and each delivery by a catcher vessel. A camera located in the observer sampling station provides views of all areas where salmon could be sorted from the catch as well as the secure location where salmon are stored, thus allowing observers to comprehensively monitor the salmon bycatch while still performing their other required duties.

Other means of electronic monitoring, including the use of digital video cameras, are currently being transitioned to operations regionally. For example, NMFS—in cooperation with the Pacific States Marine Fisheries Commission and the Pacific Fishery Management Council—will implement video monitoring in the West Coast Groundfish Trawl fishery. The agency is in the process of implementing region-specific video monitoring programs cooperatively with industry partners. Cooperatively developing electronic monitoring systems with local fishermen who work in the affected fisheries is key to ensuring that the systems being developed are practical and will reliably and efficiently provide the needed data. The program's goal is to implement a blended mix of electronic and fishery observer monitoring to provide more cost-effective and timely reporting of fish catches.

NMFS is also striving to conduct more surveys using a number of advanced sampling technologies that can achieve higher standardization and, in some cases, can directly measure fish abundance at each survey location, not just a standardized catch rate. With such information, NMFS will be able to provide more precise and accurate assessments sooner. At present, these technologies are still in the developmental phase, and collecting the data is only the first step toward an assessment. Optical and sonar sensors produce huge volumes of data, and NMFS is just beginning to work on methods to process these data types and bring the results into our assessments. In the future, these technologies will enable greater efficiency and increased accuracy and precision for our assessments, but these benefits will take some years to be realized.

NMFS also expects to develop new and innovative approaches to surveying fish stocks in hard-to-survey areas. For example, we are funding a multi-year research project with an academic partner to explore the use of towed camera arrays for use in surveying reef fishes in the Gulf of Mexico and Pacific Islands. If feasible, shifting to this approach would dramatically increase the effectiveness and efficiency of our reef fish surveys – meaning more science for the dollar. In

another example, NMFS scientists are engaged with academic partners to develop improved methods for surveying Atlantic sea scallops. This includes the Woods Hole Oceanographic Institution's towed camera technology and the University of Massachusetts' dropped camera system that uses video stills on scallop beds for analysis.

What are the challenges to ensuring NMFS ability to collect abundance data for stock assessments?

There are a number of challenges to collecting abundance data for stock assessments. I will highlight three. First is the ability to understand the relationship between fish stocks and the environment and determining how that will impact future stock abundance. Given the impacts of climate change, historical datasets are becoming less reliable in predicting future stock productivity. This makes ocean "process" studies increasingly important. Expanded funding requested in a variety of budget lines in NOAA's FY 2014 budget will increase focus on these important studies. The second challenge is finding ways to sample hard-to-survey bottom types such as coral reefs. Advanced sampling techniques, such as video technology can help and the agency is expanding partnerships to explore these techniques. The third challenge is that the capacity of the NOAA Fleet to support fishery surveys has eroded over time due to increased lifecycle costs of vessels. While advanced sampling technologies offer cost and data collection efficiencies to supplement ship surveys, these systems and moored sensors must be deployed and serviced by the NOAA Fleet, and there are many vital survey operations that still must be conducted by scientists and fishermen working off of the NOAA ships. The FY 2014 President's Budget Request includes an increase for OMAO to provide more Days at Sea and fully utilize the NOAA Fleet assets. This increase would support a utilization rate of about 94 percent - an approximate 40 percent increase over FY 2012.

How can the Act be modified to provide better data collection activities, and how can these activities improve the scientific underpinnings of our current management activities?

The quality of scientific advice provided to management has been a major reason the United States has become a model of responsible fisheries management. Direction provided by the Magnuson-Stevens Act has been crucial to NOAA's scientific program. However, this is not to say that we cannot continue to improve the scientific guidance we provide.

The conference, *Managing Our Nation's Fisheries 3*—cosponsored by the eight Regional Fishery Management Councils and NMFS—concluded a little over a week ago. The conference focused on three broad themes: (1) improving fishery management essentials, (2) advancing ecosystem-based decision-making, and (3) providing for fishing community sustainability. Presentations and discussions that occurred at this meeting frequently focused on the importance of improved scientific advice. We expect to analyze the results of these discussions for guidance on reauthorization of the Magnuson-Stevens Act. These analyses and our continuing discussions with Congress, our partners, and stakeholders should lead to further improvements in our scientific advice under the Magnuson-Stevens Act umbrella.

Thank you again for the opportunity to discuss fisheries data collection programs under the Magnuson-Stevens Act. I am available to answer any questions you may have.