Endangered Species Act - Section 7 Consultation
Biological Opinion

Action Agency: National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), Southeast Regional Office (SERO), Sustainable Fisheries Division (F/SER2).

Activity: The Continued Authorization of Shrimp Trawling as Managed under the Fishery Management Plan (FMP) for the Shrimp Fishery of the South Atlantic Region, Including Proposed Amendment 6 to that FMP.

Consulting Agency: NOAA, NMFS, SERO, Protected Resources Division (F/SER3).

Approved by: _____
Roy E. Crabtree, Ph.D., Regional Administrator

Date Issued: 2/25/05

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Introduction

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*), requires each federal agency to ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or to result in the destruction or adverse modification of any designated critical habitat of those species. When the action of a federal agency may affect a species protected under the ESA, that agency is required to consult with either NMFS or the U.S. Fish and Wildlife Service, depending on the protected species that may be affected. Formal consultations on most listed marine species are conducted between the action agency and NMFS. Consultations are concluded after NMFS issues a biological opinion (opinion). If jeopardy or destruction or adverse modification is found to be likely, the opinion must identify reasonable and prudent alternatives (RPAs) to the action,

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if any, that would avoid such impacts. The opinion also includes an incidental take statement (ITS) specifying the amount or extent of incidental taking that may result from the proposed action. Non-discretionary reasonable and prudent measures (RPMs) to minimize the impact of the incidental taking are included, and conservation recommendations are made. Notably, there are no RPMs associated with critical habitat, only RPAs that must avoid destruction or adverse modification.

This document represents NMFS' opinion on the effects of the continued authorization of shrimp trawling as managed under the FMP for the Shrimp Fishery of the South Atlantic Region (South Atlantic Shrimp FMP) on smalltooth sawfish, *Pristis pectinata*, in accordance with section 7 of the ESA. This consultation considers all South Atlantic Shrimp FMP amendments implemented to date, as well as the alternatives proposed in the "Final Amendment 6 to the [South Atlantic Shrimp FMP], including a Final Supplemental Environmental Impact Statement, Initial Regulatory Flexibility Analysis, Regulatory Impact Review, Social Impact Assessment/Fishery Impact Statement, and Biological Assessment" (SAFMC and NMFS 2004). NMFS has dual responsibilities as both the action agency under the Magnuson-Stevenson Fishery Conservation and Management Act (MSFMCA) (16 U.S.C. §1801 *et seq.*) and the consulting agency under the ESA. For the purposes of this consultation, F/SER2 is considered the action agency and the consulting agency is F/SER3.

This opinion is based on information provided in Amendment 6 to the South Atlantic Shrimp FMP, the smalltooth sawfish status review (NMFS 2000), recent smalltooth sawfish publications (e.g., Poulakis and Seitz 2004, Simpfendorfer and Wiley 2004), observer and logbook data of fishery effort and protected species interactions, consultation with F/SER2 staff, and previous opinions on the South Atlantic federal shrimp fishery and other relevant fisheries.

1.0 Consultation History

Previous Consultations

The effects of the South Atlantic federal shrimp fishery on endangered and threatened species have been analyzed as part of the proposed action of numerous formal section 7 consultations (i.e., NMFS 1992, 1994, 1996, 1998, and 2002). These consultations are summarized in the most recent opinion, dated December 2, 2002, on shrimp trawling in the southeastern United States under the sea turtle conservation regulations and as managed by the FMPs for shrimp in the South Atlantic and Gulf of Mexico (hereafter the 2002 opinion).

The 2002 opinion included an analysis of the effects of the South Atlantic federal shrimp fishery on both sea turtle and marine mammal species. Based on this analysis, NMFS concluded that shrimp trawling in the southeastern United States, under the proposed revisions to the sea turtle conservation regulations at that time and as managed by the FMPs for shrimp in the South Atlantic and Gulf of Mexico, is not likely to jeopardize the continued existence of endangered green, leatherback, hawksbill, and Kemp's ridley sea turtles, and threatened loggerhead sea turtles. An ITS was issued allotting take for each of these species. ESA listed marine mammals, sturgeon, the olive ridley sea turtle, and Johnson's seagrass were all found not likely to be adversely affected. No incidental take was issued for these species.

Cause for Reinitiating Section 7 Consultation

On November 8, 2004, FSER2 requested initiation of the section 7 consultation process on Amendment 6 to the South Atlantic Shrimp FMP. The proposed actions contained within this amendment focus on advancing the SAFMC's and NMFS' compliance with National Standards 1 (prevent overfishing while achieving optimum yield) and 9 (minimize bycatch or mortality from bycatch, where bycatch is defined as the incidental capture of non-target fish and other marine animals). Specifically, F/SER2 requested F/SER3 review Amendment 6 to determine if reinitiation of formal section 7 consultation is warranted.

As provided in 50 CFR 402.16, reinitiation of formal consultation is required when discretionary involvement or control over the action has been retained (or is authorized by law) and: (1) the amount or extent of the incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. These conditions were therefore used by F/SER3 to determine whether section 7 consultation should be reinitiated on the South Atlantic federal shrimp fishery. A summary of this analysis follows:

(1) Has the amount or extent of the incidental take been exceeded?

The 2002 opinion authorized the take of sea turtles. The amount and extent of incidental take specified in that opinion has not been exceeded. No take has been reported for any other listed species analyzed in the opinion.

(2) Is there any new information revealing effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered?

The 2002 opinion considered the effects of the South Atlantic federal shrimp fishery on both sea turtle and marine mammal species. Since then, there has been no new information indicating that the actual effects of the fishery are different from the expected effects already considered in that opinion. The underlying, primary information sources used in the 2002 opinion in analyzing the effects of the action and determining whether the action would result in jeopardy to sea turtle species were the *Analysis of Sea Turtle Bycatch in the Commercial Shrimp Fisheries of Southeast U.S. Waters and the Gulf of Mexico* (Epperly et al. 2002) and *Stock Assessments of Loggerhead and Leatherback Sea Turtles and an Assessment of the Impact of the Pelagic Longline Fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic* (NMFS SEFSC 2001). These two documents still comprise the best available information on sea turtle stocks and shrimp fishery impacts.

The 2002 opinion concluded that shrimp trawling in the southeastern United States, under the proposed revisions to the sea turtle conservation regulations at that time and as managed by the FMPs for shrimp in the South Atlantic and Gulf of Mexico, is not likely to jeopardize the continued existence of endangered green, leatherback, hawksbill, and Kemp's ridley sea turtles, and threatened loggerhead sea turtles. The February 15, 2005,

Gulf of Mexico Reef Fish Fishery opinion provided an updated analysis on the status of loggerhead, leatherback, Kemp's ridley, green, and hawksbill sea turtles. Based on that analysis, the status of Kemp's ridley, green, and hawksbill sea turtles has not changed since the 2002 opinion; therefore, there is no new information that would change the no jeopardy findings in the 2002 opinion for these three species.

A major change to the status of leatherback sea turtles from the 2002 opinion occurred when the pelagic longline regulations requiring circle hooks and gear removal was adopted. These measures are expected to decrease mortality of these species as a result of the pelagic longline fishery. Based on the fact that the significant change in the status of leatherback sea turtles is positive, there in no new information that would change the no-jeopardy conclusion for leatherbacks in the 2002 opinion.

The adopted pelagic longline regulations requiring circle hooks and gear removal are also expected to reduce mortality rates of hooked loggerheads. Another potentially significant change in the status of loggerhead sea turtles is in the nesting trends of the South Florida nesting population. The South Florida nesting population of loggerheads had previously shown an increasing trend but in recent years of depressed nesting, is now showing no discernible long-term trend. The SEFSC believes it is too early to determine if the recent declines in the South Florida nesting population indicate a decreasing population or if they are part of a cyclical pattern.

The jeopardy analysis in the 2002 opinion relied on a model in the NMFS SEFSC (2001) that assumed a 30% drop in mortality of large juvenile and adult loggerhead sea turtles as a result of the use of new turtle excluder device modifications. As a result of this 30% drop, the model indicated that if the northern nesting population of loggerhead sea turtles were decreasing by 2% per year, it would stabilize; and if this population was slightly increasing, it would show a dramatic increase. Based on this information, the 2002 opinion determined that a stable population would increase and using the northern nesting population as a proxy indicated other subpopulations would also increase. Therefore, the fact that there is no discernable long-term trend leads NMFS to believes that there is no new information, at this time, that would change the basis for the no-jeopardy conclusion of the 2002 opinion for loggerhead sea turtles.

