# Programmatic Environmental Assessment (PEA)
# National Oceanic and Atmospheric Administration (NOAA)
# Fisheries, Southeast Regional Office,
# Federal Financial Assistance and
# Special Permits

## January 11, 2011

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# Executive Summary

This PEA is intended to streamline the NOAA grants and special permitting processes in the NOAA Fisheries, Southeast Region (SER). The SER has received submittals in the last five years (2004-2009) from states and other entities for 20 types of grants and 22 special permits (defined as exempted fishing permits (EFPs), scientific research permits (SRPs) and Exempted Educational Activity Authorizations). Letters of Acknowledgement (LOAs) are not included herein in the definition of "special permits." Both NOAA scientists and non-NOAA scientists are subject to SRP. No grants analyzed under this PEA are issued to NOAA scientists; instead, all such grants are issued to entities other than NOAA.

All of the grants use funding sources as directed by Congress in appropriations or other regulations. The PEA proposes a more effective alternative process to review those grants and special permits. The PEA also considers the no-action alternative, i.e., continuing with the present course of action for approving grants and special permits.

Each factor listed below is relevant in making a Finding of No Significant Impact (FONSI) and has been considered individually, as well as in combination with the others. Various grants and Special Permits (defined as Exempted Educational Activity Authorizations, exempted fishing permits (EFPs), and scientific research permits (SRPs)) are analyzed in the PEA. In addition, EFPs and SRPs will be issued in accordance with National Marine Fisheries Service Instruction 01-108-02, October 28, 2003, renewed January 2008.

The term "context" is generally defined as the circumstances or events that form the environment within which something exists or takes place. The circumstances or events for those grants analyzed in the PEA are the receipt of an appropriate grants application by the Southeast Region for a competitive or non-competitive funding opportunity. The circumstances or events for the Special Permits analyzed in the PEA are the receipt of an appropriate Special Permit application by the Southeast Region. The types of grants and Specials Permits are described later in the PEA. The location of the various grants and Special Permits is the Southeast Region comprising the eight coastal states of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, as well as the Commonwealth of Puerto Rico and the U.S. Virgin Islands. The exact location of the activities within the Southeast Region varies depending on the associated grants and special permits.

The "affected interests" include the communities in proximity to the research or survey activities, as well as the entities dependent on the status of the fish stocks being researched. The significance of an action is analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. PEA Table 1 lists various affected interests, localities, and those interests' expected perspective regarding the proposed action.

All of the past actions submitted within these grants and special permits have been determined to have no significant impact. All those actions were determined to be categorically excluded actions per NAO 216-6, with the exception of three construction projects that required environmental assessments. The approach of clearing individual National Environmental Policy Act (NEPA) documentation for each grant and special permit via categorical exclusions is redundant, time-consuming, and not cost-effective, and potentially interferes with the timely dissemination of grant funds and special permits.

The PEA complies with more recent NOAA Acquisition and Grants Office direction in September 2009, and Department of Commerce (DOC) Federal Assistance Law Division guidance in January 2010, regarding NEPA compliance for grant applications where NOAA has control or discretion.

The PEA process uses the following steps, to achieve greater efficiencies and cost-effectiveness in the grant and special permits review processes:

Determine whether NEPA even applies, i.e., does NOAA have control or discretion?

Categorize the types of activities that are included within those past funding and permit requests in terms of NEPA compliance requirements and the associated potential environmental effects.

Identify the types of funding and permit requests that have been submitted for consideration by the SER State/Federal Liaison Branch (hereafter referred to as the SER Grants Branch) and SER Sustainable Fisheries Division (SFD) in the last five years (2004-2009).

Evaluate the potential environmental impacts associated with those types of activities using the process outlined in NAO 216-6.

Determine if any of the activities could have potential significant impacts per 40 CFR 1508.27 and NAO 216-6, and the NMFS FONSI Instruction.

Use the resultant analyses in the PEA and FONSI, if determined to be appropriate, for substantially streamlining the environmental review process for funding and special permit decisions.

Proposed actions over the last five years (2004-2009) have been grouped into three categories for analytical purposes.

**Category A:** Special permits and activities that have no potential for environmental impacts, either because they involve administrative, educational, computer simulations or other non-environmental activities, or because the recipient's proposed action would collect data or conduct laboratory studies using specimens that were collected by others during the course of unrelated activities, such as measuring fish caught during commercial or recreational fishing activities.

**Category B:** Special permits and activities that have little to no potential for significant environmental effects, even though the recipient's actions would occur in the environment, such as benthic habitat mapping, video surveys, hatchery (onshore) grow-out operations, or water quality monitoring.

**Category C:** Special permits and activities that have the potential for significant environmental impacts, such as construction of buildings, restoration of damaged habitats or structures, collection of protected species, offshore aquaculture activities, or significant taking of overfished species.

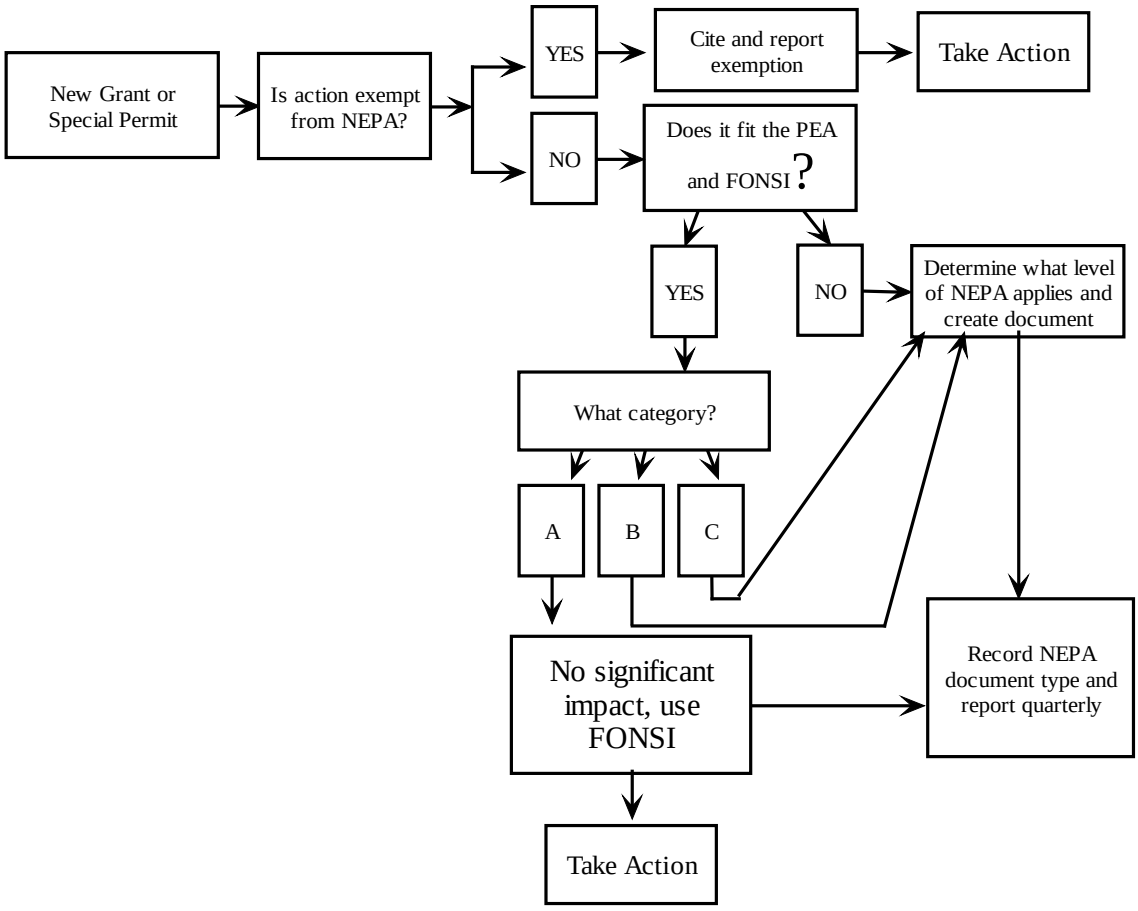
Proposed actions in Category A have no potential for environmental impacts, and would be analyzed and tracked under the PEA using the reporting form in Appendix B. Proposed actions in Category B and Category C would undergo tracking and case-by-case analysis, possibly including coordination with other agencies and NOAA Fisheries Divisions and would not be approved without further NEPA analysis as appropriate. The reporting form in Appendix B will

be used for tracking purposes and indicating whether NEPA applies based on past NOAA and DOC guidance. The PEA identifies the three general categories of activities, submitted in funding requests over the last five years (2004-2009) (see Section 3); of these, Category A projects will have no effect on ESA-listed species (Table 3). Projects in this category consist of outreach, administrative and technical tasks, or non-field based research. Regardless of the task type, the distinguishing factor for these types of projects is that they do not occur in the marine environment and no effects to marine organisms are anticipated. Some projects may use information gathered from activities occurring in the marine environment, but those activities would be subject to a separate Section 7 review. Therefore, any future approved funding requests that do not occur in the marine environment will have no effect on listed species and do not require Section 7 consultation. In these cases, SER Grants Branch staff can satisfy the requirement for Section 7 consultation by stating in writing that a specific project will not affect listed species.

The two additional categories of approved funding requests (Categories B and C) may affect listed species but most would not adversely affect them. Upon determination by SER Grants Branch staff that approved funding requests may affect listed species or critical habitat, but is not likely to have an adverse effect, an informal consultation would be initiated to the SER Protected Resources Division with a request for concurrence. A Section 7 formal consultation would be initiated if needed. If the funding request or special permit may affect important coastal zone resources, the project would also be coordinated with the Habitat Conservation Division.

All categorical exclusions will be tracked and reviewed periodically (using the tracking form included in the PEA) to assess the potential for cumulative impacts. The figure on the following page shows the process for reviewing a new proposed action based on the analysis presented in this PEA:

**Programmatic Environmental Assessment Process for Federal Financial Assistance and Special Permits**



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## List of Abbreviations and Acronyms

ACCSP – Atlantic Coastal Cooperative Statistics Program
ACFCMA – Atlantic Coastal Fisheries Cooperative Management Act
ACOE – Army Corps of Engineers
ADCP – Acoustic Doppler Current Profiler
BRD – Bycatch Reduction Device
CE – Categorical Exclusion
CIMAS – Cooperative Institute for Marine and Atmospheric Studies
CFR – Code of Federal Regulations
CPUE – Catch per Unit Effort
CRP – Cooperative Research Program
CSP – Cooperative Statistics Program
CWA – Clean Water Act
CZMA – Coastal Zone Management Act
EA – Environmental Assessment
EEZ – Exclusive Economic Zone
EFH – Essential Fish Habitat
EFP – Exempted Fishing Permit
EIS – Environmental Impact Statement
ESA – Endangered Species Act
FMP – Fishery Management Plan
FONSI – Finding of No Significant Impact
GMD – Grants Management Division
GSFMC – Gulf States Marine Fisheries Commission
GULF- Gulf of Mexico
GulfFIN – Gulf Fisheries Initiative
JIMAR – Joint Institute for Marine and Atmospheric Research
MARFIN – Marine Fisheries Initiative
MARMAP – Marine Resources Monitoring, Assessment, and Prediction
MMPA – Marine Mammal Protection Act
MSA – Magnuson-Stevens Fisheries Conservation and Management Act
MSDS – Material Safety Data Sheet
NAO – NOAA Administrative Order
NEPA – National Environmental Policy Act
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
NPDES – National Pollutant Discharge Elimination System
OSHA – Occupational Safety and Health Administration
PEA – Programmatic Environmental Assessment
PIFSC – Pacific Islands Fisheries Science Center
PIT – Passive Integrated Transponder
PSAT – Pop-up Satellite Tag
ROV – Remotely Operated Vehicle

## List of Abbreviations and Acronyms (cont.)

SAV – Submerged Aquatic Vegetation
SEAMAP – Southeast Area Monitoring and Assessment Program
SEDAR – Southeast Data Assessment and Review
SER – Southeast Region
SERO – Southeast Regional Office
SFD – Sustainable Fisheries Division
S-K – Saltonstall-Kennedy Act
SRP – Scientific Research Permit
TED – Turtle Excluder Device
TRI – Toxic Release Inventory
UNH – University of New Hampshire
U.S.C. – United States Code
USDA – U.S. Department of Agriculture
USVI – U.S. Virgin Islands

# 1 Purpose and Need

## 1.1 Need for Action

This PEA was initiated in August 2009 to streamline the NOAA grants and special permitting processes in the NOAA Fisheries, Southeast Region (SER). For the purposes of this PEA, "special permits" are defined as Exempted Educational Activity Authorizations, exempted fishing permits (EFPs) and scientific research permits (SRPs) in accordance with 50 CFR 600.745. In addition, EFPs and SRPs will be issued in accordance with National Marine Fisheries Service Instruction 01-108-02, October 28, 2003, renewed January 2008. Letters of Acknowledgement (LOAs) are not included herein in the definition of "special permits" (50 CFR 600.745(a)).

Currently, the SER Grants Branch and the SER Sustainable Fisheries Division (SFD) are responsible for supporting the conservation and management of living marine and estuarine resources and ecosystems in the Exclusive Economic Zone (EEZ) through competitive and noncompetitive grants and cooperative financial assistance programs and granting of special permits. The funding for grants is provided by Congress through the appropriations and legislative processes. The Grants Management Division (GMD) of NOAA in Silver Spring, MD is responsible for issuing awards and has procedures in place requiring compliance with the National Environmental Policy Act (NEPA) by the regional offices prior to award (DOC 2002). The SER Grants Branch conducts environmental reviews for each awarded application in accordance with applicable provisions of NEPA and its implementing regulations at 40 Code of Federal Regulations (CFR) 1500 through 1508 and NOAA's implementing provisions in NAO 216-6 (NOAA 1999), as well as the GMD procedures (DOC 2008).

In the last five years (2004-2009), the SER has received submittals from states and private entities for 20 types of grants consisting of 293 individual requests and 22 special permit requests (one Exempted Educational Activity Authorization, 11 SRPs and 10 EFPs; Appendix A). All of the grants use funding sources as directed by Congress in appropriations or other regulations.

All proposed actions of the last five years (2004-2009) have been determined to be categorically excluded actions per NAO 216-6, with the exception of three construction projects that required environmental assessments and were determined to have no significant impact. There have been 315 total categorical exclusions (CEs) issued during the last five years. CEs are types of actions that have been determined by the SER to have no significant environmental effects on the environment, either individually or cumulatively.

Over the past five years (2004-2009), all the applications submitted to the SER Grants Branch have been for the same or similar types of grants (Table 2, p. 32). For all funding requests, environmental review is conducted only on those that have been recommended for funding. This has resulted in preparing numerous CE documents during each funding cycle, since the funding requests are frequently similar. This approach is redundant, time-consuming, and costly, and may interfere with the timely dissemination of grant funds and special permits.

In addition to policies stated in NAO 216-6, NOAA has provided further guidance regarding NEPA compliance for various types of grants in a NOAA memorandum dated June 19, 2007, *The Application of the National Environmental Policy Act, 42 U.S.C. 4321 et seq. to NOAA Federal Assistance Awards* (hereafter called the 2007 memo). The 2007 memo provides

direction regarding NEPA compliance for types of projects based on funding sources, statutory time limits, and NOAA discretion in decision making.

This direction was reiterated in memos dated June 19, 2009, *NEPA and Financial Assistance Awards;* September 1, 2009, *Application of the National Environmental Policy Act to NOAA Federal Financial Assistance Awards;* and December 18, 2009, *Application of the National Environmental Policy Act to NOAA Federal Financial Assistance Award Sub-Projects*. The DOC Federal Assistance Law Division (FALD) on January 29, 2010, provided further guidance in a memo entitled *Guidance Regarding Mandatory Federal Assistance Awards Authorized Under Public Law No. 111-117, (FY 2010 Appropriations Act).*

The 2007 memo states that in order:

> *"…to comply with NEPA, NOAA must assess the environmental impacts of federal assistance funding decisions when it has discretion to make, deny, or condition the award. Where NOAA lacks such discretion, NEPA compliance is not required. NOAA must also assess the environmental impacts of actions proposed to be taken by applicants or recipients of federal assistance when NOAA has authority to substantially control the recipient's post-award activities."*

The 2007 memo provides direction regarding applications in which the grant must be awarded by law within such a limited period of time that compliance with NEPA could be precluded. In addition, the 2007 memo gives direction concerning the range of discretion regarding actions considered during decisions on applications. *NOAA Acquisition and Grants Office direction in September 2009 indicates that, if NOAA has discretion, control, or substantial involvement in a proposed action, then NEPA applies. If no discretion, control, or substantial involvement exists, then NEPA does not apply.* This provides a first step in the process for reviewing a new proposed action based on the analysis presented in this PEA (see Figure 1, below.) The reporting process established in this PEA provides for a finding of whether NEPA applies based on past NOAA and DOC guidance. This finding must be documented in the reporting form located in Appendix B.

The PEA substantially improves efficiency and cost-effectiveness in the grant and special permits review processes conducted by SER. Steps in the processes are as follows:

Determine whether NEPA even applies, i.e., does NOAA have control or discretion?

Categorize the types of activities that are included within those past funding and permit requests in terms of NEPA compliance requirements and the associated potential environmental effects.

Identify the types of funding and permit requests that have been submitted for consideration by the SER State/Federal Liaison Branch (hereafter referred to as the SER Grants Branch) and SER Sustainable Fisheries Division (SFD) in the last five years (2004-2009).

Evaluate the potential environmental impacts associated with those types of activities using the process outlined in NAO 216-6.

