

Environmental Assessment

Issuance of a Scientific Research Permit to the National Marine Fisheries Service Southeast Fisheries Science Center for Resource Assessment Surveys and Conservation Engineering Research

I. Introduction

The National Marine Fisheries Service (NMFS), Southeast Region (SER) proposes to issue a scientific research permit (SRP) to NMFS Southeast Fisheries Science Center (SEFSC) for Resource Assessment Survey and Conservation Engineering (Gear) research.

II. Purpose and Need

NMFS is responsible for the management of Federal fishery resources. Scientific research is an important means of gathering valuable information about fish species and is necessary for making informed management decisions on these fish stocks. NMFS conducts Resource Assessment surveys to aid in the development of an index of relative abundance for fishery stock assessments in the South Atlantic, Gulf of Mexico and Caribbean Sea. Gear research is also conducted with the primary focus of research being the development of sea turtle and finfish bycatch mitigation measures for commercial trawl fisheries. The proposed research activities are expected to ultimately contribute to management decisions about fisheries that would potentially have positive social or economic impacts and aid in the recovery and conservation of protected species. The more data available regarding the health of these fish stocks and protected resources, the better NMFS is able maintain a productive and sustainable fishery balanced with ecosystem needs.

III. Alternatives

Alternative 1 - No Action: NMFS SER does not approve the SRP request and the SEFSC does not conduct the Resource Assessment Surveys and Gear research described in Appendix 1. The SRP previously approved for a three year period expired on December 31, 2014.

Preferred Alternative 2 - Status Quo: NMFS SER approves the SRP request and the SEFSC conducts the Resource Assessment Surveys and Gear research described in Appendix 1 for a 2-year period. The Preferred Alternative 2 would allow NMFS to continue conducting research that has been ongoing since the 70's.

Rationale for consideration of only two alternatives: NMFS SEFSC Resource Assessment Surveys are ongoing, and utilize established methods which contribute to long-term data sets used by fisheries scientists, managers and policy makers for assessing stock sizes and health, setting allowable harvest levels, and associated management measures. If NMFS SEFSC changed the established sampling methodology described in Appendix 1, NMFS would not be able to compare the data collected over many decades to the data collected this year, which is the core information supporting NMFS science and management missions and vital to fishery

management decisions made annually by the Fishery Management Councils, NMFS, and other marine resource management institutions. This will introduce greater uncertainty for fishery and other natural resource management decisions. This uncertainty could adversely affect managed fish stocks if overfishing results from poor management decisions, or could adversely affect fisheries and their supporting communities if stock uncertainty leads to more precautionary management of the stocks (e.g., reduced annual catch limits and targets). Because the methods employed are well established and contribute to long-term data sets which rely on consistent methodology for cross/multi-year comparisons, it is not reasonable to consider different alternatives to the ways in which the SEFSC conducts the research surveys and assessments. The SEFSC's sampling protocols require specific mitigation practices (described in section VII) designed to reduce the potential for adverse effects to protected species, the physical environment and other natural resources. Therefore since there are no reasonable alternatives for considering the ways in which the SEFSC conducts the research surveys and assessments, there are no other reasonable alternatives left for consideration, except to approve or disapprove the Scientific Research Permit for the SEFSC.

Discussion:

Alternative 1 - No Action: Under the No Action Alternative the NMFS SER would not issue a SRP to the SEFSC to conduct fieldwork for the fisheries and ecosystem research in marine waters of the South Atlantic, Gulf of Mexico, or Caribbean Sea. NMFS would need to rely on other data sources, such as fishery-dependent data (e.g., harvest data) and state or privately supported fishery-independent data collection surveys or programs to fulfill its responsibility to manage, conserve, and protect living marine resources in the U.S. NMFS Resource Assessment surveys would not be able to continue to collect the time-series data collected over many decades, which is the core information supporting NMFS science and management missions and vital to fishery management decisions made by the Fishery Management Councils, NMFS, and other marine resource management institutions, leading to greater uncertainty for fishery and other natural resource management decisions.

Under **Alternative 1 - No Action**, it is unlikely that any of the state or other institutional research programs would be able to undergo the fundamental realignment of budgets and scientific programs necessary to maintain the level and continuity of information currently provided by the SEFSC. No agencies or other entities would likely conduct fisheries and ecosystem research to replace the research abandoned by the SEFSC under the No Action Alternative.

Alternative 2, is NMFS SER preferred alternative, under NMFS policy directive 01-108 providing the SEFSC a SRP as an acknowledgement of their plans to conduct scientific research. The subject SRP would authorize annual collection activities to sample approximately 7,000 stations with various gear types in the exclusive economic zone of the Gulf of Mexico, Caribbean, and South Atlantic for two years. Appendix 1 describes the proposed research activities in detail. The proposed surveys will take place on NOAA ships *Pisces*, *Gordon Gunter*, *Oregon II*, R/V *Caretta* and *Southern Journey*, and contracted commercial vessels. The results of these surveys and gear studies would be made available to the appropriate Fishery Management Councils for management purposes and would continue to be provided to these organizations in the future. The research is intended to improve the scientific data supporting

fisheries management, improve monitoring and fishing opportunities for the region, and create an overall benefit to the nation.

The research plan includes sampling with trawl gear, longline, ichthyoplankton gear for sampling the surface and water column, and camera sampling all during the day and night hours. Under the research plan, short term, negligible, adverse impacts to fish populations are expected as a result of on-going research activities. For species that are targeted by commercial fisheries, mortality due to research surveys is much less than one percent of commercial harvest and is considered to have negligible adverse effects for all species. For example, based on the most recent stock assessment for red snapper, the average annual biomass for years 2009 to 2011 is 13,908 mt. The approximate total weight of red snapper annually collected during the surveys is 0.682 mt. Therefore, the amount of red snapper collected during the surveys is insignificant with regard to the overall stock. Furthermore, SEFSC research on several key species in the South Atlantic, Gulf of Mexico and Caribbean, such as red snapper and bluefin tuna, provides the scientific foundation for sustainable fisheries management, and therefore, has beneficial effects on target species populations through more informed management decisions.