The 2002 opinion also concluded that the ESA-listed marine mammals, sturgeon, the olive ridley sea turtle, and Johnson's seagrass were all not likely to be adversely affected by the proposed action, nor the designated critical habitat for Northern right whale, Gulf sturgeon, and Johnson's seagrass critical habitat adversely modified or affected. There is no new information to suggest otherwise. The 2002 opinion primarily discounted these species and habitats on the basis of little spatial overlap with areas where shrimp fishing occurs and/or no documented interactions with shrimp fishing. There is no new information indicating the overlap between these species and habitats is greater than previously thought. Also, no fishery interactions with these species and habitats have been documented.

(3) Has the agency action been subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered?

No. The changes to the agency action (i.e., management and operation of the South Atlantic federal shrimp fishery) proposed in Amendment 6 to the South Atlantic Shrimp FMP would not impact the manner in which the fishery interacts with ESA-listed species. Seven actions and preferred alternatives for their implementation are proposed (described in more detail in Section 2.0). Actions 1 and 2 would modify the framework procedures of the FMP and are administrative actions. Actions 3 and 5 would establish bycatch reporting and permit requirements in the shrimp fishery, again with no impact on the operation of the fishery. Actions 6 and 7 would establish or revise stock status criteria for the various shrimp species. Although indirect effects may occur as a result of subsequent management action in response to an evaluation of the South Atlantic federal shrimp fishery with respect to these criteria, particularly if the management action results in an increase or a decrease in fishing effort, any such action proposed would be subject to section 7 consultation at that time. The only proposed change to the operation of the South Atlantic federal shrimp fishery is the required use of bycatch reduction devices (BRDs) in the rock shrimp component of the fishery under Action 4. BRDs have been successfully used in the penaeid shrimp fishery for five years and there is no evidence to suggest they interfere with the function or use of the TEDs or have any impact on listed species interactions. Based on this analysis, Amendment 6 to the South Atlantic Shrimp FMP would have no effect on the South Atlantic federal shrimp fishery's interactions with listed species nor alter the analyses of the 2002 opinion.

(4) Has a new species been listed or critical habitat designated that may be affected by the identified action?

Yes. NMFS listed the U.S. distinct population segment (DPS) of smalltooth sawfish as endangered under the ESA in April 2003. Based on the species' previous capture in otter trawls, NMFS believes the South Atlantic federal shrimp fishery may adversely affect smalltooth sawfish.

After reviewing the factors for reinitiation, F/SER3 deems reinitiating consultation on the continued authorization of shrimp trawling as managed under the South Atlantic Shrimp FMP, including proposed Amendment 6, is only necessary for its effects on the smalltooth sawfish. This opinion, therefore, will analyze the effects of the South Atlantic federal shrimp fishery on the smalltooth sawfish. The 2002 opinion remains in effect for all other listed species that may be affected by the proposed action. This opinion is incorporated by reference and appended hereto.

2.0 Description of the Proposed Action

F/SER2 is proposing to implement Amendment 6 to the South Atlantic Shrimp FMP as prepared by the South Atlantic Fishery Management Council (SAFMC) and the SERO for the continued authorization and management of the South Atlantic federal shrimp fishery. If implemented, Amendment 6 would modify the South Atlantic Shrimp FMP and associated regulations at 50

CFR Part 622 under the authority of the MSFCMA, as amended by the Sustainable Fisheries Act (16 U.S.C. 1801 et seq.). The MSFMCA is the principle federal statute governing the management of marine fisheries in the U.S. Exclusive Economic Zone (EEZ). Section 301(a) of the MSFMCA contains 10 national standards for fishery conservation and management, with which FMPs and FMP amendments prepared by the fishery management councils and the Secretary of Commerce must comply. The actions proposed in Amendment 6 focus on advancing the SAFMC's and NMFS' compliance with National Standards 1 (prevent overfishing while achieving optimum yield) and 9 (minimize bycatch or mortality from bycatch, where bycatch is defined as the incidental capture of non-target fish and other marine animals). The proposed actions of Amendment 6 to the South Atlantic Shrimp FMP are listed below, along with the preferred alternatives to implement each action:

1. Amend the BRD Framework to adjust Council authority in regard to modifications of the BRD testing protocol.

   Preferred Alternative: Modify the BRD framework procedure to remove the authority and procedural requirements of the Council to modify the BRD testing protocol and transfer to NMFS the authority to make appropriate revisions to the protocol.

2. Amend the BRD framework to adjust the criteria for certification of new BRDs.

   Preferred Alternative: For a new BRD to be certified, it must be statistically demonstrated that such a device can reduce the total weight of finfish by at least 30%.

3. Establish a method to monitor and assess bycatch in the South Atlantic rock shrimp and penaeid shrimp fisheries.

   Preferred Alternative: Adopt the Atlantic Coastal Cooperative Statistics Program Release, Discard and Protected Species Module as the preferred methodology. Until this module is fully funded, require the use of a variety of sources to assess and monitor bycatch including: observer coverage on shrimp vessels; logbooks; state cooperation; grant funded projects; and federal penaeid shrimp permits.

4. Minimize bycatch in the rock shrimp fishery to the extent practicable.

   Preferred Alternative: Require a NMFS-approved BRD be utilized on all rock shrimp trips in the South Atlantic [EEZ].

5. Consider the requirement for a federal penaeid shrimp permit in order for a shrimp trawler to fish for or possess penaeid shrimp in the South Atlantic EEZ.

   Preferred Alternative: For a person aboard a shrimp trawler to fish for penaeid shrimp in the South Atlantic EEZ or possess penaeid shrimp in or from the South Atlantic EEZ, a valid commercial vessel permit for South Atlantic penaeid shrimp must have been issued to the vessel and must be on board. A federal penaeid shrimp permit will be issued to any vessel owner who submits an application.

6. Revise, establish and/or retain status determination criteria for penaeid shrimp stocks.

   Preferred Alternative: Using the established MSY (maximum sustainable yield) and OY (optimum yield) values, revise or establish overfishing and overfished definitions for penaeid shrimp based on an MSY control rule. Overfishing (MFMT) for all penaeid species is a fishing mortality rate that diminishes the stock below the designated MSY stock abundance (B_{MSY}) for two consecutive years and MSST is established with two thresholds: (a) if the stock diminishes to ½ MSY abundance (½ B_{MSY}) in one year, or (b) if the stock is diminished below MSY abundance (B_{MSY}) for two consecutive years. In addition, white shrimp would be considered overfished when the overwintering white shrimp population within a state's waters declines by 80% or more following a severe winter resulting in prolonged cold water temperatures. A proxy for B_{MSY} would be established for each species using CPUE information from SEAMAP-SA data as the lowest values in the 1990-2003 time period that produced catches meeting MSY the following year.

7. Revise, establish and/or retain status determination criteria for rock shrimp.

   Preferred Alternative: Establish stock status determination criteria consistent with those of penaeid shrimp, where MSY/OY for rock shrimp is the mean total landings for the South Atlantic during 1986 through 2000 (4,912,927 pounds heads-on), where overfishing (MFMT) for rock shrimp would be a fishing mortality rate that led to annual landings larger than two standard deviations (9,774,848 pounds heads-on) above MSY (4,912,927 + 9,774,848 = 14,687,775 pounds heads on) for two consecutive years, and MSST would be parent stock size less than ½ (B_{msy}) for two consecutive years.

When consulting on FMP amendments, NMFS must consider not only the effects of the specific management measures proposed in the amendment, but also the effects of all fishing activity authorized under the FMP over which NMFS retains discretionary authority to regulate. The proposed action, therefore, includes all shrimp trawl fishing activities authorized under the South Atlantic Shrimp FMP, as amended to date, and under proposed Amendment 6.

The South Atlantic Shrimp FMP authorizes fishing only in the U.S South Atlantic EEZ. Within this area shrimp are harvested with otter trawls by the commercial food shrimp fishery. Target species include penaeid shrimp species (i.e., white, brown, and pink shrimp) and rock shrimp. The commercial bait and recreational fisheries for these shrimp species in the South Atlantic occur almost exclusively in state waters, thus are not considered part of the proposed action.