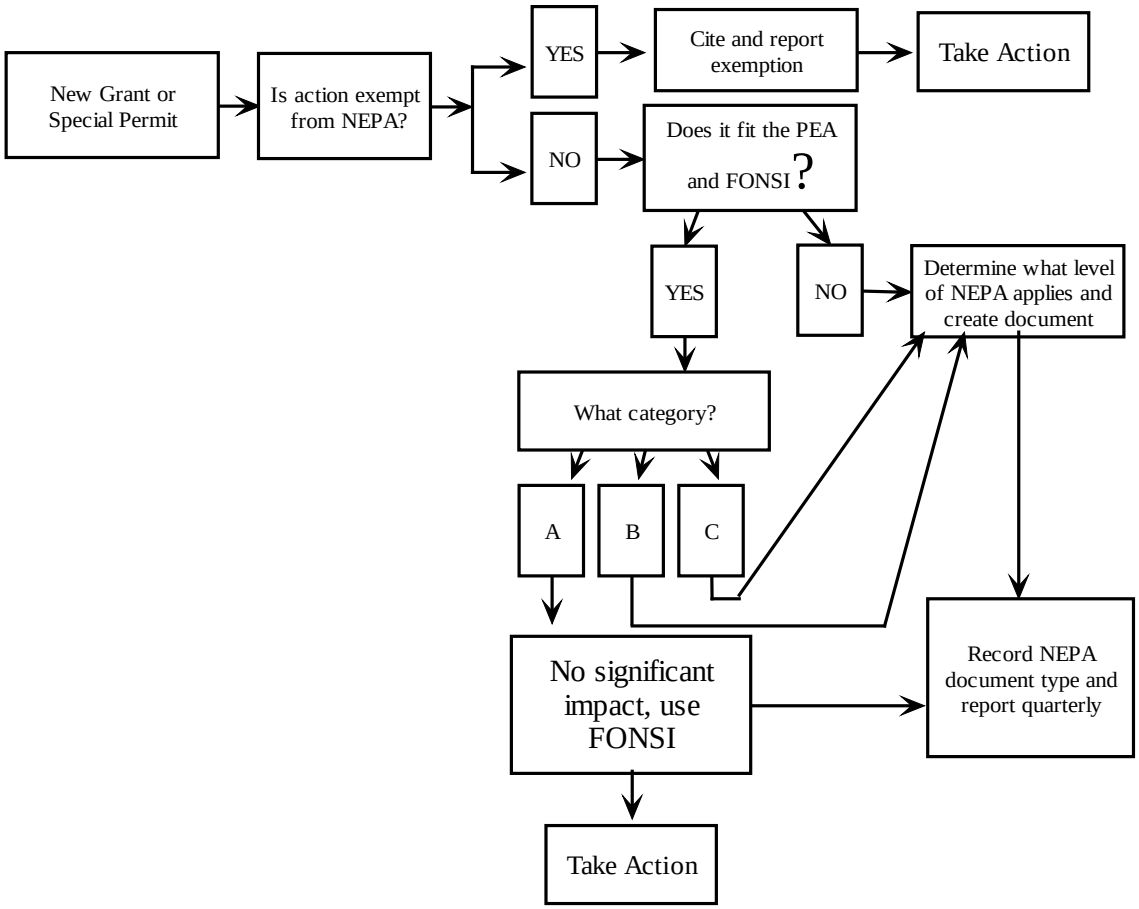
Determine if any of the activities could have potential significant impacts per 40 CFR 1508.27 and NAO 216-6, and the NMFS Finding of No Significant Impact (FONSI) Instruction, and

Use the resultant analyses in the PEA and associated FONSI, if determined to be appropriate, for substantially streamlining the environmental review process for funding and special permit decisions.

This approach supports streamlined compliance with NEPA prior to processing of all approved special permits, and approved funding requests for which NOAA has discretion, control, or substantial involvement. This includes those grant submittals with statutorily-imposed time limits because the NEPA analysis will already have been conducted for most, if not all, of those funding requests by this PEA, nullifying the time conflicts created by statute.

**Figure 1.**

**Programmatic Environmental Assessment Process for Federal Financial Assistance and Special Permits**



## 1.2 Scope of Analysis

### 1.2.1 Decisions to be made

Per 40 CFR 1501.4(b-c) and 1508.9, the primary purpose of an environmental assessment (EA) is to "briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact." The SER uses the PEA for the same purpose. The objective of this PEA is to evaluate potential environmental impacts associated with federal funding requests and special permits as defined herein with unresolved conflicts concerning alternative uses of available resources. Therefore, Alternative 1 is the Proposed and Preferred Action, and Alternative 2 is the No Action alternative.

**Alternative 1. Proposed and Preferred Action.** The preferred action is to implement the PEA review and tracking process to screen funding requests and special permits.

The past activities associated with grants and special permits have not caused any known significant impacts. Those activities have not been related to other actions with individually insignificant but cumulatively significant impacts. It is expected that the routine types of actions (Category A) in the future would continue to have no future cumulative effects on the environment. The anticipated effects are expected to be beneficial due to their similarity to past projects that have not caused any known significant impacts.

Studies and research contribute to creating more beneficial conditions for marine ecosystems. Grants and special permits provide a foundation for some of these improvements through supporting studies and research. The PEA provides changes to streamline the grants and special permits process, and provide more rigorous tracking and review of such actions (Categories B and C) with the potential for significant environmental effects. This process provides more effective agency review of future grants, all of which use funding sources as directed by Congress. In that regard, issuance of those grants in a more effective and timely manner helps SER comply with the Congressional direction. Further information on Alternative 1 is found elsewhere herein.

**Alternative 2. No Action.** The no action alternative in this PEA is to continue to operate grants and special permits as they have been done in the past, including the current method of NEPA analysis.

Section 1502.14(d) requires the alternatives analysis in an EIS (and by extension, in this PEA) to "include the alternative of no action." There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated.

The first situation might involve an action such as updating a fishery management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases "no action" is "no change" from current management direction or level of management intensity. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not

take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward. For the purposes of this PEA, the first interpretation of "no action" is what is meant, not the second one.

### 1.2.2 Geographic and Temporal Scope

This PEA has no termination date; it is intended to provide the basis for streamlining the long-term continuation of the SER Grants Branch and SER SFD special permits programs. As long as the activities associated with funding and permitting requests are described in Chapter 2, and the actual impacts associated with those activities remain within the range of impacts as identified in Chapter 3, this PEA will remain current. Upon receipt of a funding request or special permit application, the SER Grants Branch or the SER SFD, respectively, will review this PEA to determine if every activity within the request is consistent with the descriptions and associated impacts in this PEA. This PEA will receive regular review by the Responsible Program Manager (RPM), Regional NEPA Coordinator, SER Grants Branch, and SER SFD, and requirements for updates and revisions will be identified on an ongoing basis. Any FONSI resulting from this PEA will be reviewed for consistency and appropriateness annually, or more often as needed.

This PEA analyzes all types of grant requests and special permits submitted to NOAA Fisheries and assigned to the SER in the last five years (2004-2009). The special permits are listed in Appendix A. The coastal states, territory, and commonwealth included within the SER are Florida, Alabama, Georgia, Louisiana, Mississippi, South Carolina, North Carolina, Texas, the U.S. Virgin Islands, and Puerto Rico. The SER also is responsible for adjacent inland states whose rivers support fish species that migrate between salt and fresh waters or that depend on estuaries for part of their life cycle. Additionally, NOAA Fisheries Service Headquarters may determine that the Southeast Region has expertise in a particular multi-region resource, such as highly migratory species, or when a specific submittal includes actions within several different NOAA Fisheries Service regions, and assign such action to the Southeast Region.

### 1.2.3 Application of this PEA to the Grants Review and Special Permit Process

Any individual funding or special permit requests that are consistent with the descriptions in Chapter 2, and with the associated impacts evaluated in Chapter 3, and with any approved FONSI for the PEA, can be approved with no further analysis (Figure 1 above). The appropriate NEPA level determination must be recorded on the form at Appendix B, including whether or not NEPA applies, and reported quarterly to the Regional NEPA Coordinator as indicated on the form. For Category B and C actions, depending on the outcome of further NEPA review, a more detailed cumulative effects assessment may be required.

Any funding requests or special permits that are determined not to have been specifically evaluated in this PEA, are not similar to activities evaluated in this PEA, or are not covered under another NEPA document will require additional appropriate NEPA analysis in one of the following:

A supplement to this PEA (40 CFR 1502.9)

An independent CE per NAO 216-6

An independent EA or EIS

This PEA focuses on the categories of funding requests that have been submitted for review to the SER Grants Branch and special permit requests submitted to the SER SFD in the last five years (2004-2009). Within each category of funding request or special permit, specific types of associated activities are evaluated for their potential impacts. This PEA provides a streamlined process for evaluating the environmental impacts of all submitted funding requests and special permits requests. In addition, it facilitates determining when additional NEPA compliance must be conducted for specific submittals.

# 2 Descriptions of the Types of Actions and their Associated Activities

This chapter organizes and describes the activities as submitted in individual funding requests and special permits in the last five years (2004-2009), categorized into three broad areas-A, B, and C-according to their potential for significant environmental impacts. Determining significance requires consideration of both context and intensity. The exact location of the activities within the Southeast Region varies depending on the associated grants and special permits. The "affected interests" include the communities in proximity to the research or survey activities, as well as the entities dependent on the status of the fish stocks being researched.

The term "context" is generally defined as the circumstances or events that form the environment within which something exists or takes place. The circumstances or events for those grants analyzed in the PEA are the receipt of an appropriate grants application by the Southeast Region for a competitive or non-competitive funding opportunity, all of which use utilize funding sources as directed by Congress in appropriations or other regulations. The circumstances or events for the Special Permits analyzed in the PEA are the receipt of an appropriate Special Permit application by the Southeast Region. The types of grants and Specials Permits are described later in the PEA. The location of the various grants and Special Permits is the Southeast Region comprised of the eight coastal states of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, as well as the Commonwealth of Puerto Rico and the U.S. Virgin Islands. The exact location of the activities within the Southeast Region varies depending on the associated grants and special permits.

The term "intensity" refers to the severity of the proposed action's impact on the environment. In addition, this section identifies project activities that require site-specific evaluation and may trigger the need for the preparation of a Record of Environmental Consideration (REC) or a Tiered Site-specific Environmental Assessment (SEA) to determine if the particular activities would have significant impacts on the quality of the human environment given their unique environmental context.

Affected interests include those directly influenced by the proposed work proposed under a grant (or special permit), such as fishers who make a living harvesting the resources being studied, processers and others who depend on those fishers for their livelihoods, and those who might live or work near the sampling area. Different affected interests may have different geographic scopes of impact.

Table 1 lists various affected interests, localities, and each interest's expected perspectives. This table was prepared based on personal knowledge of SER Grants Branch staff, consultation with Sustainable Fisheries staff, and review of recent final reports on grants that studied fishery community user groups. The tribal information in Table 1 was based in part on the consultations

with Tribal Historic Preservation Officers regarding the construction project EAs (for example, the Mississippi Band of Choctaw Indians was consulted on July 30, 2009, and had no objections to a construction award in Jackson, Mississippi).

**Table 1. Examples of Various Affected Interests, Localities, and Perspectives**

| Affected interests | Localities | Perspective on PEA |
|---|---|---|
| Society (as a whole) | U.S.A. | Supports agency actions to provide more effective and efficient environmental analyses that, in turn, rebuild overfished fish stocks and maximize benefits to society as a whole |
| Fishing Community | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to provide more effective and efficient environmental analyses that, in turn, rebuild overfished fish stocks and maximize benefits to the fishing community without significant economic impacts |
| Indian Tribes | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to provide more effective and efficient environmental analyses, rebuild overfished fish stocks or maximize benefits to the tribal interests without significant impacts. Tribal Historic Preservation Officers are consulted on construction grants and have been supportive of all such projects |
| Scientific Researchers (non-academic) | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to provide more effective funding of scientific research |
| Educational (Academic) Institutions | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to provide more effective funding of scientific research and academic training projects (e.g., training of stock assessment scientists) |

| | | |
|---|---|---|
| Non-governmental institutions | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to help rebuild overfished fish stocks (in federal waters) and allow for better management in adjacent state waters. |
| Individuals (non-fishing), who do not live in or near the research area | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to provide more effective and efficient environmental analyses that, in turn, rebuild overfished fish stocks and maximize benefits to individual interests without significant economic impacts |
| Individuals (non-fishing), who live in or near the research area | North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas, Commonwealth of Puerto Rico, U.S. Virgin Islands | Supports agency actions to provide more effective and efficient environmental analyses that maximize benefits to local features/amenities without significant local impacts |

In determining an impact's intensity, we will consider the following factors in accordance with the Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR 1508.27), NAO 216-6 (Sec. 6.01), and NMFS Instruction 30-124-1, Guidelines for the Preparation of a FONSI. The factors include those found in NAO 216-6 (Sec. 6.01) and in 40 CFR 1508.27.

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

2. Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?

3. Can the proposed action reasonably be expected to jeopardize the sustainability of any nontarget species?

4. Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Fisheries Conservation and Management Act (MSA) and identified in FMPs?

5. Can the proposed action be reasonably expected to have a substantial significant impact on public health or safety?

6. Can the proposed action reasonably be expected to significantly affect endangered or threatened species, marine mammals, or critical habitat of these species?

7. Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

8. Are significant social or economic impacts interrelated with natural or physical environmental effects?

9. Are the effects on the quality of the human environment likely to be highly controversial?

10. Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

11. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

12. Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

13. Is the proposed action likely to significantly affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

14. Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

15. Is the proposed action likely to establish a precedent for future actions with significant environmental effects or represents a decision in principle about a future consideration?

16. Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment?

17. Can the proposed action reasonably be expected to result in cumulative significant environmental effects that could have a substantial effect on the target species or nontarget species?

The description of each broad category follows:

**Category A:** Activities such as administrative, educational, computer simulations, library/classroom research, or other non-environmental activities, that have no potential for significant environmental impacts. In addition, the recipient's proposed action would collect data or conduct laboratory studies using specimens that were collected by others during the course of unrelated activities, such as measuring fish caught during commercial or recreational fishing activities.

**Category B:** Activities that have little to no potential for significant environmental effects, even though the recipient's actions would occur in the environment, such as benthic habitat mapping, video surveys, hatchery (onshore) grow-out operations, or water quality monitoring. Proposed actions in Category B would need case-by-case screening and appropriate NEPA analysis to determine if the potential for significant environmental effects exists.

**Category C:** Activities that have the potential for significant environmental impacts, such as construction of buildings, restoration of damaged habitats or structures, collection of protected species, or offshore aquaculture actions. Each submittal in Category C would need case-by-case analysis and appropriate NEPA analysis, to include coordination with other agencies and NOAA Fisheries Divisions to determine if the potential for significant environmental effects exists.

## 2.1 Descriptions of Activities Typical of Category A: Activities that Have No Potential for Significant Environmental Impacts

Category A activities are actions (such as computer data evaluation and modeling, administration, outreach, surveys of people and data collection from specimens captured by others in activities unrelated to the grant) that have no potential for significant environmental impacts. Some samples of fish used for these activities are caught by commercial and recreational fishers. The following is a list of examples of activities that might occur. Any similar, unlisted activities would be expected to have effects like those activities analyzed in the PEA.

### 2.1.1 Recipient activities with no potential for significant environmental impacts:

**Provide administrative funding support for state fishery management agencies and regional commissions:** The states and regional commissions prepare and update fishery management plans (FMP) for species under their jurisdiction and authority, to provide more effective management and conservation as directed by applicable laws and regulations.

**Conduct intercept survey to collect catch and effort data from fishers dockside:** Port samplers meet fishers at fishing docks, boat landings, and piers to obtain catch per unit effort (CPUE) data, size distribution of catch, and if possible, biological samples such as length and weight.

**Perform stock assessments by the states, Councils, and Federal /Southeast Data Assessment and Review (SEDAR):** Fisheries scientists analyze data to assess the status of managed fisheries stocks to provide effective management and comply with applicable regulations.

**Conduct literature search and analysis:** Researchers locate and review relevant information for stock assessment analyses, FMPs, and impact analyses.

**Pay recipient support staff and operating costs:** Provide wages and operating costs for staff working on recipients' projects.

**Enhance processing of fishery-related statistics:** Recipients determine methods for better processing of catch-and-effort data, ensuring more efficient database performance.

**Disseminate various fishery statistics:** Scientists disseminate up-to-date fishery statistics via Web sites and other information pathways to federal, state and local agencies, the public, educational institutions, and other entities as appropriate. All information and associated links are updated as needed. This may include developing computer programs to access and

summarize data, interpret information requests, conduct analyses, and summarize and supply information in the appropriate format.

**Update data management systems and Web sites:** Researchers determine more efficient ways to store, maintain, and disseminate data. Information on Web sites is updated and posted in a timely manner.

**Review historical databases:** Researchers review historical archives for pertinent data and compile that information to use in current research.

**Maintain databases:** Researchers perform routine maintenance of databases, which includes installing software upgrades and revising computer programs. Project staff works to keep all computer systems functioning at optimal levels.

**Conduct telephone surveys:** Researchers perform telephone surveys to interview fishers on their fishing practices.

**Determine ex-vessel value of landings/collect data from trip tickets:** Researchers determine the cost of fisheries landings for use in economic models and socioeconomic studies.

**Coordinate biological surveys and report distribution:** Recipients coordinate field studies of managed species and share results via publications, Web sites, conferences, and technical meetings.

**Study digital archives of SEAMAP data:** Researchers study archived plankton samples in the laboratory to determine stock abundance and distribution.

**Conduct economic modeling:** Economists and data specialists develop and run models to determine sustainability of fishing communities, and to examine the effects of regulations.

**Conduct social analyses regarding impacts of new fisheries regulations:** Social scientists collect and analyze demographic information (i.e., unemployment, family information) to determine the effect of new fisheries regulations on those groups and communities.

**Train fishers on the effective use of electronic logbooks:** Researchers provide assistance to fishers to familiarize them with new, more effective technology to report catch-and-effort data.

**Conduct outreach activities:** Researchers familiar with the fishing communities serve as liaisons between fishers and state and local fishery management entities and educational institutions, to provide technical assistance.

**Conduct computer mapping of fishery-restricted areas:** Researchers use existing data on depth, abundance, and benthic habitat to create effective boundaries for protected areas that provide conservation benefits without unnecessary economic impacts.

**Conduct workshops and conferences (turtle excluder devices (TED), bycatch, ethnographic):** Researchers and fisheries organizations conduct meetings and conferences to provide a forum for technical assistance and information exchange for new technologies, how to minimize bycatch of nontarget species in fishing gear, and to provide information for understanding the effects of new fishing regulations and other necessary information.

**Provide economic data and analyses about recreational and commercial fisheries:** Researchers gather and disseminate economic data regarding fishers affected by fisheries regulations.

**Develop oceanographic and hydrographic models, including simulations and analyses:** Researchers develop and run simulation models to better understand marine and estuarine ecological processes and stock status and assessments.

### 2.1.2 Recipient actions that use specimens or other activities conducted by others:

**Conduct studies of fish use of artificial habitats:** Researchers study the effects of man-made and natural objects that are placed on the ocean floor to provide a foundation for marine plant and animal life to form highly complex community food chains and habitats. A critical issue regarding artificial reefs is whether artificial reefs are actually increasing fishery production or simply attracting fish from other areas.