IV. Affected Environment

The actions considered in this EA would occur primarily in federal and state waters of the Gulf of Mexico (Gulf), South Atlantic, and Caribbean. Descriptions of the physical, biological, economic, social, and administrative environments are available in the following Fishery Management Plan (FMP) amendments, Environmental Impact Statements (EIS), and Environmental Assessments (EAs): Amendment 40 to the reef fish fishery management plan for the reef fish resources of the Gulf of Mexico including EIS (GMFMC 2014); Amendment 15 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico including EA (GMFMC 2014); generic annual catch limits/accountability measures amendment for the Gulf of Mexico fishery management council's red drum, reef fish, shrimp, coral and coral reefs fishery management plans, including environmental impact statement, regulatory impact review, regulatory flexibility analysis, and fishery impact statement (GMFMC 2011); amendment 20A to the Fishery Management Plan for the Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic (GMFMC and SAFMC 2013); Amendment 11 to the Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and South Atlantic including EIS and Supplemental EIS (GMFMC and SAFMC 2011); Amendment 28 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region including EA (SAFMC 2013); Amendment 9 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region including EA (SAFMC 2012); Comprehensive Annual Catch Limit Amendment for the U.S. Caribbean, Amendment 6 to the Reef Fish Fishery Management Plan of Puerto Rico and the U.S. Virgin Islands, Amendment 5 to the Fishery Management Plan for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands, Amendment 3 to the Fishery Management Plan for the Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands, Amendment 3 to the Fishery Management Plan for Corals and Reef Associated Plants and Invertebrates of Puerto Rico and the U.S. Virgin Islands, including EIS (CFMC 2011) which can be found on the respective fishery management council's web sites (<http://caribbeanfmc.com>, www.gulfcouncil.org , <http://safmc.net>). The relevant information and analyses provided in these documents are incorporated by reference and further summarized below.

A. Physical Environment

Descriptions of the physical environment of federal and state waters of the Gulf, South Atlantic, and Caribbean can be found in the documents referenced above. The descriptions include detailed information about the physical properties (e.g. temperature, depth), water quality (e.g. hypoxic zones, dissolved oxygen), habitat type, habitat quality, environmental sites of special interest, shipwrecks, and essential fish habitat (EFH), that occur within federal and state waters of the Gulf, South Atlantic, and Caribbean. Many of the documents referenced above provide additional links and references to other sources of information about the physical environment of federal and state waters of the Gulf, South Atlantic, and Caribbean.

B. Biological/Ecological Environment

The Biological/Ecological environments of the Gulf, South Atlantic, and Caribbean are described in detail in the documents referenced above and include information and analyses about the life history, occurrence/abundance and status of affected species, as well as information on protected species, bycatch and climate change. Relevant portions of the biological/ecological environment are further discussed below:

i. Fish species

Fish species encountered during Resources Assessment Surveys and Gear research include demersal fish, reef fish, sharks, coastal migratory pelagic species, two invasive lionfish species, and various life history stages of planktonic fish. While most of the fish stocks encountered are considered healthy and regulated by Gulf of Mexico, Caribbean, and South Atlantic Fishery Management Council Reef Fish, Snapper-Grouper, and Shrimp FMPs some are being overfished. The data obtained from these surveys is critical in the rebuilding process by providing managers with the information needed to make sound decisions.

ii. Invertebrates

A variety of pelagic and mid-water, surface migrating invertebrates are caught during the ichthyoplankton surveys and benthic invertebrates are encountered during the trawl surveys. Catch typically consists of various life history stages of shrimp species, squid and crustaceans.

iii. Protected species

ESA Listed Species

The following list of endangered or threatened species may be present in the action area and described further at <http://www.nmfs.noaa.gov/pr/species/esa/>. Due to the nature of the proposed activities marine mammal interactions would be limited to ship strikes (none to date) and acoustic interference for the listed species. While sturgeon and sawfish occur in the proposed area they have never been encountered during the proposed research activities. Sea turtles are most commonly encountered during our trawl surveys and occasionally during longline. When encountered, all scientific parties involved would be experienced in capturing and handling sea turtles and would undertake several precautions. In addition, separate permits have been obtained to sample these turtles. Even though research efforts are non-directed for ESA-listed

species, valuable biological information is gained from sampling methodologies used (biopsy and tagging) during the course of the resource assessment cruises.

Table 1. ESA-Listed Species and Critical Habitat Potentially Affected by Continued Research Activities		
Marine Mammals	Scientific Name	Status
<i>Blue whale</i>	<i>Balaenoptera musculus</i>	<i>Endangered</i>
<i>Humpback whale</i>	<i>Megaptera novaeangliae</i>	<i>Endangered</i>
<i>Fin whale</i>	<i>Balaenoptera physalus</i>	<i>Endangered</i>
<i>North Atlantic right whale</i>	<i>Eubalaena glacialis</i>	<i>Endangered</i>
<i>Sei whale</i>	<i>Balaenoptera borealis</i>	<i>Endangered</i>
<i>Sperm whale</i>	<i>Physeter macrocephalus</i>	<i>Endangered</i>
Sea Turtles	Scientific Name	Status
<i>Green sea turtle</i>	<i>Chelonia mydas</i>	<i>Endangered/Threatened *</i>
<i>Hawksbill sea turtle</i>	<i>Eretmochelys imbricata</i>	<i>Endangered</i>
<i>Leatherback sea turtle</i>	<i>Dermochelys coriacea</i>	<i>Endangered</i>
<i>Loggerhead sea turtle</i>	<i>Caretta caretta</i>	<i>Threatened**</i>
<i>Kemp's ridley sea turtle</i>	<i>Lepidochelys kempii</i>	<i>Threatened</i>
Invertebrates	Scientific Name	Status
<i>Elkhorn coral</i>	<i>Acropora palmata</i>	<i>Threatened</i>
<i>Staghorn coral</i>	<i>Acropora cervicornis</i>	<i>Threatened</i>
<i>Rough cactus coral</i>	<i>Mycetophyllia ferox</i>	<i>Threatened</i>
<i>Pillar coral</i>	<i>Dendrogyra cylindrus</i>	<i>Threatened</i>
<i>Lobed star coral</i>	<i>Orbicella annularis</i>	<i>Threatened</i>
<i>Mountainous star coral</i>	<i>Orbicella faveolata</i>	<i>Threatened</i>
<i>Boulder star coral</i>	<i>Orbicella franksi</i>	<i>Threatened</i>
Fish	Scientific Name	Status
<i>Gulf Sturgeon</i>	<i>Acipenser oxyrinchus desotoi</i>	<i>Threatened</i>
<i>Smalltooth sawfish</i>	<i>Pristis pectinata</i>	<i>Endangered ***</i>
<i>Atlantic sturgeon</i>	<i>Acipenser oxyrinchus oxyrinchus</i>	<i>Endangered/Threatened ****</i>
Critical Habitat		
<i>Elkhorn and staghorn coral</i>		
<i>North Atlantic right whale</i>		
<i>Northwest Atlantic Ocean Distinct Population Segments (DPS) of loggerhead sea turtle</i>		
*Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered.		
**The Northwest Atlantic DPS.		
***The United States DPS.		
****The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are listed as endangered; the Gulf of Maine DPS is listed as threatened.		