The 2002 opinion includes a detailed description of the management and operation (i.e., vessels, gear, and fishing practices) of all southeastern shrimp fisheries. Amendment 6 to the South Atlantic Shrimp FMP provides additional information on South Atlantic shrimp fisheries. Specific sections of these documents that describe characteristics of the South Atlantic shrimp fishery relevant to the analysis of its potential effects on smalltooth sawfish are listed in Table 2.1 (p. 8). These sections are incorporated by reference.

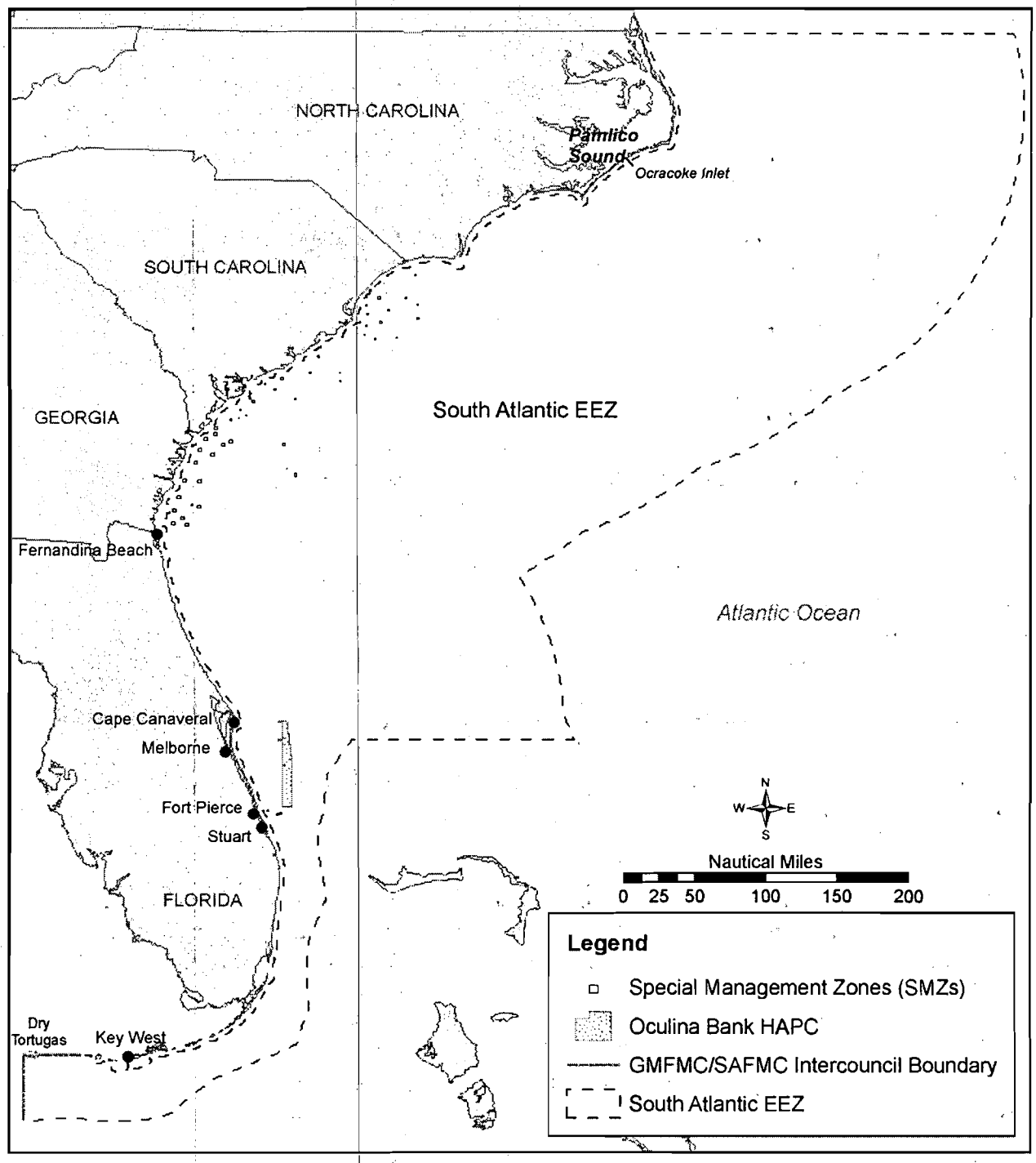
Table 2.1. South Atlantic Federal Shrimp Fishery Descriptions Incorporated By Reference

Source Document	Section/Subsection/Heading Title	Incorporated Pages
NMFS 2002	Sea turtle Conservation Regulations	4-6
	Shrimp Fishery Gear	7-9
	U.S. South Atlantic Area Shrimp Fishery	10-12
	History of Management Plans and Amendments of the South Atlantic Area Shrimp Fishery	14-15
SAFMC 2004	Objectives of the South Atlantic Shrimp FMP	11 and 12.
	3.2.2.1/The Commercial Food Shrimp Fishery	91-95

2.3 Action Area

The management unit of the South Atlantic Shrimp FMP is the U.S South Atlantic EEZ. The U.S. South Atlantic EEZ extends offshore from 3 to 200 nautical miles off the coasts of North Carolina, South Carolina, Georgia, and east Florida. The actual outer boundaries of the EEZ vary according to areas where jurisdictional boundaries meet with Bermuda, the Bahamas and Cuba. The South Atlantic federal shrimp fishery may operate anywhere within the U.S. South Atlantic EEZ. The action area of the proposed action therefore consists of this entire area. Fishing activity within this area is determined by a variety of biological (e.g., distribution of shrimp), socio-economic (e.g., market factors, location of ports, operating costs), and regulatory factors (e.g., gear-restricted closed areas). Figure 2.1 (p. 9) depicts the South Atlantic EEZ, as well as areas within the South Atlantic EEZ where trawling is prohibited (i.e., Oculina Bank Habitat Area of Particular Concern (HAPC) and special management zones (SMZs)) are also included in the figure.

Figure 2.1 South Atlantic Federal Shrimp Fishery Action Area



3.0 Status of Listed Species and Critical Habitat

The following endangered and threatened species are known to occur in the South Atlantic EEZ:

Marine Mammals	**Status**
Fin whale (*Balaenoptera physalus*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Northern right whale (*Eubalaena glacialis*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Sea turtles	
Green turtle (*Chelonia mydas*)	Endangered/Threatened*
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Olive ridley sea turtle (*Lepidochelys olivacea*)	Threatened
Fish	
Smalltooth sawfish (*Pristis pectinata*)	Endangered**
Critical Habitat	
Northern right whale critical habitat	

**Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. Due to the inability to distinguish between the populations away from the nesting beaches, green sea turtles are considered endangered wherever they occur in U.S. waters.*
***The U.S. DPS.*

This opinion analyzes the effects of the South Atlantic federal shrimp fishery on the smalltooth sawfish. The marine mammals, sea turtles, and critical habitat listed above as occurring in the action area are excluded from analysis in this opinion for the reasons described in Section 1.0 (pp. 3-5).

Smalltooth sawfish are known to occur in the South Atlantic, off of Florida and Georgia. Previous captures in other trawl fisheries indicate the South Atlantic shrimp trawl fishery may adversely affect smalltooth sawfish.

The following subsection is a synopsis of the best available information on the life history, distribution, and population status of the smalltooth sawfish. Additional background information on the status of this species can be found in a number of published documents, including the smalltooth sawfish status review (NMFS 2000), the proposed and final listing rules, and numerous recent publications (Simpfendorfer 2001, Seitz and Poulakis 2002, Simpfendorfer and Wiley 2004, Poulakis and Seitz 2004).

3.1 Smalltooth sawfish

The U.S. smalltooth sawfish distinct population segment (DPS) was listed as endangered under the ESA on April 1, 2003 (68 FR 15674). The smalltooth sawfish is the first marine fish to be listed in the United States. Critical habitat for the species has not been designated. Historically, smalltooth sawfish occurred commonly in the inshore waters of the Gulf of Mexico and the eastern U.S. seaboard up to North Carolina, and more rarely as far north as New York. Based on smalltooth sawfish encounter data, the current core range for the smalltooth sawfish is currently from the Caloosahatchee River, Florida, to Florida Bay (Simpfendorfer and Wiley 2004).

All extant sawfish belong to the Suborder *Pristoidea*, Family *Pristidae*, and Genus *Pristis*. Although they are rays, sawfish physically more resemble sharks, with only the trunk and especially the head ventrally flattened. Smalltooth sawfish are characterized by their "saw," a long, narrow, flattened rostral blade with a series of transverse teeth along either edge.