**Identify, analyze, and digitize archived plankton and zooplankton samples in the laboratory:** Researchers study and analyze archived phytoplankton and zooplankton using digitizing equipment that allows study without damaging the organisms in the samples.

**Conduct observer coverage onboard commercial and other private vessels:** Trained observers participate in vessel fishing trips made by commercial fishers to gather catch, effort, and bycatch information. All target and bycatch species (fish and invertebrates) are enumerated, measured, weighed, and sexed if possible. Date, time, location, and net characteristics (length, height, hang ratio, twine size, etc.) of all sets and retrievals for vessel using nets, and hook-and-line data for vessels using that gear, are recorded. Information on all protected species interactions including identification, disposition, measurement, inspection, and all standard resuscitation, tagging, release, and reporting protocols are also collected.

**Conduct creel surveys:** Recreational fishers are interviewed to determine the type of fishing gears deployed, the location of fishing activity, and other components of fishing effort, such as number of days fished, vessel length, and crew size.

**Conduct tournament catch surveys:** Researchers conduct a creel census through on-site interviews of recreational anglers at fishing tournaments and other events to obtain CPUE data, size distribution, and biological samples. Follow-up telephone surveys are often conducted to gather supplementary information.

**Conduct genetic studies:** Researchers take tissue samples of fish caught by commercial and recreational fishers to obtain genetic information on population structure, growth, and decline of species.

**Process otoliths:** Researchers use fish otoliths to determine the fish age and population structure.

**Conduct studies of otolith chemistry:** Otolith elemental composition research reveals the ambient water conditions at the time of otolith deposition and is used as a biological tag. This signature has been used in stock identification, larval dispersal studies, and to determine migration during various life-history phases.

**Process fish gonads for sex determinations:** Gonads are used to determine the sex of a fish and to provide information on the reproductive characteristics of fish populations.

**Conduct laboratory analyses of oyster and other seafood products (ionizing radiation treatment):** Researchers study the effect of low dose gamma radiation on the inactivation of the bacteria *Vibrio* to support the hypothesis that irradiation technology can be used to make eating shellfish safer.

**Conduct experiments on fish navigation and orientation:** Researchers study temperature and other water characteristics in regard to the migration behavior and orientation of fish species. These studies address the hypothesis that fish use orientation cues associated with the sun during open ocean migration.

**Conduct laboratory studies of fish species life history:** Researchers study aspects of the phylogeny, morphology, life history, ecology, and behavior of fishes during the egg, larval, and juvenile stages.

**Conduct analyses of potential aquaculture sales:** Marketing specialists conduct surveys and food tests at restaurants and retail outlets to help maximize distribution of new aquaculture seafood products and branding.

**Develop standard protocols (or "procedures"), e.g., for capture, grow-out, spawning, transport, and quarantine of hatchery-reared fish in highly controlled, closed environments:** This is limited to a review and synthesis of existing bodies of information and published literature, in a classroom or library environment.

## 2.2 Descriptions of Activities Typical of Category B: Activities with Little to No Potential for Significant Environmental Impacts

The following activities identified in funding requests have little to no potential for significant environmental impacts or effect on public health or safety. These activities are not expected to establish a precedent for future actions with significant environmental effects or represent a decision in principle about a future consideration.

**Use side-scan sonar and remotely-operated vehicles (ROVs) for mapping and visual sampling:** Scientists use underwater equipment to gather data on fisheries population abundance and location and to map bottom characteristics.

**Conduct aerial surveys:** Researchers fly aircraft over areas of fisheries and marine mammal aggregations to determine abundance, stock status, and behavior of species that can be observed on the ocean surface, such as schools of large fish or marine mammals. Aerial surveys of protected species such as whales must be conducted per regulations in compliance with the ESA or the Marine Mammal Protection Act (MMPA). Other surveys, such as inventories of large schools of fish, may be conducted at lower altitudes consistent with safety.

**Map bottom characteristics (e.g., Marine Resources Monitoring, Assessment, and Prediction (MARMAP), Southeastern Area Monitoring and Assessment Program (SEAMAP):** Researchers use various techniques, including side-scan sonar and video cameras, to create maps of benthic habitats in the South Atlantic and the Gulf of Mexico (Gulf).

**Sample using underwater cameras:** Researchers use video recorders to identify fish and other marine organisms and determine their abundance, migration, and other behavioral patterns.

**Conduct surveys and research using passive acoustic underwater equipment:** Researchers use hydrophones and receivers to study and identify the behaviors of sound-producing fish and marine mammal species.

**Conduct surveys of coral reefs and associated organisms:** Researchers conduct field surveys of coral reef habitats and inhabitants using transects, video cameras, towed-diver methodologies, and other techniques, intended to minimize impacts to reef organisms. See the Programmatic

Environmental Assessment, NOAA Coral Reef Conservation Grant Program, June 2005, in the reference section of this PEA (NOAA 2005a) and also at: http://www.nmfs.noaa.gov/habitat/ead/ecosysdocs/CoralPEAFinal.pdf.

**Map ocean bottoms to determine impacts caused by hurricanes and other disasters on habitat:** Researchers determine changes in topography and condition of the benthic communities after impact using side-scan sonar and pole sampling, which measures topography and identifies bottom type.

**Conduct research on hatchery (closed-system) grow-out operations:** Researchers study performance optimization, grow-out efficiency, and monitor water quality in closed aquacultures systems. A nutrient loading threshold for aquaculture systems in Category B is not established herein because of the other, possibly overriding parameters that affect such aquaculture systems' potential for environmental impacts.

**Conduct nutritional studies and production techniques for growing/rearing fish in partially–closed hatcheries:** This research is done in partially-controlled environments (not all in laboratory conditions or in closed, re-circulating aquaculture systems).

**Develop standard protocols (or "procedures"), e.g., for capture, grow-out, spawning, transport, and quarantine of hatchery-reared fish in partially-closed systems:** This research is done in partially-controlled environments (not all under laboratory conditions or in closed, re-circulating aquaculture systems).

**Develop new technologies for utilization of byproducts created by seafood processing, or byproducts of aquacultured species for other uses such as pharmaceuticals:** Researchers develop new technologies to obtain collagen, protein, lipids, or pharmaceutical compounds from byproducts of seafood processing or aquaculture. Byproducts such as shrimp shells, alligator skins, and tuna skins are used in the pharmaceutical, food protein, and related industries.

**Conduct nutritional studies and production techniques for growing/rearing fish in closed-system hatcheries:** This research is done in controlled environments, either in under laboratory conditions or in closed re-circulating aquaculture systems.

**Conduct economic analyses of aquaculture systems:** Researchers study costs and earning information to determine profitability of experimental aquaculture systems. The feasibility study (e.g., economic analysis of performance) may be conducted on existing commercial operations.

**Conduct laboratory research on electropositive metals for non-target elasmobranch deterrence during fishing operations:** Electropositive metals are materials that produce a measurable voltage when immersed in an electrolyte such as seawater. This voltage overpowers the electroreceptors of the shark's ampullary organ and acts as a repellent that can potentially be used to minimize shark bycatch in commercial longline fishing gear.

Proposed actions in Category B would need case-by-case screening and appropriate NEPA analysis to determine if the potential for significant environmental effects exists.

## 2.3 Descriptions of Activities Typical of Category C: Activities Having a Potential for Significant Environmental Effects

### Category C.1 Capturing and Handling Organisms

The following activities involving capturing and handling marine and estuarine animals identified in funding requests and special permits have the potential for significant environmental impacts. Such activities would need case-by-case analysis and appropriate NEPA analysis to determine if the potential for significant impacts exists.

**Conduct studies of gear effectiveness and technologies to reduce catch of nontarget species:** Gear can include but are not limited to bycatch reduction devices (BRD), TEDs, gillnets, horizontal and vertical longlines, fish traps, fyke nets, pound nets, trawls, bandit gear, hook-and-line, seines, chevron traps, crab and lobster traps, tongs, spears, and dredges. These studies typically include actions taken at sea by the recipients and involve catching target and sometimes nontarget species.

**Use fishing gear to catch target species for study:** The same fishing methods as listed above are used by researchers to take individuals of target species, including species listed under the ESA. The numbers collected, especially for protected species, must be known to ensure that populations are not significantly impacted. Gear itself can cause damage to benthic habitats and biotic communities and catch nontarget species.

**Conduct studies of the effectiveness of various hook designs in optimizing take of target species while minimizing take of non-target bycatch:** Researchers study various hooks and other gear designs using gear as configured in recreational and commercial fisheries. These studies may take target species and nontarget species such as sea turtles and sharks, and may result in some mortality of nontarget species.

**Place tags on fish, sea turtles, and other species:** Researchers place passive or active tags, either on the surface or subcutaneously. Passive tags do not emit any data, such as external flipper tags made of plastic or metal, and Passive Integrated Transponder (PIT) tags that are read using electronic scanning equipment. Some tags collect and hold data until the animal or tag reaches the surface for data transmittal. Researchers can tag species listed under the ESA if the recipient has necessary permits from NOAA Fisheries. These tags are used to follow animal movements and calculate population size using catch-recapture methodologies.

**Conduct plankton surveys:** Researchers collect plankton specimens to determine species composition, abundance, and distribution using 60 cm bongo nets and 1 x 2 meter neuston nets during shrimp and groundfish surveys.

**Collect environmental data:** Researchers collect samples with sampling bottles (chlorophyll, nutrients), and hydrographic probes that measure conductivity, dissolved oxygen, salinity, pH, temperature, depth, water transparency, wind speed and direction, wave height, and cloud cover.

## Category C.2 Aquaculture, Stock Enhancement, and Hatchery Operations

The following activities involving ocean studies of aquaculture technologies and methodologies, and stock enhancement have the potential for significant environmental impacts.

Such activities would need case-by-case analysis and appropriate NEPA analysis to determine if the potential for significant impacts exists:

**Conduct studies on offshore, open-system marine aquaculture grow-out operations.**

### Category C.3 – Construction and Reconstruction of Man-Made Structures and Ecosystem Restoration

The following activities involving the construction and reconstruction of structures and ecosystem restoration have the potential for environmental effects and would need case-by-case analysis and appropriate NEPA analysis to determine if the potential for significant impacts exists:

### Category C.3(a) Restoring damaged and degraded ecosystems and biological systems

**Restore oyster reefs that are physically destroyed or buried by silt:** Oyster dredges may be dragged across the damaged oyster bed to remove overlying sediment and expose hard substrate. Areas are then replenished with new/fresh cultch, from a variety of substrates, such as oyster shells, fossilized shells, crushed concrete, or crushed limestone. The cultch can be distributed by pressurized spray from barges or hand-shoveled from smaller boats.

**Rebuild damaged dunes by dredging sand from material in an adjacent borrow ditch:** Dredge material is placed in the areas of damaged dunes to protect against further erosion and to prevent seawater from contaminating freshwater and brackish water marshes. Native plants adapted to the conditions are planted on the rebuilt dunes to further protect from erosion.

### Category C.3(b) Constructing Buildings, Building Additions to Structures, and Other Structures

Rebuild in place or directly adjacent to the original structure levees, ponds, bridges, and docks that have been damaged or destroyed by storms and other natural disasters.

Build new construction, as well as add-ons, to existing structures.

Each submittal in Category C would need case-by-case analysis and appropriate NEPA analysis, possibly including coordination with other agencies and NOAA Fisheries Divisions to determine if the potential for significant environmental effects exists.

# 3 Environmental Consequences

## 3.1 Introduction

The applicant needs to obtain the appropriate federal, state, and local permits and approvals prior to receiving a grant or special permit. Such approvals and permits that may be pertinent to a particular funding request, or special permit request, include:

SRPs or EFPs from the federal government per the MSA and from the state and local governments per pertinent laws and ordinances.

Permits from the U.S. Army Corps of Engineers (ACOE) for disposal of dredge or fill material into waters of the United States (Section 404 Clean Water Act (CWA)).

Consistency determination from the state Coastal Commission for actions within the designated state coastal zone per the Coastal Zone Management Act (CZMA).

Evaluation of the potential impacts to historic, cultural, or scientific resources and appropriate consultation conducted with the State Historic Preservation Officer or the Advisory Council on Historic Preservation.

Any necessary permits and authorizations per the ESA and the MMPA regarding direct take or incidental take of listed species (as discussed elsewhere herein).

Any other federal, state, or local permits or authorizations associated with the proposed action that is the subject for requested funding.

The SER Grants Branch or SER SFD (as appropriate) also expect that the applicant is fully capable of and will implement all appropriate federal, state, and local safety procedures (Department of Commerce Financial Assistance Standard Terms and Conditions, 2008), regulations required for use of vessels in state and federal waters, and proper protocols for ensuring that the action would not cause the introduction or spread of invasive species, including proper cleaning protocols for vessels and underwater gear.

NAO 216-6 is currently under review and revision. When the revisions are completed the PEA will be reviewed in light of the new revisions, and any necessary updates will be made as appropriate.

## 3.2 Activities in Funding and Special Permit Requests Categorized by Potential Level of Impact

### 3.2.1 Potential Impacts for Category A: Activities that Hold No Potential for Significant Environmental Impacts

All activities in Category A (Section 3.1) would have no potential for any significant environmental impacts. Category A includes actions such as computer modeling, administrative actions, educational efforts, completely closed, highly controlled aquaculture research, and actions in which the recipient uses resources collected by others. This could include research on organisms already in captivity. Therefore, these actions would have no potential for significant environmental impacts caused by the requested funding or permit.

These types of activities are typically categorically excluded per NAO 216-6:

**Section 6.03.c.3(d):** "Administrative or Routine Program Functions."

**Section 6.03.c.3(i):** "Other Categories of Actions Not Having Significant Environmental Impacts." This includes actions with short-term effects, or actions of limited size or magnitude.

### 3.2.2 Potential Impacts for Category B: Activities With Minimal to No Potential for Significant Environmental Impacts

All activities in Category B (Section 3.2) are of such a minor nature that the potential impacts are minimal to none. These activities include use of remotely operated vehicles (ROVs) for habitat evaluations, aerial surveys, aquaculture systems that are recirculating with no offshore discharge (onshore), benthic mapping, and video monitoring.

If a Category B activity is determined to be suitable for a CE, the following CEs may apply per NAO 216-6:

**Section 6.03.c.3(a): "Research Programs."** Programs or projects of limited size and magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible.

**Section 6.03.c.3(b): "Financial or planning grants."** Financial support services, such as a Saltonstall-Kennedy grant, a fishery loan or grant disbursement under the Fisherman's Contingency Fund or Fisheries Obligation Guarantee Program, or a grant under the Coastal Zone Management Act (CZMA) where the environmental effects are minor or negligible. New financial support services and programs would undergo an EA or EIS at the time of conception to determine if a CE could apply to subsequent actions.

**Section 6.03.c.3(i): "Other categories of actions not having significant environmental impacts."** This includes actions with short-term effects, or actions of limited size or magnitude.

### 3.2.3 Potential Impacts for Category C: Activities with the Potential for Significant Environmental Impacts

The activities in Category C include all special permits and those funding requests with the potential for environmental effects and may not be suitable for a CE under certain circumstances (Section 3.3). These include actions in which the grant or special permit recipient would collect living organisms, potentially including listed species or fish stocks that are overfished or that are undergoing overfishing, activities involving offshore aquaculture with significant discharge to natural waters bodies, construction of or additions to buildings, and habitat restoration. Funding or special permit requests that include any activities within this category would require additional analysis of the proposed request and potentially an EA or EIS, depending on the circumstances.

If a Category C activity is determined to be suitable for a CE, the following CEs may apply:

**Section 6.03.c.3(a): "Research Programs."** Programs or projects of limited size and magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible;

**Section 6.03.c.3(b): "Financial or planning grants."** Financial support services, such as a Saltonstall-Kennedy grant, a fishery loan or grant disbursement under the Fisherman's Contingency Fund or Fisheries Obligation Guarantee Program, or a grant under the CZMA where the environmental effects are minor or negligible. New financial support services and programs would undergo and EA or EIS at the time of conception to determine if a CE could apply to subsequent actions.

**Section 6.03.c.3(c): "Minor project activities."** Projects where the proposal is for a minor amelioration action such as planting dune grass or for minor improvements to an existing site (e.g., fences, roads, picnic facilities, etc.), unless such projects in conjunction with other related actions may result in a cumulative impact.

**Section 6.03.c.3(f): "Construction Activities."** Minor construction conducted in accordance with approved facility master plans and construction projects on the interiors of non-historic NOAA-owned and leased buildings, including fire deficiencies, air quality, interior renovation, expansion or improvement of an existing facility where the gross square footage is not increased by more than 10 percent and the site size is not increased substantially, and minor repair/replacement of existing piers or floats not exceeding 80 feet in length.

**Section 6.03.c.3(g): "Facility improvements or additions."** Minor facility improvement or addition where ground disturbance is limited to previously disturbed areas (i.e., previously paved or cleared areas).

**Section 6.03.c.3(i): "Other categories of actions not having significant environmental impacts."** This includes actions with short-term effects or actions or limited size or magnitude.

NAO 216-6 Section 6.03.c.3 requires that, in all cases, a determination must be made as to whether the effects of an action that normally falls under one of the identified CEs may have a significant impact on the environment using the criteria listed in NAO 216-6 Section 5.05b. and therefore whether an EA or EIS should be prepared.

NAO 216-6 identifies exceptions to CEs that, when applied to a particular activity considered for a CE, might have significant impacts requiring preparation of an EA or an EIS, including the following criteria (NAO 216-6 Section 4.01c. and 5.05c.):

Involves a geographic area with unique characteristics,

The subject of public controversy based on potential environmental consequences,

Has uncertain environmental impacts or unique or unknown risks,

Would establish a precedent or decision in principle about a future consideration proposals,

May result in cumulatively significant impacts, or

May have any significant environmental effects upon endangered or threatened species or their habitats.

Specific exceptions include activities that involve a significant status of a managed fish stock per the MSA (Table 2, p.32) or a species listed as threatened or endangered under the ESA (Table 3, p. 35). If any of these species are included within requests, the application must be reviewed by the SER Regional NEPA Coordinator, the SER SFD and/or the SER Protected Resources Division to determine if the funding request must undergo additional NEPA analysis.