Non-ESA Listed Marine Mammals

In addition to the ESA-listed marine mammals described above, a number of non-ESA listed marine mammals may also be found in the action area. In particular, dolphin species frequently encountered during trawl surveys are Atlantic spotted dolphin (*Stenella frontalis*) and bottlenose dolphin (*Tursiops truncatus*). Neither of these stocks are listed as depleted under the Marine Mammal Protection Act (MMPA). Further information regarding the stock status, abundance, density, and distribution and habitat can be found at <http://www.nmfs.noaa.gov/pr/species/mammals/>.

iv. Essential Fish Habitat (EFH)

The area that would be affected by this final action has been identified as EFH in Gulf of Mexico, South Atlantic, and Caribbean Fishery Management Council FMPs and the Consolidated Highly Migratory Species FMP of NMFS's Highly Migratory Species Division. The activities being proposed are considered scientific research and therefore fall in accordance with guidelines set forth under the qualifying criteria for EFH General Concurrence.

C. Economic and Social Environment

The economic and social environments of the Gulf, South Atlantic, and Caribbean are described in detail in the documents referenced above. These descriptions include information and analyses on fishing communities, charter boats and headboats, commercial and recreational sectors, environmental justice, permits, and other business activity.

D. Administrative Environment

The administrative environments of the Gulf, South Atlantic, and Caribbean are described in detail in the documents referenced above and include more specific information about State and Federal fisheries managers, policymakers, and stakeholders in the Gulf of Mexico, South Atlantic, and Caribbean. Additionally, the SEFSC is responsible for scientific research on living marine resources that occupy marine and estuarine habits of the continental southeastern United States, as well as Puerto Rico and the U.S. Virgin Islands. The SEFSC is one of NMFS' six fisheries science centers responsible for federal marine fishery research programs. Further information regarding the SEFSC and their research can be found here <http://www.sefsc.noaa.gov/labs/miami.htm>.

V. Environmental Effects

A. Effects to the Physical Environment

Most of the gear proposed to be used under **Preferred Alternative 2** is based on common fishing gears. These gears directly affect the physical environment through contact. Trawling is recognized for its impacts to benthic environments because the heavy doors drag along the bottom and the tickler chains scrape along the sea floor. NMFS trawls are conducted primarily over soft substrates such as mud or silt that are more resilient to disturbance than other bottom types. Research has shown that areas that have been closed to shrimp trawling seasonally, such as the Texas closure, are not physically altered relative to areas continuously open to shrimp

trawling, and longer term parameters such as currents and storms may have more effects on the physical characteristics of an area (Sheridan and Doerr 2005). Therefore, this type of research gear, particularly at the reduced level of use compared to commercial trawl operations, is considered to have minor impacts to the physical environment.

Under **Preferred Alternative 2**, bottom longline gear will be deployed over hard bottom habitats using weights to keep the gear in direct contact with the bottom. Its potential for adverse impact is dependent on the type of habitat it is set on, the presence or absence of currents, and the behavior of fish after being hooked. In addition, this gear upon retrieval can abrade, snag, and dislodge smaller rocks, corals, and sessile invertebrates (Hamilton 2000; Barnette 2001). Direct underwater observations of longline gear in the Pacific halibut fishery by High (1998) noted that the gear could sweep across the bottom. Some halibut were observed pulling portions of longlines 15 to 20 feet over the bottom. Although the gear was observed in contact with or snagged on a variety of objects including coral, sturdy soft corals (e.g., gorgonians) usually appeared unharmed while stony corals often had portions broken off. However, in a different study where deployed bottom longline gear was directly observed (Atlantic tilefish fishery), no evidence of gear movement was documented, even when placed in strong currents (Grimes et al. 1982). This was attributed to anchors set at either end of the bottom longline as well as sash weights along the line to prevent movement. Based on these direct observations, it is logical to assume that bottom longline gear would have a minor impact on sandy or muddy habitat areas. However, due to the vertical relief that hardbottom and coral reef habitats provide, it would be expected that bottom longline gear may become entangled, resulting in potential negative impacts to habitat (Barnette 2001). Because bottom longlines under the proposed research are limited in their scope, particularly when compared to commercial fishing operations, and the amount of time the gear is set would be limited (Appendix 1) reducing the interaction time, any effects to the physical environment by this gear as a result of this action would likely be minor.

The terminal end of handline gear (bandit gear, rod-and-reel, and electric reels) used in fishing is generally suspended over hard bottom because many managed reef fish species occur higher over this type of substrate than over sand or mud bottoms (GMFMC 2004). Handline gear is less likely to contact the bottom than longlines, but still has the potential to snag and entangle bottom structures and cause tear-offs or abrasions (Barnette 2001). In using bandit gear, a weighted line is lowered to the bottom, and then the lead is raised slightly off the bottom (Siebenaler and Brady 1952). The gear is in direct contact with the bottom for only a short period of time. Barnette (2001) suggests that physical impacts may include entanglement and minor degradation of benthic species from line abrasion and the use of weights (sinkers). Commercial or recreational fishing with rod-and-reel also lays gear on the bottom. The terminal part of the gear is either lifted off the bottom like fishing with bandit gear, or left contacting the bottom. Sometimes the fishing line can become entangled on coral and hard bottom outcroppings. The subsequent algal growth can foul and eventually kill the underlying coral (Barnette 2001). Researchers conducting studies in the restricted fishing area at Madison-Swanson reported seeing lost fishing line on the bottom, much of which appeared to be fairly old and covered with growth (A. David, SEFSC, pers. comm.), a clear indication that bottom fishing has had an impact on the physical environment prior to fishing being prohibited in the area (GMFMC 2003). Because handlines under the proposed research are limited in their scope, particularly when compared to commercial fishing operations, any effects to the physical environment by this gear as a result of this action would likely be minor.

The proposed survey methods include the use of chevron traps. Barnette (2001) indicated that traps set on hard bottoms may physically damage live organisms, such as corals, gorgonians, and sponges. Damage may include flattening of habitats, particularly by breaking branching corals and Gorgonians, and injury may lead to reduced growth rates or death, either directly or through subsequent algal overgrowth or disease infection. During initial hauling, a trap may be dragged over more substrate until it lifts off the bottom. The proposed study does not set traps in trotlines. To do so can cause further damage from the trotline being dragged across the bottom, potentially shearing off at their base those organisms most important in providing topographic complexity. Traps are not known to adversely affect soft bottom habitats. Traps may also ghost fish if lost; however, the chevron traps that would be used have blowout panels to prevent ghost fishing. Given the limited trap sets under the Reef Fish Surveys, impacts by this gear on the physical environment would likely be minor.

Ichthyoplankton surveys and pelagic longlining are conducted exclusively in pelagic open ocean areas. For the ichthyoplankton surveys, surface trawl gear and other water sampling equipment are deployed in the water column and there would be no contact with the ocean bottom. The same is true for pelagic longlines. Therefore, these gear types are not expected to affect the physical environment.

Under **Alternative 1 - No action**, there would be no adverse effects to the physical environment because no sampling would occur. Under the preferred alternative, adverse effects would occur as described above. However, because of the limited use of trawls, longlines, vertical lines, chevron traps, and plankton nets, these gears would likely only have minor effects, particularly compared to commercial fisheries where gear use is several orders of magnitude greater. Therefore, any effects to the physical environment are expected to be minor.