Life History and Distribution

Life history information on smalltooth sawfish is limited. Small amounts of data exist in old taxonomic works and occurrence notes (e.g., Breder 1952, Bigelow and Schroeder 1953, Wallace 1967, Thorson et al. 1966). However, as Simpfendorfer and Wiley (2004) note, these relate primarily to occurrence and size. Recent research and sawfish public encounter information is now providing new data and hypotheses about smalltooth sawfish life history (e.g., Simpfendorfer 2001 and 2003, Seitz and Poulakis 2002, Poulakis and Seitz 2004, Simpfendorfer and Wiley 2004), but more data are needed to confirm many of these new hypotheses.

As in all elasmobranchs, fertilization is internal. Bigelow and Schroeder report the litter size as 15 to 20. Simpfendorfer and Wiley (2004), however, caution this may be an overestimate, with recent anecdotal information suggesting smaller litter sizes (~10). Smalltooth sawfish mating and pupping seasons, gestation, and reproductive periodicity are all unknown. Gestation and reproductive periodicity, however, may be inferred based on that of the largetooth sawfish, sharing the same genus and having similarities in size and habitat. Thorson (1976) reported the gestation period for largetooth sawfish was approximately 5 months and concluded that females probably produce litters every second year.

Bigelow and Schroeder (1953) describe smalltooth sawfish as generally about 2 feet long (61 cm) at birth and growing to a length of 18 feet (549 cm) or greater. Recent data from smalltooth sawfish caught off Florida, however, demonstrate young are born at 75-85 cm (Simpfendorfer and Wiley 2004), with males reaching maturity at approximately 270 cm and females at approximately 360 cm (Simpfendorfer 2002 and 2004). The maximum reported size of a smalltooth sawfish is 760 cm (Last and Stevens 1994), but the maximum size normally observed is 600 cm (Adams and Wilson 1995). No formal studies on the age and growth of the smalltooth sawfish have been conducted to date, but growth studies of largetooth sawfish suggest slow growth, late maturity (10 years) and long lifespan (25-30 years) (Thorson 1982; Simpfendorfer 2000). These characteristics suggest a very low intrinsic rate of increase (Simpfendorfer 2000).

Smalltooth sawfish feed primarily on fish, with mullet, jacks, and ladyfish believed to be their primary food resources (Simpfendorfer 2001). By moving its saw rapidly from side to side through the water, the relatively slow moving sawfish is able to strike at individual fish (Breder 1952). The teeth on the saw stun, impale, injure, or kill the fish. Smalltooth sawfish then rub their saw against bottom substrate to remove the fish, which are then eaten. In addition to fish, smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs), which are located by disturbing bottom sediment with their saw (Norman and Fraser 1937, Bigelow and Schroeder 1953).

Smalltooth sawfish are euryhaline, occurring in waters with a broad range of salinities from freshwater to full seawater (Simpfendorfer 2001). Their occurrence in freshwater is suspected to be only in estuarine areas temporarily freshwater from receiving high levels of freshwater input. Many encounters are reported at the mouths of rivers or other sources of freshwater inflows, suggesting estuarine areas may be an important factor in the species distribution (Simpfendorfer and Wiley 2004).

The literature indicates that smalltooth sawfish are most common in shallow coastal waters less than 25 m (Bigelow and Schroeder 1953, Adams and Wilson 1995). Indeed, the distribution of the smallest size classes of smalltooth sawfish indicate that nursery areas occur throughout Florida in areas of shallow water, close to shore and typically associated with mangroves (Simpfendorfer and Wiley 2004). However, encounter data indicate there is a tendency for smalltooth sawfish to move offshore and into deeper water as they grow. An examination of the relationship between the depth at which sawfish occur and their estimated size indicates that larger animals are more likely to be found in deeper waters. Since large animals are also observed in very shallow waters, it is believed that smaller (younger) animals are restricted to shallow waters, while large animals roam over a much larger depth range (Simpfendorfer 2001). Recent data from sawfish encounter reports and from satellite tagging indicate mature animals occur regularly in waters in excess of 50 meters (Poulakis and Seitz 2004, Simpfendorfer and Wiley 2004).

Mote Marine Laboratory (MML) data indicate smalltooth sawfish occur over a range of temperatures but appear to prefer water temperatures greater than 64.4°F (18°C) (Simpfendorfer 2001). The data also suggest that smalltooth sawfish may utilize warm-water outflows of power stations as thermal refuges during colder months to enhance their survival or become trapped by surrounding cold water from which they would normally migrate. Almost all occurrences of smalltooth sawfish in warm-water outflows were during the coldest part of the year, when water temperatures in these outfalls are typically well above ambient temperatures. Further study of the importance of thermal refuges to smalltooth sawfish is needed. Significant use of these areas by sawfish may disrupt their normal migratory patterns (Simpfendorfer and Wiley 2004).

Historic records of smalltooth sawfish indicate that some large mature individuals migrated north along the U.S. Atlantic coast as temperatures warmed in the summer and then south as temperatures cooled (Bigelow and Schroeder 1953). Recent Florida encounter data, however, do not suggest such migration. One smalltooth sawfish has been recorded north of Florida since 1963 (i.e., a smalltooth sawfish captured off of Georgia in July 2002) but it is unknown whether this individual resided in Georgia waters annually or had migrated north from Florida. Given the

very limited number of encounter reports from the east coast of Florida, Simpfendorfer and Wiley (2004) hypothesize the population previously undertaking the summer migration has declined to a point where the migration is undetectable or does not occur. Further research focusing on states north of Florida or using satellite telemetry is needed to test this hypothesis.

Population Dynamics, Status and Trends

Despite being widely recognized as common throughout their historic range up until the middle of the 20th century, the smalltooth sawfish population declined dramatically during the middle and later parts of the century. The decline in the population of smalltooth sawfish is attributed to fishing (both commercial and recreational), habitat modification, and sawfish life history. Large numbers of smalltooth sawfish were caught as bycatch in the early part of this century. Smalltooth sawfish were historically caught as bycatch in various fishing gears throughout their historic range, including gillnet, otter trawl, trammel net, seine, and to a lesser degree, handline. Frequent accounts in earlier literature document smalltooth sawfish being entangled in fishing nets from areas where smalltooth sawfish were once common but are now rare (Everman and Bean, 1898). Loss and/or degradation of habitat contributed to the decline of many marine species and continue to impact the distribution and abundance of smalltooth sawfish.

Estimates of the magnitude of the decline in the smalltooth sawfish are difficult to make. Because of the species' limited importance in commercial and recreational fisheries and its large size and toothed rostrum, making it difficult to handle, it was not well studied before incidental bycatch severely reduced its numbers. However, based on the contraction of the species' range, and other anecdotal data, Simpfendorfer (2001) estimated that the U.S. population size is currently less than 5% of its size at the time of European settlement.

Seitz and Poulakis (2002) and Poulakis and Seitz (2004) document recent (1990 to 2002) occurrences of sawfish along the southwest coast of Florida, and in Florida Bay and the Florida Keys, respectively. The information was collected by soliciting information from anyone who would possibly encounter these fish via posters displaying an image of a sawfish and requesting anyone with information on these fish since 1990 to contact the authors. Posters were distributed beginning in January 1999 and continue to be maintained from Charlotte County to Monroe County in places where anglers and boaters would likely encounter them (e.g., bait and tackle shops, boat ramps, fishing tournaments). In addition to circulating posters, information was obtained by contacting other fishery biologists, fishing guides, guide associations, rod and gun clubs, recreational and commercial fishermen, scuba divers, mosquito control districts, and newspapers. The Poulakis and Seitz database includes a total of 2,620 smalltooth sawfish encounters (Poulakis, pers. comm. 2005).

MML also maintains a smalltooth sawfish public encounter database, established in 2000 to compile information on the distribution and abundance of sawfish. Encounter records are collected using some of the same outreach tactics as above in Florida statewide. To ensure the requests for information are spread evenly throughout the state, awareness-raising activities were divided into six regions and focused in each region on a biannual basis between May 2002 and May 2004. Prior to 2002, awareness-raising activities were organized on an ad-hoc basis because of limited resources. The records in the database extend back to the 1950s, but are mostly from 1998 to the present. The data are validated using a variety of methods

(photographs, video, directed questions). A total of 434 sawfish encounters have been validated since 1998, most from recreational fishers (Simpfendorfer and Wiley 2004).