In the Southeast Region, 17 Fisheries Management Plans (FMPs) containing 175 stocks or complexes are managed by NOAA Fisheries and the South Atlantic, Caribbean, and Gulf of Mexico Fishery Management Councils:

South Atlantic golden crab

South Atlantic shrimp

South Atlantic snapper grouper

Coral, coral reefs, and live/hard bottom habitats of the South Atlantic region

Pelagic *Sargassum* habitat of the South Atlantic region

Dolphin and wahoo

Gulf of Mexico/South Atlantic spiny lobster

Coastal Migratory Pelagics of the Gulf of Mexico and South Atlantic

Gulf of Mexico stone crab

Gulf of Mexico shrimp

Reef fish resources of the Gulf of Mexico

Gulf of Mexico red drum

Coral and coral reefs of the Gulf of Mexico

Reef fish fishery of Puerto Rico and the U.S. Virgin Islands

Queen conch resources of Puerto Rico and the U.S. Virgin Islands

Spiny lobster fishery of Puerto Rico and the U.S. Virgin Islands

Corals and reef-associated invertebrates of Puerto Rico and the U.S. Virgin Islands

Within these FMPs, 17 species/units are subject to overfishing, 10 species/units are overfished, and 4 species/units are approaching an overfished condition (Table 2, p. 32).

**Types of Funding Requests Submitted to SER Grants Branch between 2005 and 2009**

**Atlantic Coastal Cooperative Statistics Program (ACCSP)**

The ACCSP is a cooperative state-federal program to design, implement, and conduct marine fisheries statistics data collection programs and to integrate those data into a single data management system that will meet the needs of fishery managers, scientists and fishermen. Most recently, funds have been awarded for Florida's Atlantic Coast Head Boat At-Sea Sampling project, North Carolina's commercial gillnet observer program, and South Carolina's collection of biological data in the snapper-grouper fishery.

**Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA)**

The ACFCMA supports the development, implementation, and enforcement of effective interstate conservation and management of Atlantic Coastal resources. Funds can be provided to prepare, implement, and enforce coastal FMPs and State activities required within such plans. Funds can also be used for program activities to support and enhance State cooperation in collection, management and analysis of fishery data; law enforcement; habitat conservation; fishery research including biological and socioeconomic research; and fishery management planning.

**Anadromous Species**

The Anadromous Fish Conservation Act authorizes the Secretaries of the Interior and Commerce to enter into cooperative agreements with the States and other non-federal interests to conserve, develop, and enhance anadromous fish and their critical habitat. The types of projects funded are investigations, engineering and biological surveys, research, stream clearance, construction, maintenance and operations of hatcheries, and devices and structures for improving movement, feeding, and spawning conditions.

**Three Fishery Management Councils in the SER**

These five-year grants fund the administrative operations of the Caribbean Fishery Management Council, the Gulf of Mexico Fishery Management Council, and the South Atlantic Fishery Management Council and allow them to develop and modify Fishery Management Plans (FMPs).

**Cooperative Research Program (CRP)**

The CRP is a competitive federal assistance program that funds projects seeking to increase and improve the working relationship between researchers from the NOAA Fisheries, state fishery agencies, universities, and fishermen. The CRP's principal goal is to provide a means

of involving commercial and recreational fishermen in the collection of fundamental fisheries information to support the development and evaluation of management and regulatory options. CRP applicants are encouraged to address one of the priority areas for that particular funding cycle (i.e., commercial finfish, Caribbean fisheries, recreational and commercial fisheries, and commercial shrimp harvest).

**Cooperative Statistics Program (CSP)**

The five-year grants for the State/Federal CSP, through a Congressional allocation, include 10 recipients who collect fishery statistics and provide them to NOAA Fisheries.

**General Congressional Earmarks**

These earmarks are miscellaneous Congressionally-directed awards to various recipients to conduct a range of research and other activities.

**Gulf Economics and Social Science Research**

This five-year award funds economic and social science data collection in the Gulf region. The recipient is the Gulf States Marine Fisheries Commission (GSMFC).

**Gulf Fisheries Information Network (GulfFIN)**

These grants continue funding of the GulfFIN. The mission of the GulfFIN is to cooperatively collect, manage, and disseminate marine commercial, recreational and anadromous fishery data and information for the conservation and management of fishery resources in the Southeast Region and to support the development of a national program.

**Restoration after a Hurricane or Other Disaster**

The Secretary of Commerce declared a fishery resource disaster in 2008 due to the devastation of Hurricanes Gustav and Ike. As a result, funds were appropriated to several Gulf States. It is likely that similar awards will be made in the future.

**Interjurisdictional Fisheries Act**

Interjurisdictional Fisheries Act of 1986 projects are carried out to gather information and conduct activities that support management of United States multi-jurisdictional fisheries. Grant funds can be used for research and enforcement of interjurisdictional fishery resources and for the development of FMPs.

**Marine Fisheries Initiative Program (MARFIN)**

The competitive MARFIN funds research and development projects that optimize the use of fisheries in the Gulf and South Atlantic.

**MARMAP**

This five-year grant funds the MARMAP program, including fishery-independent surveys and research.

**Mote Marine Laboratory**

These Congressionally-directed grants fund basic and applied scientific research on sharks, skates, and rays.

**Saltonstall-Kennedy Act (S-K)**

The S-K competition provides grants for fisheries research and development projects addressed to any aspect of U.S. fisheries, including, but not limited to, harvesting, processing, marketing, and associated infrastructures.

**Southeast Area Monitoring and Assessment Program (SEAMAP)**

The SEAMAP is a state/federal program designed to collect, manage, and disseminate fishery-independent data in the southeastern U.S. Three components currently partner with NOAA FISHERIES: SEAMAP-Gulf; SEAMAP-South Atlantic; and SEAMAP-Caribbean. Each component operates independently, planning and conducting surveys, and disseminating information in accordance with cooperatively established administrative policies and guidelines.

**Section 6 (Endangered Species Act)**

These grants fund various types of research (sea turtles, right whales, etc.) in accordance with Section 6 of the ESA.

**State of South Carolina**

These Congressionally-directed grants fund basic and applied scientific research in South Carolina.

**University of New Hampshire (UNH)**

These Congressionally-directed grants to UNH help conduct research on Atlantic bluefin tuna (ABFT).

**Cooperative Institute for Marine and Atmospheric Studies (CIMAS)**

This funding under a cooperative agreement with CIMAS provides oceanographic research on shrimp transport and recruitment. The results will be provided to NOAA, the South Florida Ecosystem Restoration Task Force, shrimp fishers, and the scientific community.

**Table 2. Southeast Region stocks that are subject to overfishing, are overfished, or are approaching an overfished condition.[1]**

| Fishery Mgt. Council | FMP | Subject to Overfishing | Overfished | Approaching an Overfished Status |
|---|---|---|---|---|
| **South Atlantic** | South Atlantic Snapper Grouper | Vermilion snapper<br>Red snapper<br>Snowy grouper<br>Black sea bass<br>Gag grouper<br>Speckled hind<br>Warsaw grouper<br>Tilefish<br>Red grouper | Red snapper<br>Snowy grouper<br>Black sea bass<br>Red porgy<br>Red Grouper | Gag grouper |
| | South Atlantic Shrimp | | Pink shrimp[1] | |
| **Gulf of Mexico** | Reef Fish Resources of the Gulf of Mexico | Greater amberjack<br>Gag grouper<br>Gray triggerfish<br>Red Snapper | Greater amberjack<br>Gray triggerfish<br>Red Snapper<br>Gag grouper | |
| **Caribbean** | Reef fish Fishery of Puerto Rico and the USVI | Grouper Unit 1<br>Grouper Unit 4<br>Snapper Unit 1<br>Parrotfishes | Grouper Unit 1<br>Grouper Unit 2<br>Grouper Unit 4 | Snapper Unit 1<br>Parrotfishes |
| | Queen Conch Resources of Puerto Rico and U.S. Virgin Islands (USVI) | Queen conch | Queen conch | |

[1] Based on National Marine Fisheries Service 2009 Report to Congress: The Status of U.S. Fisheries, May 2010 (NOAA 2010), and updates at http://www.nmfs.noaa.gov/sfa/statusoffisheries/2010/third/mapoverfishedstockscy_q3_2010.pdf as of September 2010. South Atlantic pink shrimp are in overfished status due to environmental factors.

### 3.2.4 Analysis of Funding and Special Permits Requests on ESA-Listed Species

The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq*.) requires that federal agencies use their authorities to conserve threatened and endangered species. Section 7(a)(2) of the ESA requires that each federal agency ensure any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or to result in the destruction or significant modification of any designated critical habitat of such species. The ESA requires NOAA Fisheries to consult with the appropriate administrative agency (NOAA Fisheries Protected Resources Division for most marine species, the U.S. Fish and Wildlife Service (USFWS) for all remaining species) when proposing an action that "may affect"[1] critical habitat or threatened or endangered species. Consultations are necessary to determine the potential impacts of the proposed action. Species are listed as threatened or endangered per the ESA are found in Table 3, p. 35.

NEPA directs federal agencies to conduct reviews that consider the potential impacts on the environment when planning projects and issuing permits (NOAA 2005b). NEPA reviews do not satisfy the requirements set for federal agencies under Section 7 of the ESA, and when appropriate a Section 7 consultation must be completed before a Finding of No Significant Impact (FONSI) is signed (Moore 1999). For federal agencies to comply with these requirements, specific analysis of the potential impacts to ESA-listed species must be conducted.

Funding grant proposals or issuing special permits are examples of actions funded or authorized by a federal agency and require Section 7 review pursuant to the ESA. Presently, the SER SFD requests ESA Section 7 consultations for all special permits. The SER Grants Branch staff conducts reviews of approved funding requests for potential impacts to ESA-listed species. If potential impacts are identified during that initial review, a Section 7 consultation is requested.

The Department of Commerce standard terms and conditions specify that funding recipients comply with the Clean Air Act, Clean Water Act, Flood Disaster Protection Act of 1973, Coastal Zone Management Act, Coastal Barriers Resources Act, Wild and Scenic Rivers Act, and Safe Drinking Water Act of 1974 (Department of Commerce Financial Assistance Standard Terms and Conditions, 2008). Therefore the grants would not threaten a violation of federal, state, or local laws or requirements imposed for the protection of the environment. However, in many cases the award of funds represents the only opportunity for a project to receive review pursuant to Section 7 of the ESA. This PEA addresses ESA consultations by specifying the types of actions that do not require consultation because they will not affect ESA-listed species, as well as specifying how consultation would be initiated for projects that may affect listed species or designated critical habitat.

The PEA identifies the three general categories of activities, submitted in funding requests over the last five years (2004-2009) (see Section 3); of these, Category A projects will have no effect on ESA-listed species (Table 3). Projects in Category A consist of outreach, administrative and technical tasks, or non-field based research. Regardless of the task type, the distinguishing factor

[1] "May affect" refers to *any* potential effects, including beneficial effects, to listed species (USFWS and NMFS 1998).

for these types of projects is that they do not occur in the marine environment and no effects to marine organisms are anticipated. Some projects may use information gathered from activities occurring in the marine environment, but those activities would be subject to a separate Section 7 review. Therefore, any future approved funding requests that do not occur in the marine environment will have no effect on listed species and do not require Section 7 consultations. In these cases, SER Grants Branch staff can satisfy the requirement for Section 7 consultation by stating in writing that a specific project will not affect listed species.

The PEA also identifies two additional categories of approved funding requests (Categories B and C) with different degrees of potential for significant environmental impacts. Projects in these categories may affect listed species but most would not adversely affect them. Upon determination by SER Grants Branch staff that approved funding requests may affect listed species or critical habitat, but is not likely to have an adverse effect, an informal consultation would be initiated to the SER Protected Resources Division with a request for concurrence. A Section 7 formal consultation would be initiated if needed.

**Table 3. Species Listed as Threatened or Endangered per the Endangered Species Act.**

| Listed Species | Scientific Name | Status | Date Listed |
|---|---|---|---|
| **Marine Mammals** | | | |
| blue whale | *Balaenoptera musculus* | Endangered | 12/02/70 |
| finback whale | *Balaenoptera physalus* | Endangered | 12/02/70 |
| humpback whale | *Megaptera novaeangliae* | Endangered | 12/02/70 |
| North Atlantic right whale | *Eubalaena glacialis* | Endangered | 12/02/70 |
| sei whale | *Balaenoptera borealis* | Endangered | 12/02/70 |
| sperm whale | *Physeter macrocephalus* | Endangered | 12/02/70 |
| **Turtles** | | | |
| green sea turtle | *Chelonia mydas* | Threatened | 07/28/78 |
| hawksbill sea turtle | *Eretmochelys imbricata* | Endangered | 06/02/70 |
| Kemp's ridley sea turtle | *Lepidochelys kempii* | Endangered | 12/02/70 |
| leatherback sea turtle | *Dermochelys coriacea* | Endangered | 06/02/70 |
| loggerhead sea turtle | *Caretta caretta* | Threatened | 07/28/78 |
| **Fish** | | | |
| Gulf sturgeon | *Acipenser oxyrinchus desotoi* | Threatened | 09/30/91 |
| shortnose sturgeon | *Acipenser brevirostrum* | Endangered | 03/11/67 |
| smalltooth sawfish | *Pristis pectinata* | Endangered | 04/01/03 |
| **Invertebrates** | | | |
| elkhorn coral | *Acropora palmata* | Threatened | 05/09/06 |
| staghorn coral | *Acropora cervicornis* | Threatened | 05/09/06 |
| **Seagrasses** | | | |
| Johnson's seagrass | *Halophila johnsonii* | Threatened | 09/14/98 |
| **Critical Habitat** | | | |
| Critical habitat has been designated for the following species: | | | |
| green sea turtle | *Chelonia mydas* | Threatened | |
| hawksbill sea turtle | *Eretmochelys imbricata* | Endangered | |
| leatherback sea turtle | *Dermochelys coriacea* | Endangered | |
| Gulf sturgeon | *Acipenser oxyrinchus desotoi* | Threatened | |
| smalltooth sawfish | *Pristis pectinata* | Endangered | |
| elkhorn coral | *Acropora palmata* | Threatened | |
| staghorn coral | *Acropora cervicornis* | Threatened | |
| Johnson's seagrass | *Halophila johnsonii* | Threatened | |

## 3.3 Analyses of Potential Environmental Impacts for Activities in Category C

The following evaluations of environmental effects focus on Category C activities included within funding and special permit requests, based on activities that have been received in the last five years (2004-2009). Category C actions most likely to have significant environmental effects involve those actions with impacts to: (1) species that are listed as threatened or endangered per the ESA or their critical habitat, (2) those species whose stocks have been identified as overfished, undergoing overfishing, or approaching an overfished status, and (3) offshore aquaculture.

Any funding request or special permit that has an activity identified as Category C, even if most of the activities associated with the request are determined to be categorically excluded under Categories A or B, would require additional NEPA review. Review would include determination of consistency with the impact analyses in this section.

### 3.3.1 Potential Impacts to Essential Fish Habitat (EFH) and Target Populations by Various Types of Fishing Gear used in the Southeast Region

The following introductory text is taken from http://swr.nmfs.noaa.gov/hcd/efhprim.htm.

> Besides delineating EFH, FMPs or FMP amendments must also identify and describe potential threats to EFH, which includes threats from fishing or any other sources, and recommend EFH conservation and enhancement measures. Councils are required to implement management measures to minimize, to the extent practicable, any adverse impacts to EFH caused by fishing gears. Guidelines for development of EFH amendment sections for each of these issues are included in the EFH regulations.
>
> In the regulatory context for conserving fish habitat, the most important provisions of the MSA are those which require consultation with NMFS when any activity proposed to be permitted, funded, or undertaken by a federal agency may have adverse impacts on designated EFH. NMFS has addressed these concerns in the EFH regulations by emphasizing the use of existing environmental review processes. Provided the specifications outlined in the regulations are met, EFH consultations will be incorporated into interagency procedures previously established under the NEPA, ESA, Clean Water Act, Fish and Wildlife Coordination Act, or other applicable statutes.
>
> The EFH regulations define an *adverse effect* as "any impact which reduces quality and/or quantity of EFH...[and] may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.
>
> An "EFH Assessment" is a review of the proposed project and its potential impacts to EFH which is prepared by the Federal action agency. As set forth in the regulations, EFH Assessments must include (1) a description of the proposed action; (2) an analysis of the effects, including cumulative effects, of the action on EFH, the managed species, and associated species by life history stage; (3) the federal agency's views regarding the effects of the action on EFH; and (4) proposed mitigation, if applicable. If appropriate, the assessment

should also include: the results of an on-site inspection; the views of recognized experts on the habitat or species affects; a literature review; an analysis of alternatives to the proposed action; and any other relevant information.

The PEA's establishment of categories for approved funding requests with varying degrees of potential for significant environmental impacts addresses the question of "substantial damage to the ocean and coastal habitats and/or EFH." Funding requests or special permits that have no effect on these habitats would be categorized in Category A. Funding requests or special permits that may affect EFH would be categorized in Category B and C. Additional NEPA analysis would then be required to determine whether those requests could reasonably be expected to cause substantial damage to those habitats.

## General descriptions of fishing gear and associated types of impacts to EFH

The following discussion represents the available gear information for the Southeast Region (comprising the South Atlantic, Gulf, and Caribbean). This was taken from the Final Environmental Impact Statement (EIS) for the Generic Essential Fish Habitat Amendment to the FMPs of the Gulf of Mexico, March 2004, pages 3-242 through 3-268. This source provides information applicable to the entire Southeast Region. All citations listed here are cited in that document and can be found in Chapter 5, References, of this PEA.

As part of an effort to identify fishing impacts on fish habitat from the gear used in the Gulf, South Atlantic, and Caribbean Regions, Rester (2000a, 200b, 2001) compiled an annotated bibliography of papers and reports that addressed fishery-related habitat impacts. The bibliography included scientific literature, technical reports, state and federal agency reports, college theses, conference and meeting proceedings, popular articles, memoranda, and other forms of nonscientific literature, but did not include studies that pertained to the ecosystem effects of fishing (e.g., changes in the biological community structure). The bibliography focused on the physical impacts of fishing activities on habitat.