B. Effects to the Biological/Ecological Environment

This section describes the effects of fishery research activities, including research vessels, survey gear, and other associated equipment, on the biological/ecological environment in the SEFSC fisheries research areas of the Gulf of Mexico, South Atlantic and U.S. Caribbean.

i. Fish Species

Direct mortality of fish occurs as a result of fisheries research surveys (**Preferred Alternative 2**) and tagging activities. Fish are taken in a variety of gear types; however, these surveys provide important data regarding fish abundance and distribution, necessary for managers to maintain healthy populations and rebuild overfished stocks. Fisheries research surveys are also used to determine biomass estimates, abundance, and distribution of stocks. Stock assessments based on accurate abundance and distribution data are essential to developing effective management strategies. Invasive species, *Pterois miles* and *P. volitans*, are also encountered on our surveys and will be sacrificed to prevent the further spread and colonization of these species. Biological information will also be gathered to better our scientific knowledge of lionfish occurring in the research area. **Preferred Alternative 2** would allow fisheries research currently being conducted to continue for two years and allow for better management decisions.

Under **Alternative 1 - No action**, the SEFSC would stop conducting fisheries research in marine waters. Currently, the SEFSC collects data which are used to manage and conserve marine resources, including fish, their habitats, and the ecosystems that sustain the fish populations of the Gulf of Mexico, South Atlantic and the U.S. Caribbean. Alternative 1 would have no immediate adverse direct effects on fish. However, the loss of scientific information about these species would make it much more difficult for fisheries managers to effectively monitor their status, set commercial harvest limits, or develop fishery regulations to protect vulnerable stocks, especially as information used in stock assessments gets older and less reliable. Although the effects would be minor, this alternative would also prevent a means for removal of the invasive lionfish species causing additional stress to the biological and ecological environment. Studies have shown that lionfish feed on prey normally consumed by snappers, groupers, and other commercially important native species therefore negatively affecting the well-being of valuable commercial and recreational fisheries.

ii. Invertebrates

Under **Preferred Alternative 2**, short term, minor impacts to invertebrates are expected from SEFSC research activities. The amount of invertebrates caught in research surveys is negligible compared to population levels. As is the case with fish, the SEFSC conducts research and provides stock assessment advice for several species of invertebrate species with valuable commercial fisheries, such as brown shrimp and blue crab. The SEFSC research is important for the scientific and sustainable management of these fisheries, helping to prevent overfishing on the stocks.

Alternative 1 - No action would eliminate any minor impacts on invertebrates that may occur under **Preferred Alternative 2**, but would result in potential negative impacts to invertebrates due to a lack of information essential for informed decision making and conservation of invertebrates and their habitats. Currently, SEFSC collects data which are used to manage and conserve marine resources, including invertebrates, their habitats, and the ecosystems that sustain invertebrate populations in the Gulf of Mexico, South Atlantic and U.S. Caribbean. Under Alternative 1, discontinuation of SEFSC research activities are expected to result in adverse impacts to invertebrates, outweighing any benefits resulting from elimination of the minor impacts that may occur under **Preferred Alternative 2**.

iii. Protected Species

ESA Listed Species

The NMFS SER is conducting an ESA Section 7 consultation, and is in the process of completing a Biological Opinion on all fisheries independent monitoring activities in the SER. All proposed actions being considered for this SRP are being analyzed as a part of that consultation. The SER completed an ESA Section 7(a)(2) and Section 7(d) memorandum determining that the research activities proposed under the SRP would not jeopardize the continued existence of any endangered or threatened species during the ESA consultation process. The potential impacts of the research activities for the period between the initiation of the research activities and the completion of the opinion, summer of 2015, are outlined in the 7(a)(2)/7(d) memo and included in Appendix 1.

Since inception of the resource assessment surveys in the early 1970s, 69 interactions have occurred with ESA listed species and out of that only one was lethal. Considering the scope of

the activities and the populations of the listed stocks, these numbers are minimal and have negligible adverse impacts on listed species populations and their habitats.

Non-ESA Listed Marine Mammals

Trawl data from previous surveys shows that the incidental take of non-ESA-listed marine mammals, although unlikely, is possible in the proposed action area. In particular, dolphin species frequently encountered during trawl surveys are Atlantic spotted dolphin (*Stenella frontalis*) and bottlenose dolphin (*Tursiops truncatus*). Neither of these stocks or any in the Gulf of Mexico are listed as depleted under the Marine Mammal Protection Act (MMPA).

Out of the thousands of trawls conducted since the early 1970s, two marine mammal interactions have occurred with only one being lethal. As with past surveys it is believed that marine mammal takes will continue to be extremely low, resulting in negligible impacts to dolphin populations. Additionally, a variety of mitigations measures are implemented on all of the proposed research activities to reduce the risk of marine mammal interactions with the gear. These measures appear to be successful as interactions are extremely low compared to the commercial and recreational fisheries.

iv. Essential Fish Habitat (EFH)

Under **Preferred Alternative 2**, methods used during all research activities will limit anticipated effects to EFH to the greatest extent possible. Trawl and longline gear will not be set in areas known to contain natural hard bottom. Ichthyoplankton surveys are conducted exclusively in pelagic open ocean areas using surface trawl gear and other water sampling equipment; thus there will be no contact with the ocean bottom. For the pelagic habitat, although there will be an effect of a prey source removal, the amount of take is extremely small and therefore there will be no measurable effect to coastal habitat and/or EFH.

Under **Alternative 1 - No Action**, any of the minor adverse impacts expected to occur under **Preferred Alternative 2** would be eliminated. However, the loss of scientific information provided by the SEFSC survey activities would make it difficult for fisheries managers to assess the efficacy of special resource areas in fulfilling the ecosystem functions for which they were designated. Furthermore, a lack of input from SEFSC research would preclude the maintenance and effective management of existing EFH, HAPC, and closed areas, and would encumber the designation of additional special resource areas in the future. Therefore, although Alternative 1 - No action, would eliminate minor impacts expected under **Preferred Alternative 2**, this would be offset by indirect adverse impacts resulting from a lack of the essential scientific information currently used to establish, maintain, and manage special resource areas.

C. Effects to the Social and Economic Environment

Preferred Alternative 2 would allow the long-term standardized resource surveys conducted by NOAA fishery research vessels to continue for a 2-year period. These surveys are fundamental elements of stock assessments in the Southeast region. The extended time-series of data collected through these surveys helps identify trends that inform fisheries management. This information is essential to establishing species-specific sustainable harvest limits. Harvest limits that are set too high may lead to overfishing of specific stocks and more restrictive management measures in the future to rebuild those stocks. Harvest limits that are set too low do not allow a maximum

sustainable harvest that benefits commercial and recreational fisheries and the communities and services that support them. In addition, the predictability and reliability of long term data sets and the harvest limits they support is essential for economic stability in the fisheries over time.