The majority of smalltooth sawfish encounters today are from the southwest coast of Florida between the Caloosahatchee River and Florida Bay. Outside of this core area, the smalltooth sawfish appears more common on the west coast of Florida and in the Florida Keys than on the east coast, and occurrences decrease the greater the distance from the core area (Simpfendorfer and Wiley 2004). The capture of a smalltooth sawfish off Georgia in 2002 is the first record north of Florida since 1963. New reports during 2004 extend the current range of the species to Panama City, offshore Louisiana (south of Timbalier Island in 100 ft of water), southern Texas, and the northern coast of Cuba. The Texas sighting was not confirmed to be a smalltooth sawfish and may have been a largetooth sawfish.

There are no data available to estimate the present population size. Although smalltooth sawfish encounter databases may provide a useful future means of measuring changes in the population and its distribution over time, conclusions about the abundance of smalltooth sawfish now cannot be made because outreach efforts and observation efforts are not expanded evenly across each study period. Dr. Simpfendorfer reluctantly gives an estimate of 2,000 individuals based on his four years of field experience and data collected from the public, but cautions that actual numbers may be plus or minus at least 50%.

Recent encounters with neonates (young of the year), juveniles, and sexually mature sawfish indicate that the population is reproducing (Seitz and Poulakis 2002, Simpfendorfer 2003). The abundance of juveniles encountered, including very small individuals, suggests that the population remains reproductively active and viable (Simpfendorfer and Wiley 2004). Also, the declining numbers of individuals with increasing size is consistent with the historic size composition data (G. Burgess, pers. comm. in Simpfendorfer and Wiley 2004). This information and recent encounters in new areas beyond the core abundance area suggest that the population may be increasing. However, smalltooth sawfish encounters are still rare along much of their historical range and absent from areas of historical abundance such as the Indian River Lagoon and John's Pass (Simpfendorfer and Wiley 2004). With recovery of the species expected to be slow on the basis of the species' life history and other threats to the species remaining (see below), the population's future remains tenuous.

Threats

Smalltooth sawfish are threatened today by the loss of southeastern coastal habitat through such activities as agricultural and urban development, commercial activities, dredge and fill operations, boating, erosion, and diversions of freshwater run-off. Dredging, canal development, seawall construction, and mangrove clearing have degraded a significant proportion of the coastline. Smalltooth sawfish may be especially vulnerable to coastal habitat degradation due to their affinity for shallow, estuarine systems (NMFS 2000).

Fisheries still pose a threat to smalltooth sawfish. Although changes over the past decade to U.S. fishing regulations such as Florida's net ban have started to reduce threats to the species over parts of its range, smalltooth sawfish are still occasionally incidentally caught in commercial shrimp trawls, bottom longlines, and recreational rod and reel.

The current and future abundance of the smalltooth sawfish is limited by its life history characteristics (NMFS 2000). Slow growing, late maturing, and long-lived, these combined characteristics result in a very low intrinsic rate of population increase and are associated with the life history strategy known as "k-selection." K-selected animals are usually successful at maintaining relatively small, persistent population sizes in relatively constant environments. Consequently, they are not able to respond effectively (rapidly) to additional and new sources of mortality resulting from changes in their environment (Musick 1999). Simpfendorfer (2000) demonstrated that the life history of this species makes it impossible to sustain any significant level of fishing and makes it slow to recover from any population decline. Thus, the species is susceptible to population decline, even with relatively small increases in mortality.

4.0 Environmental Baseline

The environmental baseline is a snapshot of the factors affecting the species in the action area. By regulation, environmental baselines for biological opinions include the past and present impacts of all state, federal, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). This section therefore identifies and discusses the effects of past and ongoing human and natural factors within the action area leading to the current status of the smalltooth sawfish and its habitats.

4.1 Status of the Species Within the Action Area

Based our knowledge of smalltooth sawfish distribution and abundance, smalltooth sawfish are only present within the southern portion of the action area (i.e. off Florida and Georgia) and are generally rare. Available information indicates that smalltooth sawfish remain in very shallow water until they reach maturity. Thus, only large mature individuals are likely to occur within the proposed action area. Simpfendorfer and Wiley (2004) data also suggest there is an inverse relationship between size and northern distribution. The 100-199 cm size class was not encountered north of Biscayne Bay on Florida's east coast, whereas most size groups greater than 200 cm were encountered as far north as Jupiter Inlet. Animals of all size classes occurred in the outer Florida Keys (Simpfendorfer and Wiley 2004). Smalltooth sawfish greater than 200 cm (total length) may be found in the southern portion (primarily off Florida) of the action area intermittently, throughout the year spending the rest of their time within state waters.

4.2 Factors Affecting Smalltooth Sawfish Within the Action Area

Individuals found in the action area can potentially be affected by activities both within the southeast portion of the action area and adjacent nearshore waters. Summaries of these activities are provided.

4.2.1 Federal Actions

Fisheries

Shark fisheries operating in the South Atlantic EEZ include the commercial shark bottom longline and drift gillnet fisheries and recreational shark fisheries under the FMP for Atlantic Tunas, Swordfish, and Sharks (HMS FMP). A section 7 consultation was completed on October 29, 2003, on the continued operation of those fisheries and the July 2003, Proposed Rule for Draft Amendment 1 to the HMS FMP (NMFS 2003). The shark bottom longline and drift gillnet fisheries were both found likely to adversely affect smalltooth sawfish. Seven smalltooth sawfish have been observed caught in the bottom longline fishery to date. All of these caught animals, with the exception of 1 for which data are missing, were released alive. Only 1 smalltooth sawfish has been observed incidentally caught in the shark drift gillnet fishery. The incidental capture occurred in Atlantic, where the shark drift gillnet fishery predominantly operates. The consultation concluded the proposed action was not likely to jeopardize the continued existence of the smalltooth sawfish. An ITS was provided authorizing non-lethal takes.

Smalltooth sawfish may infrequently be taken in various other South Atlantic federal fisheries involving trawl, gillnet, bottom longline gear, and hook-and-line gear. However, NMFS has little data to substantiate such takings. NMFS is collecting data to analyze the impacts of these fisheries and will conduct section 7 consultations as appropriate.

ESA Permits

Regulations developed under the ESA allow for the taking of ESA-listed species for scientific research purposes. Prior to issuance of these authorizations for taking, the proposal must be reviewed for compliance with section 7 of the ESA. There is currently one active research permit issued for the smalltooth sawfish. The permit allows researchers to capture, handle, collect tissue samples, and tag up to 60 smalltooth sawfish per year in Florida waters (both South Atlantic and Gulf of Mexico). Although the research may result in disturbance and injury of smalltooth sawfish, the activities are not expected to affect the reproduction of the individuals that are caught, nor result in mortality.

4.2.2 State or Private Actions

A significant proportion of the Florida coast has been degraded by inland hydrological projects, urbanization, agricultural activities, and other anthropogenic activities such as dredging, canal development, seawall construction, and mangrove clearing. These activities have led to the loss and degradation of smalltooth sawfish habitat and may adversely affect their recovery.

Florida state recreational fisheries conducted in waters off the east coast of Florida are known to occasionally take smalltooth sawfish. Fishers who capture smalltooth sawfish most commonly are fishing for snook (*Centropomus undecimalis*), redfish (*Scianops ocellatus*) and sharks (Simpfendorfer and Wiley 2004). Available data indicate that these takes are non-lethal. NMFS is strongly encouraging the Florida Fish and Wildlife Commission to apply for an ESA section 10 incidental take permit for its fisheries.

4.2.3 Conservation and Recovery Actions

State regulations restricting the use of gear known to incidentally catch smalltooth sawfish may benefit the species by reducing their incidental capture and/or mortality in these gear types. In 1994, entangling nets (including gillnets, trammel nets, and purse seines) were banned in Florida state waters. Although intended to restore the populations of inshore gamefish, this action removed possibly the greatest source of fishing mortality on smalltooth sawfish (Simpfendorfer 2002). Regulations implemented under the Atlantic Large Whale Take Reduction Plan and the Atlantic HMS FMP limit the use of gillnets in federal waters. Florida's ban of the use of shrimp trawls within one miles of the Atlantic coast may also aid recovery of this species.