A new literature search in September 2010 was conducted regarding studies on gear impacts. Companion studies in the Florida Keys found high rates of damage from contact of lobster traps with hard and soft corals and sponges; however, the percentage of traps contacting live coral is low (Lewis et al. 2009, T. Matthews, FWRI, unpublished data). Barnette (2001) used the over 600 papers compiled by Rester (2000a, 2000b, 2001) to examine fishing impacts in the Southeast Region. Barnette (2001) found a paucity of readily available information on the numerous types of gear used within the South Atlantic, Gulf, and Caribbean. While there have been hundreds of studies published on gear impacts worldwide, the majority of these focus on mobile gear such as dredges and trawls. Furthermore, in addition to the approved gears within the various FMPs, there are many gear types utilized within state and territorial waters that also need to be evaluated because EFH may extend into coastal and estuarine waters. There are few, if any, more recent habitat impact studies that have been conducted on these gear types. Matthews (2003) studied the distribution of trap fishing and effects on habitats in coral reef ecosystems and found that a relatively small percentage of the traps set in shallow water actually contact hard corals, gorgonians, or sponges. Various Biological Opinions have been conducted (NMFS 2005a; NMFS 2005b; NMFS 2006a; NMFS 2006b, NMFS 2007) but did not directly address EFH. The PEA will be updated as more recent habitat studies are obtained.

Johnson (2002) also reviewed literature through May 2002 dealing with the effects of fishing gears on benthic habitats. The document primarily focused on mobile gears, such as trawls and dredges which are not typically used in Caribbean fisheries. The document, however, also contained some information on traps, pots, longlines, and gill nets.

A December 1999 EFH Workshop attended by NOAA Fisheries scientists and managers also addressed fishing impacts, and examined which factors made gear impact studies relevant to the Southeast Region (Hamilton 2000). The criteria regarding gear impacts included whether the specified gear was used in the Southeast Region, whether it was utilized in the same manner (similar fisheries), and whether the habitat was similar. This review recognized that in many instances, numerous epifaunal and infaunal species are an integral part of benthic habitat.

Studies of gear types that are not applicable to the Southeast Region such as explosives, cyanide/poisons, and beam trawls are not included in this section. Explosives and cyanide have been prohibited by the various Fishery Management Councils due to the documented habitat damage associated with those methods. The numerous studies conducted on beam trawls are also not discussed here, due to the fact that beam trawls are rarely used within the region and would require a separate NEPA review and determination. The following section is largely excerpted from Barnette (2001).

**Description of otter trawls:** Otter trawls pursue invertebrate species such as shrimp and calico scallops and also flounder and butterfish in both state and Federal waters of the Gulf. Otter trawls are the most extensively utilized, towed bottom-fishing gear (Watling and Norse 1998).

**Impacts of otter trawls:** Trawls have been identified as the most widespread form of disturbance to marine systems in areas too deep to be affected by storms. The otter trawl is one of the most studied gear types. As a result, much information is available on its potential impacts to critical habitat. Otter trawls can affect the seabed by scraping and plowing, sediment re-suspension, physical habitat destruction, and removal or scattering of non-target benthos (Jones 1992). Trawl gear can vary greatly in design. In general, the various parts of trawl gear that may impact the bottom include the doors, tickler chains, footropes, rollers, and the belly of the net, depending on its operation and towing speeds. Although the passing of one trawl net over a specific bottom site may be relatively minor, the cumulative effect and intensity of trawling may generate long-term changes in benthic communities (Collie et al. 1997, NRC 2002).

Trawling has the potential to reduce or degrade structural components and habitat complexity by removing or damaging epifauna, smoothing bedforms (thereby reducing bottom heterogeneity), and removing structure producing organisms. Trawling may change the distribution and size of sedimentary particles; increase water column turbidity, suppress primary producer growth, and alter nutrient cycling. The ecological effect of trawling is highly variable as it depends upon site-specific characteristics such as bottom type, water depth, community type, gear type, intensity and duration of trawling, and natural disturbances.

Impacts from tickler chains appear to be minor on sand substrates, but are more substantial on live hard bottoms habitats and on corals. Other studies have shown that there are no significant or consistent effects of experimental trawling on any of the soft-sediment organisms studied. One study holds that trawling mimics natural disturbance and stimulates benthic production as if the bottom were cultivated (Cahoon et al., not dated). The use of bottom trawls for catching

commercial-quantities of reef fish for the aquarium trade is prohibited in the Gulf. Weak links on tickler chains of bottom trawls are required in the Gulf to minimize damage to EFH.

**Description of pair trawls:** A pair trawl is similar to an otter trawl without the otter boards. The pair trawl is so named because it is fished using two boats, with each side of the net attached to one of the vessels. The two vessels stay a fixed distance apart while hauling the trawl, thus keeping the net mouth open and eliminating the need for trawl doors. The pair trawl can be used to harvest either pelagic or demersal fishery species.

**Impacts of pair trawls:** In situations where the pair trawl is fished at the surface for pelagic species, it should have no impact on benthic habitats. However, when it is used to fish for demersal species, it does contact the bottom. The detrimental effects are probably less than an otter trawl because it lacks doors. Pair trawls, however, still have tickler chains and lines which might damage any habitats with vertical structure, such as sponges and corals. Weak links on tickler chains of bottom trawls are required in the Gulf to minimize damage to EFH.

**Description of roller frame trawls:** Frame trawls are primarily used to harvest bait shrimp in the State of Florida. They consist of a frame that holds open a net and supports slotted rollers that turn freely as the trawl moves across the bottom. This motion prevents the scouring and scraping impacts primarily associated with otter trawls. Participants in the fishery usually operate in shallow water less than 30 feet deep.

**Impacts of roller frame trawls:** Futch and Beaumariage (1965) found that while frame trawls gathered large amounts of unattached algae and deciduous *Thalassia testudinum* leaves, no submerged aquatic vegetation (SAV) with roots attached were found in the trawl catch. Trawls with larger rollers 8 inches in diameter reduced the amount of bycatch material, with most drags collecting little or no SAV or algae. Additionally, there was minimal SAV degradation; degradation that did result, however, was mostly from propeller scars. When rake teeth were extended below the rollers, they had a tendency to uproot SAV.

In contrast to studies that assessed impacts to SAV, Tilmant (1979) found a high incidence of damage to stony corals in a study that investigated frame trawl impact on hard bottom habitat in Biscayne Bay. Frame trawls turned over or crushed 80% of *Porites porites* and *Solenastrea hyades* and damaged over 50% of sponges and 38% of gorgonians in the trawl path. Macroalgae, including *Halimeda* and *Sargassum*, were impacted. *Sargassum* torn loose from the bottom resulted in an early release to the free- floating state. Tilmant (1979) found it doubtful that this action was harmful to *Sargassum* unless it occurred during early column formation. Within dense SAV communities, removal of epibenthic algae, tunicates, sponges, and other primary producers may also be significant. In trawled areas, Tilmant (1979) also noted that in hard bottoms 30% to 80% damage to coral was recorded as well as a decline in groups of large and small benthos. The use of bottom trawls for catching commercial-quantities of reef fish for the aquarium trade is prohibited in the Gulf. Weak links on tickler chains of bottom trawls are required in the Gulf to minimize damage to EFH.

**Description of skimmer trawls:** Skimmer trawls are positioned along the side of a boat, one on each side, and pushed through the water to harvest shrimp. Skimmer trawls are supported by a tubular metal frame that skims over the bottom on a weighted metal shoe or skid. Tickler chains are also utilized along the base of the net.

**Impacts of skimmer trawls:** Skimmer trawls work on mud bottoms in water generally less than 10 feet deep. The weighted shoe and tickler chains impact the bottom, resulting in sediment re-suspension. Skimmer trawls may cause bottom damage due to improperly tuned or poorly designed gear (skids and bullets) or prop damage in shallow areas (Steele 1994). Furthermore, because skimmer trawls are used in shallow water, they may have a detrimental impact on critical nursery areas such as the marsh/water interface, SAV, or other sensitive submerged habitats. Habitat provided by sponges and SAV are cut off by tickler chains and lead lines, as opposed to otter trawl doors which can dig in and tear up the bottom. However, skimmer trawls are expected to impact the bottom less than or the same as otter trawls due to the absence of doors (Kennedy 1993, Steele 1994, Coale et al. 1994). The use of bottom trawls for catching commercial-quantities of reef fish for the aquarium trade is prohibited in the Gulf. Weak links on tickler chains of bottom trawls are required in the Gulf to minimize damage to EFH.

**Bottom longline and buoy gear:** Bottom longlines use baited hooks on offshoots (gangions or leaders) of a single main line to catch fish at various levels depending on the targeted species. The line can be anchored at the bottom in areas too rough for trawling or to target reef-associated species, or set adrift, suspended by floats to target swordfish and sharks. Longlines are widely utilized in numerous fisheries throughout the SER. According to the NOAA Fisheries Logbook data (1990-2001), bottom longlines can be over 8 miles long and soak in the water for over 40 hours per set.

**Impacts of bottom longline and buoy gear:** The principal components of the bottom longline that can produce seabed effects are the anchors or weights, hooks, and the mainline (ICES 2000). When a vessel is retrieving a bottom longline it may be dragged across the bottom for some distance. Any substrate penetration would not be expected to exceed the breadth of the fishhook, which is rarely more than 50 mm (Drew and Larsen 1994).

Lost or abandoned longline gear potentially can result in ghost fishing, where the line floats free and catches fish, sea turtles, and marine mammals until all the bait is gone (unless the caught organisms themselves become bait for other species). Gear sometimes becomes lost because of weather or accidents, and may be abandoned by fishermen in closed areas who may be trying to avoid detection by enforcement. Cumulative effects of lost longline gear could be significant. Retrieval of lost or abandoned gear typically occurs by dragging a grappling hook across the bottom to snag the line, which can cause severe local damage to fragile habitat such as coral. The magnitude of the potential problems from lost gear has not been evaluated in the Gulf.

**Description of pelagic longlines:** Pelagic longline gear is composed of the primary fishing line, or mainline of the longline system, which can vary from five to 40 miles in length, with approximately 20 to 30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline, which connects the mainline to several buoys and periodic markers with radar reflectors and radio beacons. Each individual hook is connected by a leader to the mainline. Circle hooks are being used as a more conservative gear in the Atlantic pelagic longline fishery compared to the traditional “J-style” hooks (Fisheries Research Institute 2007).

**Impacts of pelagic longlines:** Pelagic longline gear has a negligible impact on benthic EFH, because there is no interaction with bottom habitats.

**Description of Drum Lines:** Drum lines are used for catching sharks and keeping them alive until they are retrieved. A drum line involves a monofilament line attached to a line with a

swivel and the rope attached to a buoy and a weight. The swiveled line allows the shark to continue breathing by swimming in large circles slowly around the rope.

**Impacts of Drum Lines:** The weight is dropped on the ocean floor, which could break corals and other vertical structures.

**Description of traps and pots:** Traps and pots are widely used on a variety of habitats in both state and Federal waters to harvest species such as lobster, blue crabs, golden crabs, stone crabs, black sea bass, snapper, grouper and other assorted reef fish species. Traps and pots are rigid devices weighted to rest on the bottom with buoys to mark their location at the surface. They may be fished in relatively shallow or deep water and are often designed specifically to catch one species (such as stone crab or lobsters) or a variety of species (such as mixed reef fishes and spiny lobster). Generally, though not always, they are baited and equipped with one or more funnel openings. When fishing, they are left unattended for some time before retrieval; soak time varies by fishery. The amount of damage currently done by traps in the Gulf is not known, although they are currently prohibited in federal waters of the Gulf.

Both stone crab and lobster traps may be constructed of wood or plastic. Soak times for stone crab traps range from nine days to three weeks. Soak times for lobster traps range from three to ten days, with average times increasing as the season progresses. In the Florida Keys, most traps are singles, but when multiple traps are fished they must have a buoy at both ends. Reef fish traps in the Caribbean are typically constructed of wire mesh over steel or wood frames and are soaked (fished) for approximately 7 days and reset in place as long as they are catching fish. Most artisanal fishermen set traps singly but commercial fishermen, e.g., St. Thomas, set traps in strings of approximately 5-10 traps. Mesh size (opening) dimensions are used as a means to control bycatch mortality.

**Impacts of traps and pots:** Due to their use to harvest species associated with coral and hard bottom habitat, traps and pots may impact and degrade habitat when they are first set, while they are fishing, or when they are hauled. More concern has been expressed regarding the impacts of traps on corals than on hard bottom or other bottom types although Uhrin et al. (2005) and R. Hill (SEFSC, unpublished data) have identified impacts to benthic organisms, such as seagrasses or gorgonians, in soft bottom habitats as well. Gomez et al. (1987) noted breakage of corals when traps fell or settled on colonies. Van der Knapp (1993) noted that fish traps set on staghorn coral easily damaged the coral. The greatest impact was caused when the trap's frame hit the coral formation directly. Follow-up studies of recovery rates reported that many gorgonians damaged by traps generally healed within 30 days and most staghorn coral injuries began to regenerate within about 35 days although the time for regeneration varied from branch to branch and long-term effects were not recorded. Algal invasion and growth at lesion sites prevented tissue regrowth over the damaged portion of the coral.

Research by Appeldoorn et al. (2000) in La Parguera, Puerto Rico found that traps may physically damage live organisms, such as corals, gorgonians, and sponges, which provide structure and in some cases nutrition for reef fish and invertebrates. More than half of all traps were set away from high relief coral reefs but many impacted hard bottom and soft bottom communities. All traps deployed in hardbottom or coral reef habitats caused some damage to gorgonians, hard corals, and sponges. Damage included flattening of habitats, particularly by breaking branching corals and gorgonians. Injuries may lead to colony death or reduced growth rates. An expansion of Appeldoorn's methodologies have been applied across the Virgin Islands

and Puerto Rico, with similar findings. As many as 50% of all traps cause at least some damage to structural organisms although some show capabilities to repair tissue damage (Ronald Hill, SEFSC, unpublished data[manuscript, in preparation]). Companion studies in the Florida Keys found high rates of damage from contact of lobster traps with hard and soft corals and sponges; however, since live coral are seriously reduced from historical levels, the percentage of traps contacting live coral is low (Lewis et al. 2009, T. Matthews, FWRI, unpublished data).

Although each individual trap has a relatively small footprint, the damage can be substantial due to the total number of traps deployed, including lost and abandoned traps. Traps are hauled and reset in specific areas multiple times before fishing activity moves to other grounds. Therefore, trap damage will be concentrated (cumulative effect) in particular areas rather than be uniform over all coral reef habitats.

During hauling, a trap may be dragged over the substrate until it lifts off the bottom. As many as 30% of all traps studied caused additional damage during hauling (Appeldoorn et al. 2000). Traps set in "strings" or trotlines (multiple traps tied together) 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. To lessen this potential, most fishermen in the Caribbean use floating poly line between traps but it still has been seen to contact the bottom. Traps that are lost or set unbuoyed are often recovered by dragging a grappling hook through the water to catch the floating line. This practice can result in dragging-induced damage from the grappling hook, the trap, and the trotline. The area swept by trotlines upon trap recovery is much greater than the cumulative area of the traps themselves.

Studies in the Florida Keys have examined the movement of traps during various wind events and found a greater propensity for movement of traps than expected. Even fronts with light to moderate winds have demonstrated that traps move such that they contact up to 5x the footprint of the trap with greater damage to soft corals, hard corals and sponges (Lewis et al. 2009). Additional observations also noted greater interaction between lines and benthos during storm events with more entanglement and shearing.

If lost, pots and traps may also cause ghost fishing until they degrade. Biodegradable panels or fastenings prevent ghost fishing, but only if the panels are rigged in accordance with the regulations and only after the biodegradable closure deteriorates and the pot or trap opens. Length of time for deterioration has not been studied in the Gulf although the regulations in the Caribbean are based on degradation after 7-14 days. Studies in 2009-10 at the University of the Virgin Islands in collaboration with NOAA researchers (Hill and Monaco) are examining the degradation rates and fates of lost traps.

**Description of vertical gear:** Hook and line, handline, bandit gear, and rod and reel are widely utilized by commercial and recreational fishermen over a variety of estuarine, nearshore, and marine habitats. Hook and line may be used over reef habitat or trolled in pursuit of pelagic species in both state and Federal waters. Vertical gear fishers rely on finding concentrations of fish within the range of attraction of the few hooks on vertical gear. Concentrations of many managed fish species are higher on hard bottom areas than on sand or mud bottoms. The total amount of damage currently done by vertical gear in the Gulf is not known.

**Impacts of vertical gear:** Historically, little scientific information has existed on the physical impacts on marine habitats from these gear types. Impacts may include entanglement and minor degradation of benthic species from line abrasion and the use of weights (sinkers). Schleyer and

Tomalin (2000) noted that discarded or lost fishing line appeared to entangle readily on branching and digitate corals and was accompanied by progressive algal growth. This subsequent fouling eventually overgrows and kills the coral, becoming an amorphous lump once accreted by coralline algae. Lines entangled amongst fragile coral may break delicate gorgonians and similar species. Chiappone et al. (2002) documented the abundance and impacts of remnant commercial and recreational fishing gear on reef biota in the Florida Keys National Marine Sanctuary. Forty-five sites were surveyed in the summer of 2000, covering approximately 8,040 $m^2$. Almost 90% of the 110 debris items found consisted of monofilament line (38%), wood from lobster pots (20%), combined fishing weights, leaders, and hooks (16%), and rope from lobster traps (13%). Documented impacts associated with the 110 debris items were reported as 54 (49%) causing tissue abrasion, other damage, and/or mortality to 161 individuals or colonies of sessile invertebrates (sponges, branching gorgonians, fire coral, scleractinian corals, and the colonial zoanthid *Palythoa mammilosa*).

**Descriptions of gill and trammel nets:** Gillnets consist of a wall of netting set in a straight line, equipped with weights at the bottom and floats at the top, and is usually anchored at each end. As fish swim through the virtually invisible monofilament netting, they become entangled when their gills are caught in the mesh. Gillnets may be fixed to the bottom (sink net) or set midwater or near the surface to fish for pelagic species. A trammel net is made up of two or more panels suspended from a float line and attached to a single lead line. The outer panel(s) is (are) of a larger mesh size than the inner panel. Fish swim through the outer panel(s) and hit the inner panel carrying it through the other outer panel, creating a bag and trapping the fish.

**Impacts of gill and trammel nets:** The majority of the studies that have investigated impacts of fixed gillnets have determined that they have a minimal effect on the benthos (Carr 1988). However, Carr noted that ghost gillnets in the Gulf of Maine could become entangled in rough bottom. Bottom gillnets set over coral may cause negative impacts as the weighted lines at the base of the net often become entangled with branching and foliaceous corals. As the nets are retrieved, the corals are broken.