Preferred Alternative 2 is expected to result in less scientific uncertainty, leading to better informed management decisions which should result in greater economic stability both in the near and long term. This in turn is expected to have a positive effect on communities in the Gulf, South Atlantic, and Caribbean that rely on these resources.

While the research conducted under **Preferred Alternative 2** does involve hazardous materials and impacts to human health, those affects would not be adverse. The Chief Scientist of each research cruise is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy (<http://www.moc.noaa.gov/all-ships/index.html>), the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request. In addition, the proposed research could result in potential injuries to researchers as they collect the needed samples. To minimize these hazards researchers are provided with and required to use personal protective equipment while following strict safety protocols.

Under **Alternative 1 - No action**, NMFS SER would not issue the SRP to the SEFSC and subsequently the SEFSC would not carry out their research. This alternative would not have any immediate adverse impacts on the resources described in the affected environment section. However, NMFS would not be able to continue to collect the time-series data collected over many decades, which is the core information supporting NMFS science and management missions and vital to fishery management decisions made by the Fishery Management Councils, NMFS, and other marine resource management institutions, leading to greater uncertainty for fishery and other natural resource management decisions. This uncertainty could adversely affect managed fish stocks over the long term if overfishing results from poor management decisions, or could adversely affect fisheries and their supporting communities if stock uncertainty leads to more precautionary management of the stocks (e.g., reduced annual catch limits and targets).

Under **Alternative 1 - No action**, it is unlikely that any of the state or other institutional research programs would be able to undergo the fundamental realignment of budgets and scientific programs necessary to maintain the level and continuity of information currently provided by the SEFSC on these three major marine ecosystems. No agencies or other entities would likely conduct fisheries and ecosystem research to replace the research abandoned by the SEFSC under the No Action Alternative. This would likely result in adverse effects to the economies and communities that rely on these fisheries.

D. Effects to the Administrative Environment

Issuing a 2-year SRP (**Preferred Alternative 2**) would have minor direct impacts on workload at the SEFSC and SERO. The long-term indirect effects of issuing the permit (**Preferred Alternative 2**) are expected to be beneficial, because the research it authorizes would allow

fisheries scientists, managers and policymakers to make informed decisions about how best to manage resources. We expect that by reducing uncertainty behind fisheries management decisions, the overall administrative burden of implementing new/different regulations and policies will be lowered.

Alternative 1 - No Action, is not expected to have any direct effect on the administrative environment, because no permit would need to be issued. However, it is anticipated that the loss of even a single year of data obtained by the SEFSC's research would indirectly, negatively affect the administrative environment because fisheries managers and policymakers will be challenged with overcoming the uncertainty that will likely result from the missing data and information.

VI. Cumulative Impacts

The area in which the effects of the proposed action will occur.

The area in which the effects of the proposed action would occur includes state and federal waters of the Gulf of Mexico, South Atlantic and the U.S. Caribbean as well as communities dependent on saltwater fishing.

The impacts that are expected in that area from the proposed action.

The proposed action would allow the SEFSC to continue to sample fishery resources, resulting in the impacts discussed above, all of which is an effort to provide fishery independent indices for stock assessments, such as the Southeast Data, Assessment and Review (SEDAR) process. The purpose of SEDAR is to monitor population trends for managed stocks in the Gulf of Mexico, South Atlantic, and U.S. Caribbean. These assessments provide the basis for evaluating stocks relative to legally-mandated biological reference points to determine stock condition. In addition, these assessments help fishery managers develop catch limits, targets and performance indicators for setting allowable fishing levels. Without the proposed action, limited information would be available for assessments and would limit the ability of fishery managers to evaluate the performance of stocks in response to fishing and changing environmental conditions.

Other past, present, and reasonably foreseeable actions that have or are expected to have impacts in the area, and the impacts or expected impacts from these other actions.

Fishery Management

Management measures have been developed by the Fishery Management Councils based in part on stock assessments supported by the proposed action. Cumulative effects from these management measures have been recently evaluated and discussed in various amendments to the councils' FMPs, which can be found on the respective council web sites (<http://caribbeanfmc.com>, www.gulfcouncil.org, <http://safmc.net>). Examples of these amendments include the Comprehensive Annual Catch Limit Amendment for the U.S. Caribbean (CFMC 2011), Amendment 40 to the FMP for the Reef Fish Fishery Resources of the Gulf of Mexico (GMFMC 2014), and Amendment 32 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC 2014). In general, these analyses indicate fishery management actions have benefitted the physical and biological/ecological

environments by limiting fishing effort, protecting essential fish habitat, allowing overharvested stocks to recover, and reducing the likelihood of overfishing for all stocks. These analyses have also concluded that although the social and economic environments are likely to suffer short-term adverse effects from some management measures, long-term beneficial effects are likely to be realized through the sustainable harvest of these stocks.

Stressors outside of Fishery Management

Deepwater Horizon

On April 20, 2010, an explosion occurred on the Deepwater Horizon MC252 oil rig, resulting in the release of an estimated 4.9 million barrels of oil into the Gulf of Mexico. In addition, 1.84 million gallons of Corexit 9500A dispersant were applied as part of the effort to constrain the spill. The oil from the spill site largely affected the Gulf of Mexico region to an extent still unknown and does not likely pose a threat to the Caribbean and South Atlantic species. In the Gulf of Mexico, effects of the spill are still being evaluated and the full extent of the effects will not be understood until the 2010 year-class for fish stocks enter the fishery. Some effects are only now being published. For example, in a recent study, Weisberg et al. (2014) suggested the hydrocarbons associated with Deepwater Horizon MC252 oil spill did transit onto the Florida shelf and may be associated with the occurrences of reef fish with lesions and other deformities. However, these effects may be ephemeral as Murawski et al. (2014) reported that the incidence of lesions on bottom dwelling fish had declined between 2011 and 2012 in the northern Gulf. Monitoring of the stocks through the proposed action's Resource Assessment surveys is used by researchers to better understand the long-term effects of the spill.

Hypoxia

Every summer in the northern Gulf, a large hypoxic zone forms. It is the result of excess nutrients from the Mississippi River and a seasonal layering of waters in the Gulf (see <http://www.gulfhypoxia.net/>). The layering of the water is temperature and salinity dependent and prevents the mixing of higher oxygen content surface water with oxygen-poor bottom water. For 2014, the extent of the hypoxic area was estimated to be 5,052 square miles and is similar the running average for over the past five years of 5,543 square miles Gulf (see <http://www.gulfhypoxia.net/>). The hypoxic conditions in the northern Gulf directly impact less mobile benthic macroinvertebrates (e.g., polychaetes;) by influencing density, species richness, and community composition (Baustian and Rabalais 2009). However, more mobile macroinvertebrates and demersal fishes (e.g., red snapper) are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, these organisms are indirectly effect by limiting prey availability and constraining available habitat (Baustian and Rabalais 2009, Craig 2012). The proposed action would not affect the hypoxic conditions; however, data collected through the proposed action ([Southeast Area Monitoring and Assessment Program](#) summer groundfish survey) is used to generate products that form the basis for summertime advisories on anoxic and hypoxic conditions in the north-central Gulf of Mexico in real-time.