Under section 4(f)(1) of the ESA, NMFS is required to develop and implement a recovery plan for the conservation and survival of endangered and threatened species. NOAA fisheries convened a smalltooth sawfish recovery team in September 2003. The team has met several times and is currently drafting the plan. The team anticipates having a draft plan for public comment in the fall of 2005.

MML has been conducting a research project since 1999 on the conservation biology of smalltooth sawfish. Funded in part by NMFS, the project's aim is to provide data on the current status of smalltooth sawfish and to provide scientific information on which to base effective conservation measures. The project has several components including: surveys conducted using a variety of gears, a public sightings database, acoustic tagging and tracking, and genetic analysis. Data collected are providing new information on the species' current distribution and abundance, habitat use patterns, and the impact of population decline. Computer models of smalltooth sawfish populations are also being developed to investigate the rate of change in the population and how the population will recover under different conservation strategies. In addition to these benefits, public outreach efforts to increase awareness of the database are helping to also educate the public regarding smalltooth sawfish status and handling techniques.

5.0 Effects of the Action

In this section of the opinion, we assess the probable direct and indirect effects of the continued operation of the shrimp trawl fishery in the South Atlantic EEZ on listed species. The analysis in this section forms the foundation for our jeopardy analysis in Section 7.0. A jeopardy determination is reached if we would reasonably expect a proposed action to cause reductions in numbers, reproduction, or distribution that would appreciably reduce a listed species' likelihood of surviving and recovering in the wild. The status of the endangered DPS of smalltooth sawfish in the U.S., which is likely to be adversely affected by the shrimp trawl fishery in the South Atlantic EEZ, is contained in Section 3.0.

5.1 Effect of Trawl Gear

The otter trawl is the only gear type used to harvest shrimp species in federal waters. Otter trawls are classified as active fishing gear because animals do not voluntarily enter the gear; they are either swept up from the seabed or netted from the water by the gear. Shrimp trawling may also result in disturbance of seabed sediments and animals (NRC 2002).

When analyzing the effects of any action, it is important to consider both direct and indirect effects. Shrimp trawls may directly affect smalltooth sawfish that are foraging within or moving through an active trawling location via direct contact with the gear. Indirect effects (i.e., effects caused by the proposed action that are later in time, but reasonably certain to occur), however, from the South Atlantic federal shrimp fishery are not expected. Indirect effects include aspects such as habitat degradation, reduction of prey/foraging base, etc. The manner in which trawl gear is known to temporarily degrade habitat as described above is not likely to impact the smalltooth sawfish. Although smalltooth sawfish are known to prey on crustaceans (mostly shrimp and crabs they located by disturbing bottom sediment with their saw) (Norman and Fraser 1937, Bigelow and Schroeder 1953), their primary food source is fish. Prey sources for smalltooth sawfish appear to be abundant and widely distributed in shallow coastal waters throughout the species current range (Simpfendorfer 2001). We therefore do not expect potential disturbances to seabed sediments and animals to result in a reduction of the smalltooth sawfish prey/foraging base. We therefore conclude there will no indirect effects on smalltooth sawfish and all analyses will be based on direct effects.

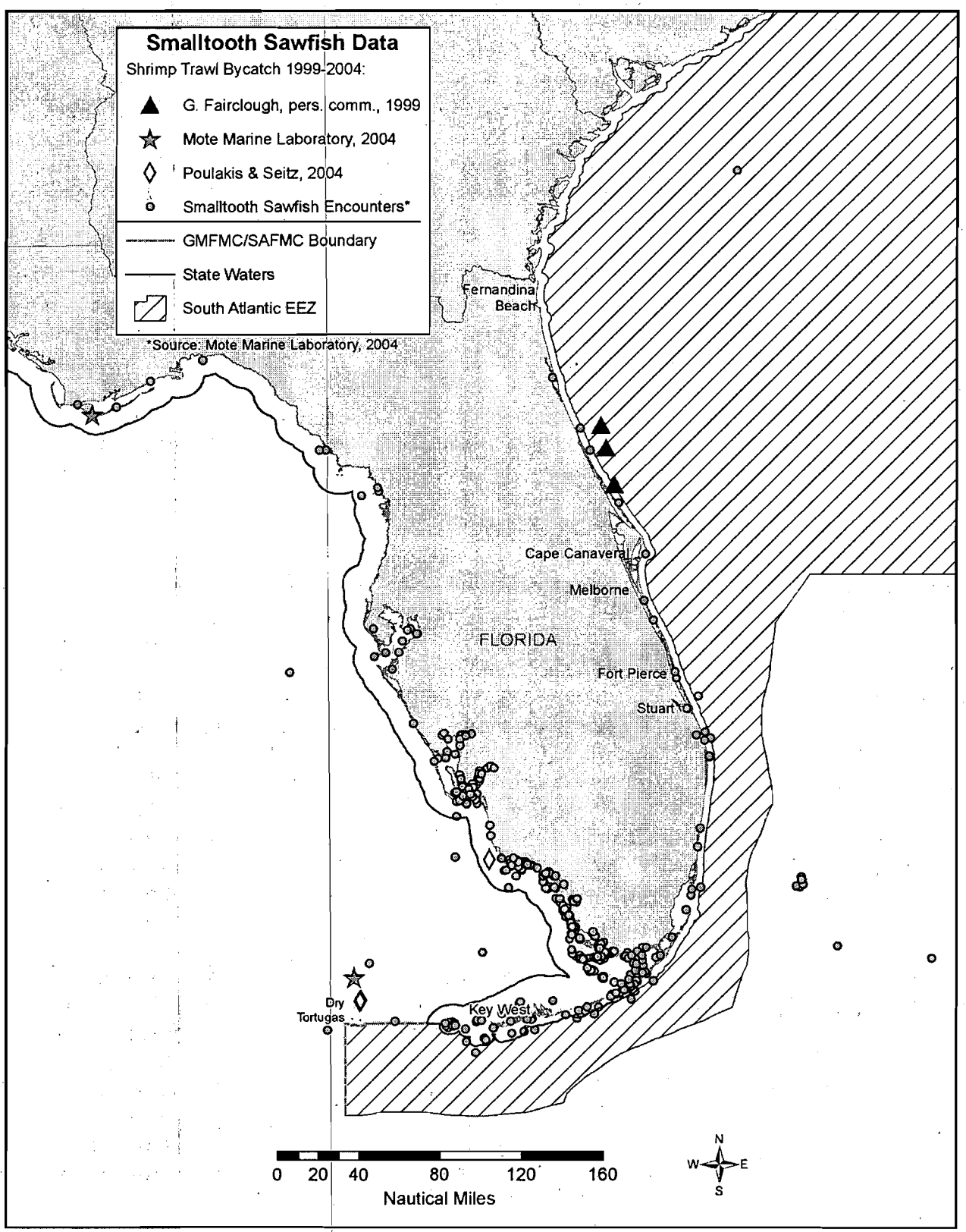
Direct effects of the shrimp trawl fishery in the South Atlantic EEZ on the smalltooth sawfish are from interactions with its fishing gear resulting in the capture, injury, or death of the species. Our analysis therefore assumes that smalltooth sawfish are not likely to be adversely affected by the shrimp trawl gear unless they interact with it. We also assume the potential effect of the gear are proportional to the number of interactions between the gear and the species.

Smalltooth sawfish have historically been caught as bycatch in otter trawls (NMFS 2000). The long, toothed rostrum of the smalltooth sawfish causes this species to be particularly vulnerable to entanglement in any type of netting gear, including the netting used in shrimp trawls. The saw penetrates easily through nets, causing the animal to become entangled when it attempts to escape. Early literature accounts document smalltooth sawfish as being frequently caught by shrimp trawls. For example, Bigelow and Schroeder (1953) noted smalltooth sawfish were of "considerable concern to fishermen as nuisances because of the damage they do to drift- and turtle-nets, to seines, and to shrimp trawls in which they often become entangled; and because of the difficulty of disentangling them without being injured by their saws." Entangled smalltooth sawfish frequently had to be cut free, causing extensive damage to trawl nets and presenting a substantial hazard if brought on board. Most smalltooth sawfish caught by fishermen were either killed outright or released only after removal of their saw.

Considering smalltooth sawfish are a demersal species and otter trawls fish close to the seafloor, smalltooth sawfish interactions are likely to occur if present in the same area. Using the spatial overlap between the areas where the shrimp trawl activity occurs and where smalltooth sawfish encounters are reported, we can determine where smalltooth sawfish interactions may occur.