Aside from the potential impacts cited on coral reef communities, the available studies indicate that habitat degradation from gillnets is minor.

**Description of fyke nets:** Fyke nets are circular nets held open with circular hoops, which can be linked together to make long nets. These work best in sheltered places.

**Impacts of fyke nets:** Fyke nets are placed on the bottom and can break vertical organisms on the bottom, both at placement and at retrieval.

**Description of purse seine and lampara nets:** Purse seines are walls of netting used to encircle entire schools of fish at or near the surface. Spotter planes are often used to locate the schools, which are subsequently surrounded by the netting and trapped by the use of a pursing or drawstring cable threaded through the bottom of the net. When the cable has pulled the netting tight, enclosing the fish in the net, the net is retrieved to congregate the fish. The catch is then either pumped onboard or hauled onboard with a crane-operated dip net in a process called brailing. Purse seines are used to harvest menhaden in the Gulf and South Atlantic. Similarly, the lampara net has a large central bunt, or bagging portion, and short wings. The buoyed float line is longer than the weighted lead line so that as the lines are hauled the wings of the net come together at the bottom first, trapping the fish. As the net is brought in, the school of fish is worked into the bunt and captured. In the Florida Keys a modified lampara net is used to harvest

baitfish near the top of the water column. The wing is used to skim the water surface as the net is drawn in and fish are herded into the pursing section to be harvested with a dip net.

**Impacts of purse seines and lampara nets:** Purse seines in the Gulf menhaden fishery frequently interact with the bottom, resulting in sediment re-suspension. Schoellhamer (1996) estimated that resuspended sediments such as those that might arise from the use of purse seining activities would last only a period of hours. Other than this, impacts to bottom habitats caused by purse seining are believed to be minimal (Stephan et al. 2000).

**Description of seines:** Seines are active fishing gears consisting of a long fence-like wall of netting with floats along the top of the net and a series of evenly-spaced weights along the bottom of the net, called a leadline. The wall of netting composing the seine is meant to stretch from the surface of the water to the bottom. Beach seines are deployed off the shoreline in a semicircle to trap fish between the shore and the net, which is then pulled in and landed on the beach or shoreline. Haul seines are used away from shore to encircle fish, which are then worked into a smaller pocket until the net can be lifted into the boat for culling. Both types are used in state waters.

**Impacts of seines:** Sadzinski et al. (1996) found that seining had no detectable effects on brackish SAV (*Vallisneria* and *Hydrilla*) plant density, height, or species composition in Chesapeake Bay, but did they not assess possible damage to SAV reproductive structures, such as shearing off flowers. There is a possibility of damage to SAV sites where seines are hauled repeatedly over the same spots over long periods of time. Barnette (2001) also states that since seines are generally set in flat benthic areas to avoid net snags and damage, their impact on bottom habitats is expected to be minor and temporary.

**Description of push nets:** A push net consists of a pole attached to a triangular or rectangular frame which supports a mesh net. The fisher uses the pole to push the net across the bottom, usually through seagrass to capture shrimp.

**Impacts of push nets:** De Sylva (1954) determined that push nets have no detrimental effect on benthic habitats.

**Description of cast nets:** Cast nets are circular nets with weighted skirts, which are thrown from land or boats over schooling fish. When thrown properly, cast nets spread out and land on the water flat and circular. The weighted perimeter of the net then sinks to the bottom, trapping the fish or invertebrates within. The cast net also has a series of “brail lines” running from the net’s perimeter and up through a large eyelet in the center of the net, where the lines all meet and connect to a single hand line. Once the cast net has been thrown and sunk, the brail lines can be pulled through the eyelet, causing the bottom of the net to be effectively pursed so the fish can be landed. These nets are typically used in estuaries and nearshore areas to catch baitfish, mullet, and shrimp.

**Impacts of cast nets:** Cast nets can become entangled on jagged bottoms with vertically-oriented organisms like sponges, which can be damaged or dislodged in the net retrieval process. De Sylva (1954), however, found that cast nets generally had no detrimental effect on bottom habitats.

**Descriptions of drop (or lift) nets:** Drop nets are closed-bottom square or circular nets having a square or circular frame attached to the open top of the net. A series of lines run from points on the frame to a single hand line. This allows the net to be lowered into the water to sit flat on the

bottom. Bait can be attached to the bottom of the net or dropped onto the water's surface above the net to attract the target species. When the desired species is on or above the net, it is hauled up quickly, presumably capturing the organism. These nets are generally fished in calmer waters with relatively flat sand or mud bottoms in estuarine settings, and are used mostly to catch crabs.

**Impacts of drop nets: T**hese nets are fished primarily on sand or mud bottoms where there is nothing to snag and lay flat on the bottom before being pulled straight up. Their impact on the benthic habitat, therefore, should be minimal.

**Description of hoop nets:** The hoop net is a stationary net fished horizontally on the bottom. It is constructed of a coneshaped or flat net, which may or may not have a series of hoops or throats at intervals along its length to hold the net open. The net is secured to the bottom with weights or stakes and the cod end of the net is usually baited. Fish or invertebrates attracted to the bait enter the net mouth and move down the conical net, eventually becoming trapped in the cod end. After an adequate soak time, the net is raised at the cod end and the captured organisms removed.

**Impacts of hoop nets:** Barnette (2001) states that while there are no studies on the habitat impacts of hoop nets, they are probably less detrimental than traps because they are used primarily on flat bottoms.

**Descriptions of pound nets:** Pound nets consist of long fences of nettings. This causes fish swimming along the fence to be directed into an enclosure called a pound, pocket, or heart, from which they cannot escape. The fence of net is oriented perpendicular to the shore. Pound nets are sometimes left in place for a number of years, and are fished exclusively in state waters.

**Impacts of pound nets:** Pound nets are not believed to impact benthic habitat unless they are deployed directly on SAV (West et al. 1994).

**Description of channel nets:** A channel net is a static gear that is attached to a structure in the water such as a dock or piling when a current is running. The current keeps the net deployed while it passively fishes for shrimp in nearshore state waters.

**Impact of channel nets:** While Higman (1952) does not specifically discuss the impacts of channel nets on benthic habitat, it may be inferred that their effect on habitat is minimal, based on the net's catch composition and lack of contact with the bottom.

**Description of barrier nets:** Barrier nets are used to collect tropical aquarium-trade species by encircling small coral heads or surrounding outcroppings. Fish are then chased into the net by divers who may or may not have additional collecting gear like dip nets or slurp guns. Optionally, the net may have a bag to facilitate the capture of the fish.

**Impacts of barrier nets:** An unpublished survey of marine aquarium fish dealers done by Tullock and Resor (1996) for the American Marinelife Dealers association found that 64% of dealers felt that the use of barrier nets was a "sustainable collection technique" as one which "does not cause physical damage to the reef environment, does not impair the captured specimen's longevity in a properly maintained aquarium environment, and does not damage non-target species such as coral polyps, other invertebrates, or non-aquarium fish." Barnette (2001) concluded that any damage done by barrier nets in the southeastern U.S. region would be "infrequent and incidental in nature" and felt that the gear would "have a negligible impact on habitat".

**Description of dip nets:** Dip nets are small handheld nets used by divers to scoop up small fishes for the aquarium trade.

**Impact of dip nets:** Barnette (2001) notes that use of dip nets may result in minor isolated impacts to coral species. No studies have focused on the potential effects of dip nets to habitat. Negative impacts may include broken coral, touched reefs, and re-suspended sediments, with the same potential effects as hand harvesting, using spears, or slurp guns. Touching coral removes a protective coating, and makes the coral more susceptible to disease and infection. Sedimentation buildup can smother corals. Touching and re-suspended sedimentation may result from actions of divers and may occur in the absence of dip nets.

**Description of spears:** Divers use pneumatic or rubber band guns or slings to hurl a spear shaft to harvest a wide array of fish species. Reef species such as grouper and snapper, as well as pelagic species such as dolphin and mackerel, are targeted by divers. Commercial divers sometimes employ a shotgun or pistol shell known as a powerhead at the shaft tip, which efficiently delivers a lethal charge to their quarry. This method is commonly used to harvest large species such as amberjack. The amount of damage currently done by spears in the Gulf is not known. The damage is generally considered minor, since much less spear fishing occurs in terms of total effort and total harvest, compared to vertical gear or longline gear. Spear fishers rely on finding concentrations of fish within the spearing range. Also, concentrations of many targeted fish species are higher on hard bottom areas with relief than on sand or mud bottoms.

**Impact of spears:** Gomez et al. (1987) concluded that spearfishing on reef habitat may result in some coral breakage, but damage is probably negligible. Impact from divers range from touching coral with hands to the re-suspension of sediment by fins. Touching coral removes a protective coating and makes the coral more susceptible to disease and infection, and sedimentation buildup can smother corals. Impacts of lines from the spear gun attached to the spear can cause additional damage. No assessment of habitat degradation or long-term impacts was discussed. It should be noted, however, that touching coral and re-suspended sedimentation result from actions of divers that may occur in the absence of spears. These impacts can lead to susceptibility to coral diseases, infections or overgrowth of algae.

Use of SCUBA while spearfishing allows divers to stay submerged longer and to have a higher potential for significant interactions with sensitive habitats. It may be assumed that divers pursuing pelagic species have no effect on benthic habitat due to the absence of any interaction with the benthos. Powerheads are not allowed in the Caribbean EEZ.

**Description of slurp guns:** Divers utilize slurp guns, which are suction-creating devices, to capture small fish in a tube alive and hopefully uninjured, typically for the aquarium trade. Slurp guns are a minor activity in terms of total effort and total harvest compared to vertical gear or longline gear. The amount of habitat damage currently done by slurp guns in the Gulf is not known. Slurp gun fishers rely on finding concentrations of fish within their range, and concentrations of many managed fish species are higher on hard bottom areas with relief, especially coral reefs, than on sand or mud bottoms.

**Impact of slurp guns:** Barnette (2001) notes that use of slurp guns may result in coral breakage, but described the damage as generally very minor. Few studies have examined the potential effects of slurp guns on habitat. Negative impacts can include broken coral, touching reefs, and re-suspended sediments. Touching coral removes a protective coating, and makes the coral more susceptible to disease and infection. Sedimentation buildup can smother corals. Coral touching,

and re-suspended sedimentation may result from actions of divers and can occur even in the absence of slurp guns.

**Description of crab scrapes:** Crab scrape are net bags attached to rectangular metal frames with short teeth on the bottom scraping bar. The gear is dragged through shallow water areas of estuaries and bays to catch blue crabs.

**Impacts of crab scrapes:** Barnette (2001) states that the use of crab scrapes in SAV could result in leaf shearing, uprooting of plants, and sediment re-suspension; Stephan et al. (2000) reported a Chesapeake Bay study that found that while crab scrapes removed the upper parts of SAV leaves, they did not "critically" disturb roots or rhizomes. Barnette (2001) also states that crab scrapes in the southeastern U.S. are not usually deployed in SAV because plant litter would quickly fill the net bag.

**Description of oyster dredges:** Oyster dredges consist of metal rectangular frames to which a bag-shaped net of metal rings is attached. The frames' lower end is called the raking bar and is often equipped with metal teeth used to dig up the bottom. The frame is connected to a towing cable and dragged along the seabed. Oyster dredges are widely used in most state waters along the Gulf and the South Atlantic and have been the principal commercial gear used by the industry in Texas, Louisiana, and Mississippi for over 100 years. The use of oyster dredges is prohibited in Florida and Alabama.

**Impacts of oyster dredges:** Mechanical harvesting of oysters using dredges extracts both living oysters and the attached shell matrix and has been blamed for a significant proportion of the removal and degradation of oyster reef habitat. Lenihan and Peterson (1998) observed that less than one season of oyster dredging reduced the height of restored oyster reefs by approximately 30%. Reduction from dredging in the height of natural oyster reefs is expected to be less than that of restored reefs because the shell matrix of natural reefs is more effectively cemented together by the progressive accumulation of settling benthic organisms, while restored reefs are initially loose piles of shell material. At an annual removal rate of 30%, restored reefs would be completely destroyed after <4 years of harvesting.

Furthermore, Lenihan and Peterson (1998) determined that the height reduction of oyster reefs through fishery disturbance impacted the quality of habitat due to seasonal bottom-water hypoxia/anoxia that caused a pattern of oyster mortality and influenced the abundance and distribution of fish and invertebrate species that utilize this temperate reef habitat (Lenihan and Peterson 1998). Lenihan and Peterson (1998) found that fishes abandoned degraded short reefs during anoxic periods and relocated to nearby oxygenated reefs, causing overcrowding and depletion of crustacean prey. Their results illustrated that tall experimental reefs (those mimicking natural, ungraded reefs) were more dependable habitat for oysters and other reef organisms than short reefs (those mimicking harvest-degraded reefs) because tall reefs provided refuge above hypoxic/anoxic bottom waters.

**Description of rakes and tongs:** Rakes are used to harvest shellfish and sponges from shallow areas such as bays and estuaries. Oyster tongs, similar to two rakes fastened together and facing each other like scissors, are used by fishermen from the deck of a boat. Long-handled tongs can harvest oysters as deep as 25 feet. In the Florida Keys, fishers are allowed to use a four-prong rake 5 inches wide to hook and harvest sponges from boats. Off other counties on the west coast of Florida, persons are limited to diving for harvest and currently use hookah or SCUBA gear and cutting the sponges with blades. In that fishery, about two-thirds of the cut sponges

regenerate a new sponge. In the Keys, however, only about one-third of the torn sponges regenerate new sponges.

**Impacts of rakes and tongs:** Lenihan and Micheli (2000) reported that the harvest of shellfish using clam rakes and oyster tongs significantly reduces oyster populations on intertidal oyster reefs. Both types of shellfish harvesting, either separately or together, reduced the densities of live oysters by 50% to 80% compared with the densities of unharvested oyster reefs. While oysters are removed, Rothschild et al. (1994) concluded that hand tongs probably have a minor effect on the actual oyster bar structure.

Sponges are an important fishery in the Florida Keys and along the west coast of Florida. Sponges are dominant organisms in deepwater passes and along hard bottom habitat communities. Sponges create vertical habitat which provides shelter and forage opportunities for other invertebrates and tropical fish species. The fishery in the Keys typically uses a four-pronged iron rake attached to the end of a 15 to 20 foot pole that hooks the sponges from the bottom. While no studies document the extent of habitat damage from this gear type, it may be concluded that the harvest of sponges directly reduces the amount of available habitat, and thus may present a negative localized impact.

**Description of patent tongs:** Similar to hand tongs, hydraulic patent tongs are much larger and are assisted with hydraulic lift, allowing them to purchase more benthic area in pursuit of oysters. Hydraulic tongs are prohibited in Gulf state fisheries. Patent tongs are not used in the oyster fisheries that occur in Gulf state waters.

**Impacts of patent tongs:** Rothschild et al. (1994) found that hydraulic-powered patent tongs are the most destructive gear to oyster reef structure because of their capability to penetrate and disassociate the oyster reef. The capability arises from the gear weight and hydraulic power. Patent tongs operate much like an industrial crane with each bite having the ability to remove a large section of the oyster bar.

**Description of bully nets:** Bully nets are similar to long- handled landing nets, but bent at a right angle to the pole. The net itself is conical with some type of line or cord attached to the end. They are used to fish for spiny lobster, principally at night when they are out in the open hunting. The fisher uses a light to locate a lobster, and then nets the lobster by releasing the cord when the net is above the lobster. The net comes down on the lobster, causing it to react by swimming backwards and further into the net for easy landing.

**Impacts of bully nets:** Bully nets do have some contact with the substrate, and in the process of capturing lobster might have minor, isolated impacts on coral species.

**Description of snares:** A snare is used by recreational divers to capture spiny lobster hiding in crevices. It consists of a long pole with a loop of coated wire on one end that is connected to a pull toggle on the other end. The loop is slipped around the lobster in a tight overhang or other inaccessible location, and then tightened around the lobster by means of the pull toggle, allowing relatively easy extraction of the lobster.

**Impacts of snares:** Barnette (2001) states that while there are no studies of this gear, its impact on the habitat is probably less than that of unassisted diver hand harvest, because the benthic contact necessary for leverage with hand harvest, is not needed when using a snare.

## Conclusions for the SER for impacts of gear on EFH and protected species populations

A review of the past applications for grant funding and special permits, indicates that the following gear have been requested for use for the associated species:

Chevron traps for reef fish and groupers

Drum line for sharks

Spears for snapper, grouper, and other reef fish

Longline for snapper, grouper, and other reef fish, shark, billfish, tilefish, tuna, and swordfish

Dredges for a variety of fish and invertebrates

Trammel nets for red drum and shortnose sturgeon

Purse seines for red drum, and seines for shad, herring, striped bass, snappers, and groupers

Hook and line for snapper, grouper and other reef fish, billfish, red drum, aquarium fish, red porgy, king mackerel, tilefish, and grunt

Bandit hook and line for finfish and red porgy

Buoy gear for swordfish

Traps and pots for black sea bass, snapper, grouper, and other reef fish, lobster, aquarium fish, tilefish, grunt, mackerel, and red porgy

Gillnets for sharks, sturgeon, shad, herring, striped bass, and gag grouper

Trawls for billfish, shrimp, blue crab, snapper, grouper, red porgy, tilefish, grunt, mackerel, and gag grouper

Fish stocks determined to be overfished, undergoing overfishing, and approaching overfished status are identified in Table 2 (page 32). EFH is described and identified in the FMPs listed on page 28. Species protected under the ESA are identified in Table 3, page 35. Many of these species are identified in requests for grants or special permits and would be captured using fishing gear identified above.

The more recent CEs for grants or permits at SER identified numbers to be taken, specific species to be taken, or specific sites to be fished with the various gear. However, as these grants or special permits were for either research or surveys and were limited in scope and duration, the proportional contribution of the use of gear on impacts to benthic habitats and on populations was determined to be minor. Scientific research is not subject to MSA, but is generally recognized by a Letter of Acknowledgement issued by the Regional Administrator. NOAA policy is that NOAA scientists are subject to MSA. (Further information on this topic is found at reefshark.nmfs.noaa.gov/f/pds/publicsite/series.cfm?ID=30) Also, scientific research is subject to the ESA. All recipients must follow applicable federal, state, and local fishing regulations and numbers of target species permitted by the ESA authorizations, which are limited to protect populations of protected species.