Climate Change

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water

temperatures. The Environmental Protection Agency's climate change web page provides basic background information on these and other measured or anticipated effects. In addition, the Intergovernmental Panel on Climate Change has numerous reports addressing their assessments of climate change (http://www.ipcc.ch/publications_and_data/publications_and_data.shtml). Global climate changes could affect the Gulf fisheries; however, the extent of these effects is not known at this time. Possible impacts include temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; changes in precipitation patterns and a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influencing the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002). It is unclear how climate change would affect reef fishes, and likely would affect species differently. Burton (2008) speculated climate change could cause shifts in spawning seasons, changes in migration patterns, and changes to basic life history parameters such as growth rates. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Hollowed et al. (2013) provided a review of projected effects of climate change on the marine fisheries and dependent communities. Integrating the potential effects of climate change into the fisheries assessment is currently difficult due to the time scale differences (Hollowed et al. 2013). The fisheries stock assessments rarely accurately project for more than a few years, a time span that would preclude detectable climate change effects. While climate change may impact Gulf reef fish species in the future, the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. Conversely, the proposed action is not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing.

The overall impact that can be expected if the individual impacts are allowed to accumulate.

The sampling conducted under the proposed action would improve the understanding of fish stocks and provide beneficial information to fishery managers to manage these stocks to produce optimum yield. The cumulative impacts of the proposed actions in conjunction with past, present and reasonably foreseeable management, as well as other documented stressors are not expected to be significant.

The proposed action would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places as these are not in federal waters of the Gulf of Mexico, South Atlantic, or U.S. Caribbean. This action is not likely to result in direct, indirect, or cumulative effects to unique areas, such as significant scientific cultural, or historical resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas as the proposed action is to only sample fishery resources in southeastern U.S. and U.S. Caribbean waters. The proposed action is not likely to cause loss or destruction to national marine sanctuaries, historic shipwrecks, habitat areas of particular concern, and marine reserves listed in the various Caribbean, Gulf of Mexico, and South Atlantic FMPs because the actions are not expected to result in appreciable changes to past sampling activities.

VII. Minimization and Mitigation Measures:

The activities authorized under the proposed SRP, if approved, would follow certain procedures in order to minimize and mitigate potential environmental effects of the proposed action. The following specific conditions would be placed on the research should the proposed permit be issued to ensure compliance with appropriate research protocols. In the event of any sea turtle, sawfish, sturgeon or marine mammal incidental take (i.e., entanglement, hooking, capture, vessel strike, etc.), researchers should follow procedures outlined in the Southeast Region Protected Species Incidental Take Reporting Form Instructions.

-Mitigation Measures for Protected Species during Research with Bottom Trawl Gear

Monitoring methods

The officer on watch (or member of the Scientific Party), and crew standing watch on the bridge visually scan for marine mammals, sea turtles, and other ESA-listed species (protected species) during all daytime operations. Bridge binoculars are used as necessary to survey the area upon arrival at the station, during visual and sonar reconnaissance of the trawl line to look for potential hazards (e.g., commercial fishing gear, unsuitable bottom for trawling, etc.), and while the gear is deployed. If any marine mammals or sea turtles are sighted by the bridge or deck crew prior to setting the gear or at any time the gear is in the water, the bridge crew and/or Chief Scientist are alerted immediately. Environmental conditions (e.g., lighting, sea state, precipitation, fog, etc.) often limit the distance for effective visual monitoring of protected species.

Operational procedures

- If any marine mammals, sea turtles or other protected species are sighted around the vessel before gear deployment, in most cases, gear is not deployed unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the Field Party Chief/Scientific Watch Leader (Chief Scientist). The vessel may be moved or gear deployment may be delayed until the animals no longer appear to be at risk of interaction with the gear.
- If trawling operations have been delayed because of the presence of marine mammals or sea turtles, the vessel resumes trawl operations only when these species have not been recently sighted or otherwise determined to no longer be at risk. This decision is at the discretion of the Field Party Chief (Chief Scientist) or Scientific Watch Leader and is dependent on the situation.
- Once the trawl net is in the water, if protected species are sighted before the gear is fully retrieved, the most appropriate response to avoid incidental take is determined by the professional judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader in consultation with the officer on watch as necessary. These judgments take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course. Most marine mammals have been caught during haul-back operations, especially when the trawl doors have been retrieved and the net is near the surface and no longer under tension. In some situations, risk of adverse interactions may be diminished by continuing to trawl with the net at depth until the marine mammals and/or sea turtles have left the area before beginning haul-back operations. In other situations, swift retrieval of the net may be the best course of action. The appropriate course of action to

minimize the risk of incidental take of protected species is determined by the professional judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader based on all situational variables, even if the choices compromise the value of the data collected at the station.

- Care is taken when emptying the trawl, including opening the cod end as close as possible to the deck of the checker (or sorting table) in order to avoid damage to protected species that may be caught in the gear but are not visible upon retrieval. The gear is emptied as quickly as possible after retrieval in order to determine whether or not protected species are present.

Tow duration

- In 2008, standard tow durations for bottom trawl surveys were reduced from 55 minutes to 30 minutes or less at targeted depth, excluding deployment and retrieval time, to reduce the likelihood of attracting and incidentally taking protected species. These short tow durations decrease the opportunity for curious marine mammals to find the vessel and investigate. Tow times are less than the 55 minute tow time restriction required for commercial shrimp trawlers not using turtle excluder devices (TEDs) (50 CFR 223.206). The resulting distance towed is typically one to two nautical miles or less, depending on the survey and trawl speed. Short tow times reduce the likelihood that captured sea turtles would drown.
- Trawl projects designed to test bycatch reduction devices and turtle excluder devices for commercial fishing gear may have longer tow times (up to four hours). These exceptions to the short tow duration protocols are necessary to meet their research objectives. TEDs are used in nets that are towed in excess of 55 minutes as required by 50 CFR 223.206. See Section 1.1.3 below.

-Mitigation Measures for Protected Species during SEFSC Conservation Engineering Trawl Research

Conservation engineering research conducted by the SEFSC is primarily carried out by the Harvesting Systems Unit at Mississippi Labs in Pascagoula, Mississippi. Independent research is conducted aboard NOAA small vessels, contracted state vessels, or contracted commercial vessels. The primary focus of the research is the development of sea turtle and finfish bycatch mitigation measures for commercial trawl fisheries. The majority of the work focuses on shrimp trawls with a variety of trawl designs used to conduct this research. This research is covered under a Section 10(a)(1)(A) permit for sea turtles, incidental captures are authorized for smalltooth sawfish (3) and Atlantic sturgeon (4).