The commercial fishing area for penaeid shrimp species in the South Atlantic is mainly concentrated from Fort Pierce, Florida to Pamlico Sound and Ocracoke Inlet, North Carolina. There is another fishery area off the Florida Keys where the main target is pink shrimp. In Georgia, shrimp trawling takes place along the entire coast. These locations and available smalltooth sawfish encounter (i.e., sightings and captures) locations are depicted in Figure 5.1. (p. 19)

Figure 5.1. Smalltooth Sawfish Encounter Data Within the Action Area



Within the action area, smalltooth sawfish are known to occur only within Florida and Georgia waters. A smalltooth sawfish caught on a shark bottom-longline off the northern coast of Georgia in 2002 is the only recent record north of Florida. Smalltooth sawfish interactions in the shrimp trawling grounds off South Carolina and North Carolina are thus not likely to interact with smalltooth sawfish based on encounter data. Based on the limited amount of encounters documented within the state of Georgia, smalltooth sawfish interactions within the state are expected to be rare.

The most important shrimp trawling areas in Florida are located in the northeastern part of the state, between Fernandina Beach and Melbourne, just south of Cape Canaveral (SAFMC and NMFS 2004). MML encounter database records from January 1999 to May 2004 identified smalltooth sawfish encounters within the state of Florida from the central Florida Panhandle on the Gulf of Mexico coast to St. Augustine on the east coast, with most occurring in the region from Charlotte Harbor to Florida Bay. Simpfendorfer and Wiley (2004) state that the core range for the species is now from the area around the mouth of the Caloosahatchee River, south through Ten Thousand Islands, along the Everglades coast, and into Florida Bay. Simpfendorfer and Wiley (2004) also state that outside of the core range the smalltooth sawfish appears more common on the west coast of Florida and the Florida Keys. Although the overall latitudinal spread of encounters was similar off both coasts, encounters off the east coast were much less common. The majority of the east coast encounters occurred south of 27.2°N, with no east coast areas having encounters rates greater than $0.03km^{-2}$ (Simpfendorfer and Wiley 2004). Observations are based on sightings densities that have not been corrected for sightings effort; however, so this encounter rate may be somewhat biased by the amount of fishing effort (i.e., more fishing effort in the Gulf of Mexico state waters than off the Atlantic coast).

SAFMC and NMFS (2004) explores the potential impact of the South Atlantic federal shrimp fishery operating in Florida, by examining shrimp trip effort reported as occurring within the EEZ for Florida by month for the years 2001 through 2002 (Table 5.1). In general, the area fished that was reported is the area where the trip was mostly executed. Approximately 20%-30% of all Florida trips in these years were recorded as occurring within the EEZ.

Table 5.1. Florida trips conducted by month within the waters of the South Atlantic EEZ for the years 2000-2002 (SAFMC and NMFS 2004).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total trips
2001	328	206	178	180	225	292	228	248	258	268	261	261	2933
2002	262	188	161	205	198	185	130	152	137	176	174	222	2190

Between 22% and 28% of the trip effort was reported as conducted in the South Atlantic off the Tortugas. Fishing trips in the South Atlantic off Key West represented 6% to 9% of the effort. Based on encounter database records of MML and Seitz and Poulakis (2004), the greatest potential for smalltooth sawfish interactions with the shrimp trawling fishery in the South Atlantic EEZ appears to be in the Florida Keys, where pink shrimp is the dominant target species.

The best available quantitative source of information available on which to base a take estimate is the recent reports of interactions between shrimp trawls documented by observer programs and smalltooth sawfish encounter databases. Since NMFS was petitioned to list the smalltooth sawfish in 1999, increased effort has been placed on collecting smalltooth sawfish data (e.g., Simpfendorfer and Wiley 2004, Poulakis and Seitz 2004). These data indicate smalltooth sawfish encounters in shrimp trawls are rare (Fairclough, pers. comm. 1999, MML Sawfish Encounter Database 2004, Seitz and Poulakis Database 2004, and NMFS Shrimp Trawl Observer Database 2004). Only 9 interactions have been documented: 6 off the west coast of Florida in the Gulf of Mexico (3 in state waters, 3 in the EEZ) and three off the east coast of Florida (all in the EEZ). The approximate locations of these events are shown on Figure 5.1 (p. 19). The 3 documented takes in the action area over the past 6 years average only 0.5 smalltooth sawfish annually. Rounding this number to the nearest whole number, we estimate up to 1 smalltooth sawfish may be taken annually.

Available information is scarce, but suggests that previously captured smalltooth sawfish did not survive the interaction. The release condition of smalltooth sawfish recently reported as incidentally caught in shrimp trawls is known for only two interactions. In both cases, the smalltooth sawfish was caught in the netting prior to reaching the cod end and was left hanging there. Although the physical act of being captured by entanglement may not be lethal, the fact that the net is out of the water for periods of time with the smalltooth sawfish hanging from it is likely to quickly result in mortality (Simpfendorfer, pers. comm. 2005). Based on this information, we anticipate annual take will be lethal.

5.2 Effect of Implementation of Amendment 6

Actions 1 and 2 would amend various portions of the BRD certification framework established in Amendment 2 to the FMP. Modifications to the BRD evaluation procedures are administrative actions that would not have any direct or indirect effects on smalltooth sawfish.

Action 3 would establish a method to monitor and assess bycatch in the South Atlantic rock shrimp and penaeid shrimp fisheries and Action 5 would establish a federal penaeid shrimp permit requirement. There are no direct impacts on smalltooth sawfish from establishing a standardized reporting methodology to estimate bycatch or from a requirement to permit vessels in the fishery. Beneficial indirect impacts may occur though through better identification of participants in the fishery and from a better estimation of protected species interactions.

Action 4 would minimize bycatch in the rock shrimp fishery to the extent practicable by requiring the use of BRDs. There are no data to suggest that smalltooth sawfish would be able to escape through BRDs or that BRDs would pose any additional risk of smalltooth sawfish entanglement.

Actions 6 and 7 would establish and/or revise stock status determination criteria for penaeid and rock shrimp. There are no direct impacts on protected resources from defining/establishing stock status determination criteria. Indirect impacts may occur as a result of subsequent management actions in response to an evaluation of the South Atlantic federal shrimp fishery with respect to these criteria, particularly if the management action results in an increase or a decrease in fishing

effort. However, any such action proposed would be subject to section 7 consultation at that time.

We now must consider what effect, if any, implementation of Amendment 6 to the South Atlantic Shrimp FMP would have on future levels of take; i.e., whether the estimated past take levels would increase or decrease and by how much, or whether the same levels would continue in the future. In summary, the changes to the agency action (i.e., management and operation of the South Atlantic federal shrimp fishery) proposed in Amendment 6 to the South Atlantic Shrimp FMP would not impact the manner in which the fishery interacts with the smalltooth sawfish, and, therefore, would not cause additional take.

5.3 Summary of Effects

The South Atlantic federal shrimp fishery directly affects smalltooth sawfish via incidental capture. Based on the best available information, the South Atlantic federal shrimp fishery as it currently operates is expected to lethally take one smalltooth sawfish annually. Based on our analysis in Section 5.2, the actions and preferred alternatives of Amendment 6 to the South Atlantic Shrimp FMP would not affect the operation of the fishery in any manner that would change the way it interacts with smalltooth sawfish. Implementation of this amendment would therefore not impact the amount or extent of takes anticipated in the South Atlantic Shrimp fishery.

6.0 Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions reasonably certain to occur within the action area or within the range of smalltooth sawfish (i.e., South Atlantic EEZ). Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Throughout the southeastern coastal states urbanization has resulted in substantial loss of coastal habitat through activities such as agricultural and urban development (wetland conversion, flood control and diversion projects, dredge and fill operations). Smalltooth sawfish are particularly vulnerable to coastal habitat degradation because of their affinity for shallow, estuarine systems. Marine pollutants and debris may also negatively impact smalltooth sawfish if it gets caught on their saw and interferes with feeding habits.