Of the species collected under past funding awards and special permits, certain fish and crustacean species (primarily vermilion snapper, red snapper, snowy grouper, black sea bass, gag grouper, Warsaw grouper, tilefish, red porgy, greater amberjack, gray triggerfish, and pink

shrimp) and species protected under the ESA (shortnose sturgeon and loggerhead sea turtle), were specifically identified to be targeted for research or surveys.

All requests involving the threatened loggerhead sea turtle and endangered shortnose sturgeon were only conducted after receiving the appropriate ESA Section 10(1)(a) permit for catching, tagging, and releasing alive. Therefore, there would be no population level impacts on loggerhead sea turtles or sturgeon. See Section 3.3.9 for evaluation of the effects of capture and tagging fish and sea turtles.

### 3.3.2 Potential Effects of Aquaculture on Water Quality and Status of Fish Populations Used as Fish Feed

The following information is taken from the Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico (Gulf of Mexico Fishery Management Council and NOAA National Marine Fisheries Service 2009a).

Since 1980, the U.S. has had a national aquaculture policy. However, to date only limited offshore aquaculture operations have been developed. Additionally, the U.S. is increasingly importing a larger share of seafood to meet domestic need. Under the Gulf FMP, it is possible that 5 to 20 aquaculture operations could be permitted in the Gulf in the next 10 years. Presently, there are no aquaculture operations in federal waters of the U.S. (The cobia farm formerly in operation in Puerto Rico was only in Puerto Rican waters.) Several firms have applied for EFPs to conduct aquaculture in federal waters of the Gulf; however, none of these requests have been granted.

Issues associated with large-scale open ocean aquaculture activities (also known as open-system) include:

Impacts to water quality primarily related to greatly increased volume of fish excreta and feed, which may impact the water column and benthos

An increase in the amount of fishmeal leading to heightened pressure on forage species (e.g., menhaden)

Water quality considerations include temperature, dissolved oxygen, and salinity. Water temperature is the environmental parameter that has the most effect on fish (Lawson 1995). Temperatures on either side of the optimum can induce stress in the animal, and can affect feeding, growth, reproduction, and disease inhibition. Low dissolved oxygen can have a variety of physiological effects on cultured organisms, impacting growth and mortality. Salinity can also vary seasonally and across locations.

The relevant perceived risks of the field of marine fish culture as identified by international experts are divided into eight main categories (Nash et al. 2005). The two most important categories are: (i) increased organic loading on the benthos and (ii) nutrient enrichment of the water column. The effects of organic effluents to and from the fish farm environments have been studied now for approximately forty years.

Recent environmental monitoring studies conducted off Puerto Rico, New Hampshire, and Hawaii indicate benthic and organic loading tends to be fairly localized around open ocean aquaculture cages (Alston et al. 2005, Rapp 2006, UNH Marine Aquaculture Center 2006, Lee et al. 2006). Alston et al. (2005) conducted bimonthly chemical and macroinvertebrate sampling at a control site and sites 0, 20, and 40 meters away from two cages off the coast of Puerto Rico in

2002 and 2003 and found no significant differences in nutrient levels among sampling sites. Rapp (2006) conducted additional environmental monitoring at the same fish cage assessed in the Alston et al. (2005) study. The study reported no increase in organic loading in the sediment for the duration of the project. Organic loading in the water column did not integrate into the sediment because of the $CaCO_3$ composition of the sediment and high current speeds near the benthos (Rapp 2006). Lee et al. (2006) observed differences between control and near-cage sites off Hawaii with a shift toward anaerobic conditions due to carbon influx from cages. The study noted that eutrophication effects increased away from the study site, but were localized in areas immediately surrounding the enclosure site. This may have been attributed to more rapid dilution and dispersal of nutrient wastes due to greater volume of water flow through the enclosure site.

It is important to note that the EPA regulates effluent discharge from aquaculture facilities via a National Pollutant Discharge Elimination System (NPDES) permit under the CWA. The EPA also published a final rule on August 23, 2004 (69 FR 162) establishing CWA effluent limitations, guidelines, and new point source pollution standards for concentrated aquatic animal production facilities, including facilities that produce 100,000 pounds or more per year of aquatic animals in net pens or submerged cage systems.

Fish meal is the most expensive ingredient in feeds. Numerous studies conducted over the past 25 years have focused on the use of less costly sources of dietary protein. Among plant sources, soybean meal has attracted the most attention due to its relatively high protein (and low carbohydrate) content and favorable amino acid composition. Other protein sources, including grain products (corn and wheat gluten), oilseeds and legumes (cottonseed meal, field peas, lupin, canola), rendered materials (poultry by-products), and single-cell protein (distiller's and brewer's yeasts) have been tested and are used at varying levels in feeds for salmonids (Carter and Hauler 2000). Interest in replacing fish meal with plant sources also applies to marine teleost species, and has met with some success (Kaushik et al. 2004).

Fish meal and oil have long been the principal constituents of feeds for carnivorous species such as salmon and trout, and more recently, have been included in feeds for omnivorous and herbivorous fish. These two ingredients supply essential amino acids deficient in plant proteins and essential fatty acids required by the fish for normal growth. Feeds for herbivorous and omnivorous species contain relatively small amounts of fish meal (0% to 25%) and oil (0% to 10%) because they can utilize plant proteins and oils relatively well. Aquafeeds for salmon contain about 25% to 50% fishmeal while those for non-salmonid marine species (such as turbot, halibut, bream, bass, and tuna) contain 45% to 55% fish meal and 10% to 20% fish oil (Tacon and Metian 2008).

As the intensive farming of aquatics species has grown, so has the demand for marine fishery products in the form of fish meal and oil for use in formulated feeds. The species most used for fish meal and oil are the small planktivorous pelagic fish captured off the coast of Peru and Chile, including anchovy and mackerels, and to a lesser extent herring, sandeel, and capelin caught in colder northern waters. The top species caught for production of fish meal globally include Peruvian anchovy (6.2 million tons), blue whiting (2.38 million tons), Japanese anchovy (2.09 million tons), Atlantic herring (1.96 million tons), and chub mackerel (1.86 million tons). Gulf menhaden make up 11$^{th}$ worldwide in total tonnage converted for purposes of fish meal.

Worldwide, approximately 25 to 30 million tons of fish are reduced to fish meal and fish oil annually. This tonnage has remained stable since the early 1970s (Tacon et al. 2006). In the United States, Gulf and Atlantic menhaden represent the greatest source of fish meal production, with Atlantic herrings and Californian pilchards accounting for a lesser quantity of U.S. fishmeal and fish oil production.

Gulf menhaden and Atlantic menhaden are managed under the Atlantic Coastal Fisheries Cooperative Management Act. Assessments are conducted every four to five years by NOAA Fisheries. If demand for these species increases due to development of an aquaculture industry in the Gulf and increases in livestock feeds, then stock assessments will be used to assess the status of each of these populations. Necessary management adjustments would then be made on the basis of the assessments if fishing mortality is too high or stock biomass has dropped below threshold levels.

The NOAA Aquaculture Program in partnership with the U.S. Department of Agriculture (USDA) launched the NOAA-USDA Aquaculture Feeds Initiative in 2007 to stimulate research into alternative feeds. NOAA scientists are also working on cost-effective ways of utilizing fish processing by-products and by-catch from commercial fishing as alternative protein and oil sources. These "co-products" may further reduce dependence on marine fish resources by feed manufacturers.

### 3.3.3 Potential Impacts of Releasing Hatchery-Reared Fish into Wild Populations

Release of hatchery-reared fish to enhance natural fish populations has been practiced by fisheries managers for well over a century. Concerns associated with stock enhancement include disease, genetic degradation, competition between wild native fish and hatchery fish, and survival of hatchery individuals.

The SER Grants Branch has received multiple applications for testing protocols and methodologies related to hatchery-reared fish. To date, these requests have involved only laboratory tests and have been approved. Future funding requests for release of hatchery-reared fish would be carefully evaluated by the SER Grants Branch, in coordination with federal and state fish and wildlife agencies, to prevent any actions that could jeopardize the health and sustainability of native wild fish populations. Those evaluations would be consistent with Executive Order 13112 of February 3, 1999, which deals with invasive species. In this regard, such applications would not result in the introduction or spread of a non-indigenous species. Approved funding requests and special permit conditions will be established, prior to approval, to prevent the introduction or spread of a non-indigenous species.

### 3.3.4 Potential Impacts of Fishing Gear Bycatch

National Standard 9 (50 CFR 600.350) requires that FMPs, to the extent practicable, minimize bycatch and to the extent it cannot be avoided minimize bycatch mortality. Additional protections are afforded to some species under the ESA, regardless of whether they are listed as stock in a managed fishery.

NOAA Fisheries deploys fishery observers to collect catch and bycatch data from U.S. commercial fishing and processing vessels. Annually, 42 different fisheries are monitored by

observer programs logging over 60,000 observer-days at sea. Observers have monitored fishing activities on all U.S. coasts, collecting data for a range of conservation and management issues.

All gear types used in the SER produce a variety of bycatch that is required to be reported. This reportable bycatch consists of all discards, including protected and prohibited species. The three Regional Fishery Management Councils in the SER are already taking steps to reduce bycatch, and are also focusing on ways to reduce overfishing of target species. See Section 3.3.1 for the list of gear requested by applicants.

Red snapper bycatch has been identified as the most significant bycatch issue in the Southeast Region. Currently, Bycatch Reduction Devices (BRDs) are providing less reduction than was originally expected and is currently needed. A NMFS panel determined a more effective BRD is needed and placement of BRD in the net is critical. However, it is unlikely technology alone will solve the red snapper bycatch problem. Reducing effort in the shrimp industry would reduce bycatch as well as increase profit. Overcapacity in the shrimp industry is a problem in the Gulf of Mexico despite hurricanes which destroyed much of the infrastructure. Studies are needed to determine the true magnitude of effort in the shrimp industry. Red snapper bycatch is also occurring in the recreational fishery. The magnitude of this impact on the stock is not very well quantified but it could be very large. (NMFS 2006).

On May 1, 2009, NMFS published an emergency rule (74 FR 20229), effective from May 18, 2009, through October 28, 2009, prohibiting bottom longlining for Gulf reef fish east of 85°30'W longitude (near Cape San Blas, Florida) and in the portion of the EEZ shoreward of the 50-fathom depth contour. The emergency rule reduced sea turtle takes in the short-term until the Gulf of Mexico Fishery Management Council develops long-term protective measures through Amendment 31 to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico (Gulf of Mexico Fishery Management Council and NMFS 2009b). NMFS implemented Amendment 31 via final rule effective May 26, 2010 (April 26, 2010, 75 FR 21512).

Results from recent Southeast Fisheries Science Center (SEFSC) observer programs and subsequent analyses indicate the number of loggerhead sea turtle takes authorized in the 2005 Biological Opinion by the bottom longline component of the reef fish fishery in the Gulf of Mexico (Gulf) has been exceeded (Gulf of Mexico Fishery Management Council and NMFS, 2009).

NMFS published the final rule to implement sea turtle release gear requirements and sea turtle careful release protocols in the Gulf of Mexico reef fish fishery on August 9, 2006, (71 FR 45428). These measures require owners and operators of vessels with federal commercial or charter vessel/headboat permits for Gulf reef fish to comply with sea turtle (and smalltooth sawfish) release protocols and have on board specific sea turtle release gear. NMFS is currently conducting rulemaking to implement similar release gear and handling requirements for the South Atlantic snapper-grouper fishery (NMFS 2009a). NMFS has made important progress toward reducing bycatch in its fisheries, but the efficacy of its management has been limited somewhat by a focus on taxon- and fishery-specific regulation and the lack of consistent mandate across taxa for taking a cumulative perspective on bycatch. Applying consistent criteria across taxa for setting bycatch limits (e.g., extending the approach used for marine mammals to sea

turtles and seabirds) would be the first step in a multi-species approach to bycatch reduction. A population-based multi- species multi-gear approach to bycatch would help identify priority areas where resources are needed most and can be used most effectively (Nash et al. 2005).

### 3.3.5 Potential Impacts to Coastal and Estuarine Organisms from the Operation of SONAR and Hydrophones

Applicants rely on underwater sound generated by sonar equipment for navigation, mapping and other assessments. A variety of sonar equipment is typically used to navigate safely in coastal waters and to collect data about the physical properties of the water column, the size and abundance of organisms that live in the water, and the structure and composition of the seabed.

Hydrophones are passive acoustic devices that listen for underwater sounds rather than emit sounds, and therefore have no significant impacts to underwater organisms.
The sonars typically used aboard study, research, and other vessels include:

- Navigation echosounders and commercial fisheries echosounders
- Acoustic Doppler Current Profiler (ADCP), used to measure ocean currents and how they change as a function of depth
- Scientific echosounders, which quantitatively measures the biomass of fish and other organisms that inhabit the water directly beneath the vessel

In addition, mapping efforts may use multibeam echosounders to develop high-resolution maps for the seabed in support of benthic habitat mapping in waters from 40m to 1000m in depth.

The sound of active (transmitting) sonars such as those typically used in vessels that might be used by applicants has several major characteristics:

**Source level or strength of the sound:** determines how loud the sound is and may be the primary indicator of the effect a sound may have on an organism;

**Frequency of the sound, or how rapidly the sound waves vibrate:** determines whether the sound is within the audible range of an organism and how far the sound propagates from its source;

**Pulse width of the sound or how long the sound is generated (duration) and pulse repetition rate or how frequently the sound is repeated:** measures how long the sound is present in the water and how often it is generated; and

**Directivity of the sound or how sound waves are focused on their target:** measure of how efficiently the sound is used to achieve its purpose.

Each of these characteristics is important in assessing the effect that a particular sonar frequency may have on the environment.

NOAA Fisheries does not believe the frequencies used in these pieces of equipment significantly affect the behavior of these animals and definitely do not harm them because:

These sonars operate at relatively low power.

These sonars are typically directed at the water column or the seabed directly beneath the vessel not at the horizon. The more powerful sonars are highly directive; for example, a sonar with a 7 degree beam width focuses 99.9% of its energy directly beneath the vessel with little power radiating outward. This is not to say that the sonar cannot be heard at a distance from the vessel, but that the power of the sound wave is greatly diminished. Only the RESON and the two Kongsberg Simrad multibeam sonars have broad beams, but are operated with very short duration pulses.

Most of the frequencies in use are highly attenuated by their transmission through the water column. At a distance of 1 km from the vessel, even the lowest frequency in use is attenuated to a source level of 1 millionth of the power measured at the vessel. Sonars with frequencies of 200 kHz or higher cannot be detected by receivers at distances greater than 2 km and 38 kHz sonars cannot be detected at distances greater than 10 km. Only 12 kHz sonars, designed to operate at full ocean depths, can be detected at ranges of 10 km or greater. However, most of the beams are directed under the ship, meaning that the sound would not travel far from the source.

These sonars transmit only briefly, typically only a few thousands of a second per pulse. Although they transmit repeatedly for very brief periods of time, they still are silent the majority of the time because they have to "listen" for the ping response and therefore do not "jam" the water column with a continuous noise.

The sonars, other than the ADCP, used by research vessels are not fundamentally different from those used by most recreational boats, fishing vessels and commercial ships. It can therefore be reasonably assumed that most marine mammals have experience with some form of downward-directed sonar. In addition, many cetaceans themselves produce impulsive, high amplitude, high-frequency sonar signals. Although somewhat different acoustically from artificial sonar, their use of such signals suggests both experience with directional sound sources and some level of tolerance and/or adaptability to exposure to such sounds (M. Lammers, Pacific Islands Fisheries Science Center (PIFSC) and University of Hawaii Institute of Marine Biology, pers. comm., 2009).

In summary, although used for research and study purposes, even the lower-frequency higher-powered sonars used for navigation and monitoring have much more in common with commercial sonars than with those used for military applications. While the acoustic signature of vessels does undoubtedly add to the ambient noise of the area in which they operate, their signature is typical of many commercial vessels and most likely inconsequential to the marine mammal and sea turtle population in the areas involved.

### 3.3.6 Physical Effects of Anchors, Moorings, and Remotely-Operated Vehicles (ROVs) on the Seabed

Submittals to the SER Grants Branch and SER SFD for studies and research generally propose a wide variety of observations on or near the seabed. Some observations are made directly by divers, while others are made by automated instruments that are deployed by divers and then retrieved at a later time. At depths greater than that at which divers can effectively work, observations are made using subsurface vehicles equipped with cameras and other instruments.

Those activities with the potential for causing a significant impact to the seabed include:

Placement of temporary or permanent markers that identify a specific location

Placement of an anchor to immobilize a piece of equipment on the bottom, at the surface or within the water column

Anchoring a boat used to transport divers and equipment

Operating a subsurface vehicle (ROV) near the seabed

A variety of sensors, such as hydrophones, are installed by divers and left to collect information until they can be recovered at a later date. Most are held in place by anchors composed of concrete or lead that is encapsulated by a thick layer of polyurethane (e.g., Rhino Liner) or polyvinyl chloride. Divers place the 3 ft x 4 ft foot anchors on the seabed where they will not damage benthic organisms other fragile structures. Many of the monitoring instruments are strapped to anchors on the seabed but others are buoyed and float on the surface or are suspended in the water column. These instruments are tethered to anchors with buoyant lines that are designed so that they do not snag and damage the nearby seabed or pose a risk to marine and estuarine animals such as sea turtles.

Anchored cameras can be placed in water deeper than divers can reach. Cameras can also be carried and used directly by divers in shallower waters.

In deeper areas, divers can routinely operate subsurface vehicles that are used to observe the benthos, including remotely-operated vehicles (ROVs), as well as towed camera sleds that are tethered to the ship (or boat). The ROV hovers above the seabed and allows the operator to control the vehicle's height off the seabed using thrusters. When using a towed camera sled, the operator can maintain the sled's height above the seabed by controlling the amount of tether deployed from the ship. Operators using ROVs and towed camera sleds are trained to maintain the vehicle above the seabed without striking the seabed and thus minimize any potential damage to the benthos.

Conducting monitoring and mapping assessments in the Gulf, the Caribbean, and the Atlantic Ocean off the coast of the southeastern U.S. would have no significant effect on the environment because:

Sites for actions that have potential ground-disturbing effects, such as anchoring boats, mooring equipment, or placing cable ties, are carefully selected using soft bottom areas that would have no significant impacts on sensitive resources.

The number of specimens collected is limited to only the small number allowed by appropriate federal and state permits and are reported to the SER Grants Branch during the life of the grant.