Monitoring methods

- Engineering trawl research surveys occur on small vessels with a limited number of scientists and crew. Before the net is set, while the net is being deployed, and during the soak, the scientists and crew will monitor the waters around the vessel and maintain a lookout for marine mammals, sea turtles and other protected species.

Operational procedures

- If any marine mammals, sea turtles or other protected species are sighted around the vessel before gear deployment, in most cases, gear is not deployed unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the Field

Party Chief (Chief Scientist). The vessel may be moved or gear deployment may be delayed until the animals no longer appear to be at risk of interaction with the gear.

- If trawling operations have been delayed because of the presence of marine mammals or sea turtles, the vessel resumes trawl operations only when these species have not been recently sighted or otherwise determined to no longer be at risk. This decision is at the discretion of the Field Party Chief (Chief Scientist) and is dependent on the situation.
- Once the trawl net is in the water, if protected species are sighted before the gear is fully retrieved, the most appropriate response to avoid incidental take is determined by the professional judgment of the Field Party Chief (Chief Scientist) in consultation with the vessel operator as necessary. These judgments take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course. Most marine mammals have been caught during haul-back operations, especially when the trawl doors have been retrieved and the net is near the surface and no longer under tension. In some situations, risk of adverse interactions may be diminished by continuing to trawl with the net at depth until the marine mammals and/or sea turtles have left the area before beginning haul-back operations. In other situations, swift retrieval of the net may be the best course of action. The appropriate course of action to minimize the risk of incidental take of protected species is determined by the professional judgment of the Field Party Chief (Chief Scientist) based on all situational variables, even if the choices compromise the value of the data collected at the station.
- Care is taken when emptying the trawl, including opening the cod end as close as possible to the deck of the checker (or sorting table) in order to avoid damage to protected species that may be caught in the gear but are not visible upon retrieval. The gear is emptied as quickly as possible after retrieval in order to determine whether or not protected species are present.

Tow Duration

- A Turtle Excluder Device (TED) is installed in nets that are towed in excess of 55 minutes as required by 50 CFR 223.206. When research objectives prevent the installation of TEDs in all trawls used, tows will be no longer than 30 minutes unless specific fisheries regulations exist requiring tow time limits in lieu of TEDs. In these cases, tow time limits will match those set by regulations such as the skimmer trawl fishery which has a 55 min tow time limit.

Turtle Excluder Devices

- SEFSC Bycatch Reduction Device (BRD) Evaluations and SEFSC-SA TED Evaluations install TEDs in each trawl to mitigate for sea turtle interactions and any potential sturgeon or sawfish interactions.
- SEFSC-GOM TED Evaluations and SEFSC Skimmer Trawl TED Testing use TEDs in one net and have 55 minute tow times. The SEFSC Small Turtle TED Testing and Gear Evaluations either use TEDs or leave the tailbags untied so that any captured animals are able to escape.

Live Feed Video/Sonar Trawl Monitoring

- In some cases live feed video or sonar monitoring of the trawl is used in lieu of tow time limits. This mitigation measure is also used in addition to TEDs during some projects. Video or

sonar feeds are monitored for the duration of the tow. If a TED is not installed in the trawl and a protected species is observed in the trawl then the tow is immediately terminated. If a TED is installed and a protected species (excluding marine mammals) is observed in the trawl then the individual is monitored for exclusion from the trawl through the TED. If the species observed is a marine mammal or the individual has trouble escaping through the TED opening, or the individual is lost from the video or sonar feed then the tow is immediately terminated.

Diver Monitored Trawls

- During diver assisted gear evaluations (SEFSC Small Turtle TED Testing and Gear Evaluations), dive teams are deployed on the trawls while they are being towed. During this research, divers actively monitor the gear for protected species interactions and use emergency signal floats to notify the vessel if an interaction occurs. When the signal float is deployed the vessel terminates the tow and slows the gear down to a minimal forward speed of less than 0.5 kts, which allows divers to assist the protected species escape.

-Mitigation Measures for Protected Species during Research with Oceanic Deep-water Trawl Gear in Deep Water (500-800 m deep)

Monitoring methods

- The officer on watch and crew standing watch on the bridge visually scan for marine mammals, sea turtles, and other ESA-listed species (protected species) during all daytime operations. Bridge binoculars are used as necessary to survey the area as far as environmental conditions (lighting, sea state, precipitation, fog, etc.) will allow. Additionally, at least 30 minutes prior to the planned start of putting the trawl net into the water, a member of the crew or scientist that is an experienced protected species observer visually scans the waters surrounding the vessel for marine mammals and sea turtles. This typically occurs during transit leading up to arrival at the sampling station and during visual and sonar reconnaissance of the trawl line to look for potential hazards (e.g., commercial fishing gear). Designated crew also monitor for protected species while the gear is deployed. If any marine mammals or sea turtles are sighted by the bridge or deck crew prior to or after setting the gear, the bridge crew and Field Party Chief (Chief Scientist) are alerted as soon as possible. Environmental conditions (lighting, sea state, precipitation, fog, etc.) often limit the distance for effective visual monitoring of protected species.

Operational procedures

- “Move-on” Rule. If any marine mammals or sea turtles are sighted anywhere around the vessel (within 2 nautical miles) in the 30 minutes before setting the gear, the vessel may be moved away from the animals to a different section of the sampling area if the animals appear to be at risk of interaction with the gear at the discretion of the officer on watch. Small moves within the sampling area can be accomplished without leaving the sample station. After moving on, if marine mammals or sea turtles are still visible from the vessel and appear to be at risk, the officer on watch will consult with the Field Party Chief (Chief Scientist) or Scientific Watch Leader to determine the best strategy to avoid potential takes of these species such as moving again or skipping the station. Strategies are based on the species encountered, their numbers and behavior, their position and vector relative to the vessel, and other factors. For instance, a whale transiting through the area and heading away from the vessel may not require any move, or may require only a short move from the initial sampling site, while a pod of dolphins gathered around

the vessel may require a longer move from the initial sampling site or possibly cancellation of the station if the dolphins follow the vessel. In most cases, trawl gear is not deployed if marine mammals or sea turtles have been sighted from the ship in the previous 30 minutes unless those animals do not appear to be in danger of interactions with the trawl, as determined by the judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader in consultation with the officer on watch. The efficacy of the “move-on” rule is limited during night time or other periods of limited visibility; research gear is deployed as necessary when visibility is poor, although operational lighting from the vessel illuminates the water in the immediate vicinity of the vessel during gear setting and retrieval.