Within the action area, state-regulated commercial and recreational fishing activities in the South Atlantic currently result in the incidental take of smalltooth sawfish. It is expected that states will continue to license/permit large vessel and pleasure-boat operations that do not fall under the purview of a federal agency, and issue regulations that will affect fishery activities. Recreational hook-and-line fisheries have been known to take smalltooth sawfish in state waters. Future cooperation between NMFS and the states on these issues should help decrease the take of smalltooth sawfish caused by recreational activities. NMFS will also continue to work with coastal states to develop and refine ESA section 6 agreements and section 10 permits to enhance programs to quantify and mitigate these takes.

In addition to fisheries, NMFS is not aware of any proposed or anticipated changes in other human-related actions (e.g., habitat degradation) or natural conditions (e.g., changes in oceanic conditions, etc.) that would substantially change the impacts that each threat has on smalltooth sawfish covered by this opinion. Therefore, NMFS expects the effects of these actions on smalltooth sawfish will continue at similar levels into the foreseeable future.

7.0 Jeopardy Analyses: Effect of the Proposed Action on Likelihood of Survival and Recovery

The analyses conducted in the previous sections of this opinion serve to provide a basis to determine whether the proposed action would be likely to jeopardize the continued existence of smalltooth sawfish known to interact with the South Atlantic federal shrimp fishery. In Section 5.0, we outlined how interaction with the South Atlantic federal shrimp fishery may affect individual smalltooth sawfish and the extent of those effects in terms of an estimate of annual take.

We now assess the smalltooth sawfish's response to this impact, in terms of overall population effects from the estimated take, and whether those effects of the proposed action, when added to the status of the species (Section 3.0), the environmental baseline (Section 4), and the cumulative effects (Section 6.0), will jeopardize the continued existence of smalltooth sawfish.

"To jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and the recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). Thus, in our jeopardy determination we first look at whether there will be a reduction in the reproduction, numbers, or distribution. Then, if there is a reduction in one or more of these elements, we evaluate whether it will cause an appreciable reduction in the likelihood of both the survival and the recovery of the species when added to the status of the species (Section 3.0), the environmental baseline (Section 4), and the cumulative effects (Section 6.0).

The proposed action is expected to result in the lethal take of one mature smalltooth sawfish annually. This lethal take would result in a reduction in the number of smalltooth sawfish. This lethal take could also result in a potential reduction in future reproduction if that individual were a female and would have survived other threats and reproduced in the future. Reductions in the distribution of the smalltooth sawfish would not occur, as one take would have no bearing on the overall position, arrangement, or frequency of its U.S. DPS range.

Whether the reduction in numbers and reproduction of smalltooth sawfish attributed to the South Atlantic federal shrimp fishery would appreciably reduce the species' likelihood of survival and recovery depends on the probable effect the changes in numbers and reproduction would have on the population's growth rate, and whether the growth rate would allow the species to recover.

Available data summarized in Section 3.0 indicate the smalltooth sawfish population is increasing. Using a demographic approach and life history data from similar species, Simpfendorfer (2000) estimates the most likely range for the intrinsic rate of increase is 0.08 per

year to 0.13 per year with population doubling times of 10.3 to 13.5 years. Although this rate is very slow, the lethal take of one individual is not expected to have any impact on this rate. The proportional change in overall survival and recovery of smalltooth sawfish from the lethal take of one smalltooth sawfish would therefore be insignificant. Based on this information, we believe the proposed action will not appreciably reduce the smalltooth sawfish's likelihood of surviving and recovering in the wild. We therefore conclude the proposed action is not likely to jeopardize the continued existence of this species.

8.0 Conclusion

Based on our review of the best available scientific and commercial data, current status of the species, environmental baseline, effects of the proposed action, and cumulative effects, it is our opinion that the continued authorization of the South Atlantic federal shrimp fishery under the South Atlantic FMP is not likely to jeopardize the continued existence of smalltooth sawfish.

9.0 Incidental Take Statement (ITS)

Section 9 of the ESA and protective regulations issued pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of the opinion on that agency action.

This opinion establishes an ITS and RPMs and terms and conditions for smalltooth sawfish in the South Atlantic federal shrimp fishery. The ITS, RPMs, and terms and conditions regarding take of sea turtles in the 2002 opinion remain applicable, required, and in force for the fishery.

9.1 Anticipated Amount or Extent of Incidental Take

NMFS anticipates the annual incidental lethal take of up to one smalltooth sawfish may occur as a result of the continued operation of the South Atlantic shrimp fishery.

9.2 Effect of the Take

NMFS has determined one lethal take annually as specified in Section 9.1 is not likely to result in jeopardy to smalltooth sawfish.

9.3 Reasonable and Prudent Measures (RPMs)

Section 7(b)(4) of the ESA requires that when an agency action is found to comply with section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of listed species NMFS will issue a statement specifying the impact of any incidental taking. It also states that RPMs necessary to minimize impacts, and terms and conditions to implement those measures

must be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency or applicant that complies with the specified terms and conditions is authorized.

The RPMs and terms and conditions are specified as required by 50 CFR 402.14 (i)(1)(ii) and (iv) to document the incidental take by the proposed action and to minimize the impact of that take on smalltooth sawfish. These measures and terms and conditions are non-discretionary, and must be implemented by NMFS in order for the protection of section 7(o)(2) to apply. NMFS has a continuing duty to regulate the activity covered by this incidental take statement. If NMFS fails to adhere to the terms and conditions of the incidental take statement through enforceable terms, and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of the incidental take, F/SER2 must report the progress of the action and its impact on the species to F/SER31 as specified in the incidental take statement [50 CFR 402.14(i)(3)].

NMFS has determined that the following RPMs are necessary and appropriate to minimize impacts of the incidental take of smalltooth sawfish during shrimp trawling.

1. NMFS must ensure that fishermen are aware of the endangered status of the smalltooth sawfish and that the anticipated smalltooth sawfish take is handled in such a way as to minimize stress to the animal and increase its potential for survival.

2. NMFS must ensure that monitoring and reporting of any smalltooth sawfish encountered (1) detects any adverse effects resulting from the South Atlantic shrimp fishery; (2) assesses the actual level of incidental take in comparison with the anticipated incidental take documented in that opinion; (3) detects when the level of anticipated take is exceeded; and (4) collects improved data from future encounters.

9.4 Terms and Conditions

In order to be exempt from liability for take prohibited by section 9 of the ESA, NMFS must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

The following term and condition implements RPM No. 1.

1. SERO must develop outreach materials (e.g., fact sheets) that provide information on the status of the smalltooth sawfish and handling guidelines; these materials must be mailed to existing rock shrimp permit holders and with any permit issued for the first time (e.g., new penaeid permits).

The following terms and conditions implement RPM No. 2.

1. At least some of the shrimp observer trips must be from areas typically fished off Florida, where smalltooth sawfish interactions are most likely to occur.

2. If feasible, observers should provide a total length measurement of the fish and the location where it was captured.

3. F/SER2 must collaborate with the SEFSC to ensure the following information is collected and reported to F/SER3 annually, based on available information:
   a. A total length measurement and location (i.e., lat./long. and net position)
   b. Total observed fishing effort
   c. Observer coverage levels obtained in the commercial South Atlantic federal shrimp fishery

4. F/SER2, in collaboration with F/SER3 and the SAFMC, must develop and implement a method to collect smalltooth sawfish take information from all permitted shrimp vessels operating within the range of smalltooth sawfish (e.g., annual fishing questionnaire, logbooks, regulation).

10.0 Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The following additional measures are recommended:

1. NMFS should conduct or fund research on the demographic, behavioral, spatial, and temporal patterns of smalltooth sawfish in South Atlantic waters to improve understanding of the co-occurrence between the South Atlantic federal shrimp fishery and the smalltooth sawfish.

2. NMFS should conduct or fund surveys or other alternative methods for determining smalltooth sawfish abundance in shrimp trawling areas off Florida, adjacent to areas where smalltooth sawfish are believed to occur in the greatest concentration.

3. NMFS should work to further cooperation between the South Atlantic shrimp industry and NMFS to better understand the nature of smalltooth sawfish interactions.

4. NMFS should evaluate data gathered on sawfish bycatch in Australia's northern prawn fishery for its applicability to the U.S. shrimp fishery.

11.0 Reinitiation of Consultation

This concludes formal consultation on the effects of the South Atlantic federal shrimp fishery on smalltooth sawfish. As provided in 50 CFR 402.16, reinitiation of formal consultation is required if discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of the taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may affect

listed species or critical habitat (when designated) in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, F/SER2 must immediately request reinitiation of formal consultation.

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