A review of the CEs prepared for all special permits and approved funding requests over the past five years (2004-2009) indicates that these actions are not likely to have had or have any significant cumulative effects on the environment. Awarded actions are conducted in widely divergent areas. Appropriate permits are issued by other agencies prior to award activities to ensure that any take of organisms is environmentally acceptable. Awards and special permits are further conditioned as appropriate to ensure that environmental impacts are either avoided or minimized.

### 3.3.7 Potential Impacts to Water Quality from Corrosion of $E^+$ and Other Repellent Materials

Electropositive metals ($E^+$) are reactive in seawater and produce a measurable electric field that may be repulsive to electroreceptive fishes such as sharks, rays, and skates. $E^+$ metals, which include lanthanide metals, reside towards the left side of the periodic table (Figure 2) and undergo spontaneous hydrolysis in the presence of seawater. By measuring the electric fields of the metals, it is possible to understand the responsible characteristics for this electrorepulsion and thus simulate those characteristics. This, in turn, deters sharks and other elasmobranches from accessing and biting on baited hooks.

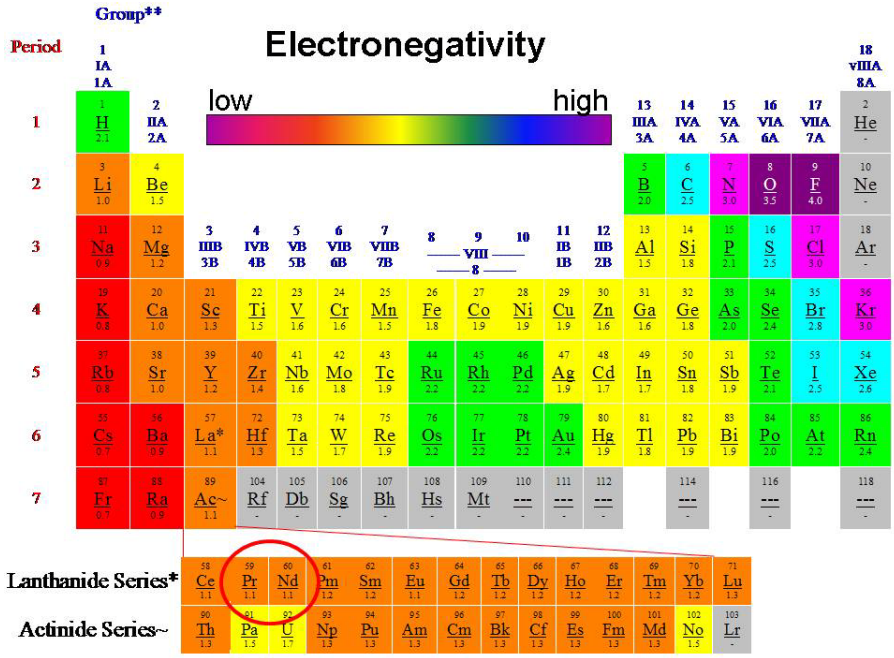



**Figure 2. Periodic table (with lanthanide series highlighted)**

$E^+$ metals used in these experiments include lanthanide elements, specifically neodymium (Nd) and praseodymium (Pr). According to the Hodge-Sterner classification system, lanthanide elements (rare earth elements) are generally considered to be of low toxicity (Haley 1965). According to Material Safety Data Sheet (MSDS) information, the lanthanide metals, Nd and Pr have a low to moderate acute toxicity rating (MSDS, Haley 1965). Toxicological studies indicate that the metals and their oxides have little toxicity to organisms (Haley 1965). A recent review indicates that lanthanide elements are used as animal feed performance boosters. Along with performance enhancing effects, rare earth elements also present very low oral toxicity, even in long-term feeding trials. Additionally, hardly any accumulation of rare earth residues was noticed in animal tissues. On this basis, use of rare earth elements as a feed additive is considered to be safe for both animals and humans. In addition, lanthanide elements appear to be used in a variety of medicinal products (see review in Redling 2006).

Neither of those chemicals or their oxides not appear on the following lists and are therefore not regulated: the Clean Water Act's Priority Pollutants, Occupational Safety and Health Administration's (OSHA) Air Contaminants, Clean Air Act's Regulated Toxic, Explosive, or

Flammable Substances, Clean Air Act's Criteria Air Pollutants, Superfund's Extremely Hazardous Substances, Resource Conservation and Recovery Act's Hazardous Constituents, Safe Drinking Water Act's Maximum Contaminant Levels, or the Clean Air Act Toxic Release Inventory (TRI) program list.

As such, the use of these $E^+$ metals (Nd and Pr) in the marine or estuarine environment as elasmobranch deterrents would have little, if any, toxicity to the environment, to any organisms, or to fishers handling the ingots.

### 3.3.8 Potential for a radio transmitter attached to the shell of a female sea turtle to interfere with mating or swimming behavior

The attachment of a transmitter such as a satellite tag to the shell of a female sea turtle may appear to be obstructive to mating; however, this has been documented not to be the case. Females with satellite tags attached to their shell prior to the nesting season have been observed nesting, and examination of the nests after hatching indicated that successful mating/fertilization had occurred (S. Kubis, Joint Institute for Marine and Atmospheric Research (JIMAR) Marine Turtle Research Biologist, NOAA Fisheries Pacific Islands Fishery Science Center, personal communication, May 2006). Additionally, transmitters continue to decrease in size as technology advances. The transmitters available for use today weigh approximately 0.1 - 0.2 kg and measure 6.5 cm x 3.5 cm x 2.5 cm. The small size of the transmitters reduces the likelihood that the animals' ability to mate or swim would be significantly affected.

### 3.3.9 Impacts of invasive procedures such as tagging, blood sampling, and tissue biopsy on sea turtles and fish

For a complete understanding of sea turtle population dynamics and life history, it is necessary to identify individuals and obtain biological samples for genetics, diet, disease, and habitat use. Turtles are flipper tagged with metal inconel tags and subcutaneously injected with Passive Integrated Transponders (PIT) tags using standard techniques (Balazs 1999); blood samples are taken using a medical grade needle and syringe (Bolten 1999; Owens 1999); and tissue biopsies are taken using a biopsy punch (Dutton and Balazs 1996). All methods used are performed by trained personnel and have been peer-reviewed and used by sea turtle researchers worldwide. All actions involving sea turtles must have a permit per the ESA.

PIT tags are routinely inserted using a hypodermic needle into fish and have been shown to have no significant impact to the fish (Prentice et al. 1987, Prentice et al. 1998). Sonic tags are routinely inserted into fish through a small slit in the body cavity and the slit is closed prior to the fish being released. These tags and their insertion procedure have been found to have no significant impacts to the fish (Prentice et al. 1987, Prentice et al. 1998).

Therefore, no mortality or injury is expected to either sea turtles or fish from tagging, blood sampling, or tissue biopsy.

### 3.3.10 Potential for injury or mortality of sea turtles during capture or handling

As with any marine habitat capture program, a possibility exists that captured sea turtles, fish, or other marine organism could experience significant impacts (including death) from capture. All handling of sea turtles and other listed species must have either an incidental take permit or a SRP per the ESA.

To minimize the potential for significant impacts, all capture and handling of sea turtles must be in compliance with "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (NOAA 2008).

Actions described in this guidance include:

Resuscitation of sea turtles

Gear removal protocols

Protocols for hook removal

Assessing whether to remove hooks

Turtle release

Techniques for sea turtles not brought aboard

Hold sea turtles prior to release

Handling time of all animals would be minimized to reduce the potential for additional stress. Turtles and fish would be handled only for the amount of time necessary to complete sampling, measuring, examination, and tagging.

## 3.4 Cumulative Effects

As directed by the NEPA, federal agencies are mandated to assess not only the indirect and direct impacts, but cumulative impacts of actions as well. The CEQ regulations implementing NEPA define a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. 1508.7). Cumulative effects can either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects.

The basic nature of grants and special permits is to increase the knowledge base for managing living marine resources so as to achieve and maintain sustainable stocks and populations. The cumulative impacts of the past proposed actions were insignificant. To that extent a highly detailed and complex assessment of cumulative impacts is unnecessary in this PEA. For future Category B and C actions, depending on the outcome of further NEPA review, a more detailed cumulative effects assessment may be required.

Despite the recognized need for fisheries-independent monitoring of managed reef fishes and associated communities within nearshore and offshore waters, a large-scale, standardized reef fish monitoring program has yet to be implemented throughout the west Florida shelf, although smaller, regional programs do exist. No single gear or survey method is capable of obtaining all data required for the effective management of reef fishes. Instead, the use of multiple, overlapping sampling gears would be the most effective and comprehensive approach to provide both abundance and demographic data for a wide variety of species and sizes of reef fishes. Accordingly, a pilot study was designed to test the effectiveness of multiple sampling gears

(stationary underwater video camera arrays, chevron traps, longlines, kali poles, and hook-and-line surveys) in sampling reef fish assemblages at various depths and habitats (Fish and Wildlife Research Institute, 2007).

The following applies to all grants, whether in Categories A, B, or C. The Department of Commerce financial assistance standard terms and conditions, incorporated by reference (Department of Commerce Financial Assistance Standard Terms and Conditions, 2008) requires that each approved funding request (grant) include performance monitoring through the submittal of written progress reports, and financial reports, generally twice a year (followed by a final progress report). Each progress report is reviewed by NOAA's Technical Monitor assigned to that award, who is familiar with the award details and is qualified to review the science supporting the funded activities. If the Technical Monitor finds the performance reports unacceptable, the recipient must make corrections to the report and funded activities as needed to comply with that award condition. Also, the SER Grants Branch staff conducts personal in-person meetings with each grant recipient to further monitor performance. Failure to perform the work in accordance with the award conditions, including applicable law requirements as described earlier, results in corrective action including withholding payments, additional special award conditions, and termination or suspension, of any Department of Commerce active awards (Department of Commerce Financial Assistance Standard Terms and Conditions, 2008).

Human uses of ocean resources are accelerating faster than our ability to manage them. Increasing conflicts are unavoidable as demands increase for ocean-based energy (oil and gas, wind and wave), marine aquaculture, commercial and recreational fishery products, shipping and navigation services, and other activities. At risk is the health of ocean ecosystems as well as the benefits they provide to coastal communities and the national economy. The nation's current approach to managing the use of ocean resources is *ad hoc* and fragmented, with no systematic way to evaluate competing ocean uses and to inform and navigate the often difficult trade-off decisions they require.

On June 12, 2009, President Obama issued a Memorandum to the Heads of Executive Departments and Agencies in which he stated: *"In order to better meet our Nation's stewardship responsibilities for the oceans, coasts, and Great Lakes, there is established an Interagency Ocean Policy Task Force, to be led by the Chair of the Council on Environmental Quality."* The Presidential memo stated that "*Within 180 days from the date of this memorandum, the Task Force shall develop, with appropriate public input, a recommended framework for effective coastal and marine spatial planning. This framework should be a comprehensive, integrated, ecosystem-based approach that addresses conservation, economic activity, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources consistent with international law, including customary international law as reflected in the 1982 United Nations Convention on the Law of the Sea*."

A draft *Interim Framework for Effective Coastal and Marine Spatial Planning* was issued by the Interagency Ocean Policy Task Force on December 9, 2009. The *Final Recommendations of The Interagency Ocean PolicyTask Force"* were issued by the Interagency Ocean Policy Task Force on July 19, 2010, and update the proposals contained in the interim report.

## 3.5 Climate Change

Climate change is affecting the world's oceans through warming of the water, changing ocean currents, changing the habitats for organisms in the food chain, and other processes. All of these changes affect the status of target fishery species, the quality of EFH, and the robustness of the marine ecosystems. Many endangered and threatened species and fish stocks that are overfished or approaching overfishing status depend on this changing environment, as do the communities that depend on these fish stocks for their livelihood.

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 (EPA) climate change webpage provides basic background information on these and other measured or anticipated effects. Climate change impacts will likely affect many marine species. To date, the research on sea turtles appears to be the most robust; some of that literature is cited herein (see below). However, the impacts on sea turtles for the most part cannot be determined with any degree of certainty.

The Intergovernmental Panel on Climate Change has stated that global climate change is unequivocal (IPCC 2007) and its impacts may have significant impacts to the hatchling sex ratios of loggerhead sea turtles (NMFS and USFWS 2007e). In marine turtles, sex is determined by temperature in the middle third of incubation with female offspring produced at higher temperatures and males at lower temperatures within a thermal tolerance range of 25º-35°C (Ackerman 1997). Increases in global temperature could potentially skew future sex ratios toward a higher numbers of females (NMFS and USFWS 2007e). Modeling suggests that an increase of 2°C in air temperature would result in a sex ratio of over 80% female offspring for loggerheads nesting near Southport, North Carolina. The same increase in air temperatures at nesting beaches in Cape Canaveral, Florida, would result in close to 100% female offspring. More ominously, an air temperature increase of 3°C is likely to exceed the thermal threshold of most clutches, leading to death (Hawkes et al. 2007). Warmer sea surface temperatures have been correlated to an earlier onset of loggerhead nesting in the spring (Weishampel et al. 2004, Hawkes et al. 2007), as well as short inter-nesting intervals (Hays et al. 2002), and shorter nesting season (Pike et al. 2006).

The effects from increased temperatures may be exacerbated on developed nesting beaches where shoreline armoring and construction have denuded vegetation. Erosion control structures could potentially result in the permanent loss of nesting beach habitat or deter nesting females (NRC 1990). Alternatively, females may nest on the seaward side of the erosion control structures, potentially exposing them to repeated tidal overwash (NMFS and USFWS 2007e). Sea level rise from global climate change (IPCC 2007) is also a potential problem, particularly for areas with low-lying beaches where sand depth is a limiting factor, as the sea may inundate nesting sites and decrease available nesting habitat (Daniels et al. 1993, Fish et al. 2005, Baker et al. 2006). The loss of habitat as a result of climate change could be accelerated due to a combination of other environmental and oceanographic changes such as an increase in the frequency of storms and/or changes in prevailing currents, both of which could lead to increased beach loss via erosion (Antonelis et al. 2006, Baker et al. 2006).

Other changes in the marine ecosystem caused by global climate change (e.g., salinity, oceanic currents, dissolved oxygen levels, nutrient distribution, etc.) could influence the distribution and abundance of phytoplankton, zooplankton, submerged aquatic vegetation, crustaceans, mollusks, forage fish, etc., which could ultimately affect the primary foraging areas of loggerhead sea turtles.

Recent increases in global temperatures have affected the phenology and survival of many species of plants and animals. Hawkes et al. (2007) investigated a case study of the effects of potential climate change on a thermally sensitive species, the loggerhead sea turtle, at a breeding location at the northerly extent of the range of regular nesting in the United States. . In addition to the physical limits imposed by temperature on this ectothermic species, sea turtle primary sex ratio is determined by the temperature experienced by eggs during the middle third of incubation. Sand temperatures were recorded and historical air temperatures (ATs) at Bald Head Island, NC, were used to examine past and predict future sex ratios under scenarios of warming. There were no significant temporal trends in primary sex ratios evident in recent years and estimated mean annual sex ratio was 58% female. Similarly, there were no temporal trends in phenology but earlier nesting and longer nesting seasons were correlated with warmer sea surface temperature. Hawkes et al. (2007) modeled the effects of incremental increases in mean AT of up to 7.5 °C, the maximum predicted increase under modelled scenarios, which would lead to 100% female hatchling production and lethally high incubation temperatures, causing reduction in hatchling production. Populations of turtles in more southern parts of the United States are currently highly female biased and are likely to become ultra-biased with as little as 1 ° C of warming and experience extreme levels of mortality if warming exceeds 3 ° C. The lack of a demonstrable increase in AT in North Carolina in recent decades coupled with primary sex ratios that are not highly biased means that the male offspring from North Carolina could play an increasingly important role in the future viability of the loggerhead turtle in the Western Atlantic.

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# 6 Appendix A. List of Special Permits (2004-2009)

| Type of Permit | Brief Description | Time frame |
|---|---|---|
| SRP | SEFSC study of *Oculina* taxonomy and distribution. | 2004-2005 |
| SRP | SEFSC GOM groundfish survey. | 2004 |
| SRP | SEFSC bottom longline cruises in South Atlantic and GOM for coastal sharks, red snapper, and finfish. | 2004 |
| SRP | SEFSC reef fish and plankton surveys, TED, red snapper and circle hook studies. | 2005 |
| SRP | SEFSC trap and hook and line gear to study red porgy annulus formation, GOM and Atlantic. | 2005 |
| SRP | SEFSC trawl, reef fish, and plankton surveys, TED, BRD, red snapper, circle hook studies, GOM and South Atlantic Bight. | 2006-2008 |
| SRP | Gray' Reef NMS hand held hook and line and ROV to sample snapper grouper species and corals beyond sanctuary boundaries. | 2007 |
| SRP | In situ marking and collection of corals by NOS/CCFHR. | 2007 |
| SRP | SEFSC. Original SRP issued in 2007. This amendment adds 36 more stations. SEFSC reef fish survey. | 2007-2010 |
| SRP | SEFSC trawl, reef fish, plankton and longline surveys. | 2009-2011 |
| SRP | SEFSC and NOS to study snapper grouper abundance and invasive species (lionfish). | 2009 |
| Exempted Educational Activity Authorization | Cape Fear Community College collection of | 2005 |

| | | |
|---|---|---|
| (EEAA) | invertebrates and vertebrates. | |
| EFP | Georgia Aquarium collection of federally managed fishes. | 2005 |
| EFP | South Carolina Aquarium collection of specified numbers of fishes. | 2005 |
| EFP | North Carolina Aquariums collection of red porgy and live rock. | 2005 |
| EFP | University of Georgia Marine Extension Service collection of snapper grouper, coastal pelagics, and spiny lobster. | 2006 |
| EFP | Gulf and South Atlantic Fisheries Foundation collection of snapper grouper in South Atlantic. | 2006-2008 |
| EFP | Georgia Aquarium collection of federally managed fishes. | 2006-2008 |
| EFP | South Carolina Aquarium collection of federally managed fishes. | 2007 |
| EFP | Mr. Tom Burgess collection of deep water reef fish off NC and to use acoustic SONAR to gather acoustic energy data. | 2008 |
| EFP | Gulf Fisherman's Association to collect regulatory discards from GOM as part of CRP grant. | 2008-2009 |
| EFP | Mr. Scott Baker Jr. to collect sub-legal snapper grouper species (300 each) off NC, SC, GA, and FL. | 2009 |

# 7 Appendix B: Reporting Form