- Trawl operations are usually the first activity undertaken upon arrival at a new station in order to reduce the opportunity to attract marine mammals and other protected species to the vessel. The order of gear deployment is determined on a case-by-case basis by the Field Party Chief (Chief Scientist) based on environmental conditions and sonar information at the sampling site. Other activities, such as water sampling or plankton tows, are conducted in conjunction with, or upon completion of, trawl activities.
- Once the trawl net is in the water, the officer on watch, Field Party Chief (Chief Scientist) or Scientific Watch Leader, and/or crew standing watch continue to monitor the waters around the vessel and maintain a lookout for marine mammals and sea turtles as far away as environmental conditions allow (as noted previously, visibility can be limited for various reasons). If these species are sighted before the gear is fully retrieved, the most appropriate response to avoid incidental take is determined by the professional judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader, in consultation with the officer on watch. These judgments take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course. Most marine mammals have been caught during haul-back operations, especially when the trawl doors have been retrieved and the net is near the surface and no longer under tension. In some situations, risk of adverse interactions may be diminished by continuing to trawl with the net at depth until the marine mammals and/or sea turtles have left the area before beginning haul-back operations. In other situations, swift retrieval of the net may be the best course of action. The appropriate course of action to minimize the risk of incidental take of protected species is determined by the professional judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader based on all situational variables, even if the choices compromise the value of the data collected at the station.
- If trawling operations have been delayed because of the presence of marine mammals or sea turtles, the vessel resumes trawl operations (when practicable) only when these species have not been sighted within 30 minutes or otherwise determined to no longer be at risk. This decision is at the discretion of the officer on watch and is dependent on the situation.
- Care is taken when emptying the trawl, including opening the cod end as close as possible to the deck of the checker (or sorting table) in order to avoid damage to protected species that may be caught in the gear but are not visible upon retrieval. The gear is emptied as quickly as possible after retrieval in order to determine whether or not protected species are present.

-Mitigation Measures for Protected Species during Research with Longline Gear

Monitoring methods

- The officer on watch (or member of the Scientific Party), and crew standing watch on the bridge visually scan for marine mammals, sea turtles, and other ESA-listed species (protected species) during all daytime operations. Bridge binoculars are used as necessary to survey the area upon arrival at the station, during visual and sonar reconnaissance of the trawl line to look for potential hazards (e.g., commercial fishing gear, unsuitable bottom for trawling, etc.), and while the gear is deployed. If any marine mammals or sea turtles are sighted by the bridge or deck crew prior to setting the gear or at any time the gear is in the water, the bridge crew and/or Chief Scientist are alerted immediately. Environmental conditions (e.g., lighting, sea state, precipitation, fog, etc.) often limit the distance for effective visual monitoring of protected species.

Operational procedures

- If any marine mammals, sea turtles or other protected species are sighted around the vessel before gear deployment, in most cases, gear is not deployed unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the Field Party Chief/Scientific Watch Leader (Chief Scientist). The vessel may be moved or gear deployment may be delayed until the animals no longer appear to be at risk of interaction with the gear.
- If longline operations have been delayed because of the presence of marine mammals or sea turtles, the vessel resumes longline operations only when these species have not been recently sighted or otherwise determined to no longer be at risk. This decision is at the discretion of the Field Party Chief (Chief Scientist) or Scientific Watch Leader and is dependent on the situation.
- Longline gear is always the first equipment or fishing gear to be deployed when the vessel arrives on station. Longline gear is set immediately upon arrival at each station.
- If sea turtles or marine mammals are detected during setting operations and are considered to be at risk, halting the setting operations and retrieval of set gear may be warranted.
- If sea turtles or marine mammals are detected while longline gear is in the water, the Field Party Chief (Chief Scientist) or Scientific Watch Leader in conjunction with the officer on watch exercise professional judgment and discretion to avoid incidental take of these species with longline gear as described for trawl gear. Haul-back may be postponed if the protected species are considered to be at risk. The species, number, and behavior of the protected species are considered along with the status of the ship and gear, weather and sea conditions, and crew safety factors. The Field Party Chief (Chief Scientist) or the Scientific Watch Leader uses professional judgment and discretion to minimize the risk of potentially adverse interactions with protected species during all aspects of longline survey activities.
- Hooks vary in size depending on the target species but are typically 15/0 circle hooks for bottom longline gear and 18/0 circle hooks for surface or pelagic longline gear. No stainless steel hooks are used in the SEFSC surveys so that in the event the hook cannot be removed, it will corrode. Finfish bait (ex. mackerel, striped mullet, spot) and non-offset circle hooks are used instead of J-hooks to reduce the incidental capture of sea turtles.
- All SEFSC bottom and pelagic longline sets are conducted with gear marked at both ends with buoys. Bottom longline sets have a 1 hour soak time while pelagic sets typically have a 3 hour soak time, excluding setting and hauling the gear.

- In all pelagic longline sets, gear configuration allows a potentially hooked sea turtle or marine mammal the ability to reach the surface (i.e., gangions are 110 percent as long as the drop line depth).
- SEFSC longline protocols specifically prohibit chumming (releasing additional bait to attract target species to the gear).

-Mitigation Measures for Protected Species during Research with Bandit Reel/Vertical Line Gear and Hook and Line Gear

Monitoring methods

- The monitoring procedures for bandit reel/vertical line gear are the same as described for trawl gear.

Operational procedures

- If any marine mammals, sea turtles or other protected species are sighted around the vessel before gear deployment, in most cases, gear is not deployed unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the Field Party Chief/Scientific Watch Leader (Chief Scientist). The vessel may be moved or gear deployment may be delayed until the animals no longer appear to be at risk of interaction with the gear.
- Soak time is reduced and standardized to 5-10 minutes per gear deployment.
- If marine mammals, sea turtles or other protected species are detected during setting operations and are considered to be at risk, immediate retrieval or halting the setting operations may be warranted.
- On the SEAMAP-GOM Reef Fish Survey (NMFS), if setting operations have been halted due to the presence of protected species, setting does not resume. The SEAMAP vertical line survey is piggy-backed onto the SEAMAP reef fish video survey, and only 50% of those video sites are subsampled, therefore the vessel simply moves to the next site rather than waiting.

Monitoring

The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NMFS, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Fishery independent monitoring and research is ongoing.

The SEFSC research activities would have minor to negligible adverse effects on the various resource components of the physical and biological environments. Because SEFSC research activities involve such a small number of vessels compared to other vessel traffic and collect relatively small amounts of biomass compared to commercial and recreational fisheries, the contribution of the research plan to cumulative adverse effects on fish, marine mammal, and other species and resource areas is very small. The proposed SEFSC scientific research activities would also have beneficial contributions to both the biological and socio-economic resources. The research activities contribute in major ways to the science that feeds into federal and state/territorial fishery management to manage fish stocks in a sustainable manner. These research activities also contribute to understanding the nature of changes in the marine environment (e.g., climate change) and adjusting resource management plans accordingly, and helps meet international treaty research obligations. Thus, the research activities help reduce adverse cumulative impacts on the biological and socioeconomic environments.

VIII. List of Agencies and Persons Consulted

NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
Saint Petersburg, Florida 33701
Phone: (727) 824-5301

NOAA Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Dr.
Miami, FL 33149
Phone: (305) 361-4200

Preparers

Brandi T. Noble
Peter Hood
Noah Silverman

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