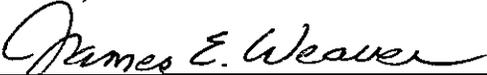


**Endangered Species Act - Section 7 Consultation
Biological Opinion**

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 Fishing under the Fishery
Management Plan (FMP) for Coastal Migratory Pelagic
Resources in the Atlantic and Gulf of Mexico (CMPR FMP)

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

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

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Introduction.....	1
1.0 Consultation History.....	2
2.0 Proposed Action.....	5
3.0 Status of Species.....	21
4.0 Environmental Baseline.....	53
5.0 Effects of the Action.....	70
6.0 Cumulative Effects.....	93
7.0 Jeopardy Analysis.....	93
8.0 Conclusion.....	100
9.0 Incidental Take Statement (ITS).....	100
10.0 Conservation Recommendations.....	103
11.0 Reinitiation of Consultation.....	104
12.0 Literature Cited.....	105
Appendix A.....	127

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 such 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.

Section 7 consultations on most listed marine species are conducted between the action agency and NMFS. These consultations are concluded after NMFS has determined that an

action is not likely to adversely affect listed species or designated critical habitat, or issues a biological opinion (opinion) identifying whether the proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify any critical habitat. If jeopardy or destruction or adverse modification is found to be likely, the opinion must identify any reasonable and prudent alternatives (RPAs) to the action 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 its continued authorization of CMPR fishing in the U.S. Atlantic and Gulf of Mexico (GOM) Exclusive Economic Zone (EEZ) on threatened and endangered species and designated critical habitat, in accordance with section 7 of the ESA. NMFS has dual responsibilities as both the action agency under the Magnuson-Stevenson Fishery Conservation and Management Act (MSFCA) (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 the original CMPR FMP and subsequent amendments to the CMPR FMP, particularly CMPR Amendment 15 (GMFMC *et al.* 2004); sea turtle recovery plans; past and current sea turtle research and population modeling efforts; the smalltooth sawfish status review (NMFS 2000a); final ESA smalltooth sawfish listing rule (68 FR 16674); and recent smalltooth sawfish publications (e.g., Poulakis and Seitz 2004, Simpfendorfer and Wiley 2004); Atlantic *Acropora* status review (*Acropora* Biological Review Team 2005); the final ESA listing rule for elkhorn and staghorn corals (71 FR 2652); Northeast Fishery Science Center Observer Program data; logbook data; Sea Turtle Stranding and Salvage Network (STSSN) data; opinions on relevant fisheries; other relevant scientific data and reports; and discussion with F/SER2 staff.

1.0 Consultation History

Previous Consultations

An informal section 7 consultation was conducted on the original FMP (NMFS 1983). NMFS concluded that the management measures proposed in the CMPR FMP were not likely to adversely affect any listed species under the ESA. The consultation did not analyze the effects of the actual operation of the fisheries.

The effects of CMPR fisheries on endangered and threatened species were first considered in an April 28, 1989, opinion, which analyzed the effects of all commercial fishing activities in the Southeast Region as part of a formal section 7 consultation on NMFS' Marine Mammal Authorization Program (NMFS 1989a). The opinion concluded that commercial fishing activities in the southeastern United States were not likely to jeopardize the continued existence of threatened or endangered species. The incidental take of ten Kemp's ridley, green, hawksbill, or leatherback sea turtles; 100 loggerhead sea turtles; or 100 shortnose

sturgeon was allotted to each fishery identified in the ITS. The CMPR hook-and-line and gillnet fisheries were two of the fisheries identified. The amount of incidental take was later amended by a July 5, 1989, opinion, which reduced the amount of take to only ten documented Kemp's ridley, green, hawksbill, or leatherback sea turtles; 100 loggerhead sea turtles; or 100 shortnose sturgeon for all commercial fishing activities conducted in the Atlantic Ocean and the Gulf of Mexico fisheries combined (NMFS 1989b).

On November 6, 1991, a formal section 7 consultation on Amendment 6 to the FMP was initiated. The resulting August 19, 1992, opinion on the effects of commercial fishing activities under the CMPR FMP and Amendment 6 found that the regulatory actions were not likely to adversely affect listed species (NMFS 1992). Additionally, the opinion concluded fishing activities conducted under the authority of the CMPR FMP might affect, but were not likely to jeopardize, the continued existence of listed sea turtles. An incidental take statement with associated RPMs and terms and conditions was issued; conservation recommendations were also made. The incidental take levels for listed species for all fisheries in the United States established in the July 5, 1989, opinion were retained. Nevertheless, the August 19, 1992, opinion also stated that section 7 consultation was to be reinitiated if the total documented incidental take of Kemp's ridley, green, hawksbill, or leatherback sea turtles met or exceeded five, or twenty-five loggerhead sea turtles, for the combined gillnet and hook-and line-fisheries for CMPR.

Subsequent amendments to the CMPR FMP and emergency actions were all either consulted on informally and found not likely to adversely affect any threatened or endangered species, or were determined by F/SER2 to have no effect and not warrant consultation. None of the actions were found to change the prosecution of CMPR fisheries in any manner that would alter the findings of the August 19, 1992, opinion.

Present Consultation

On November 8, 2004, F/SER2 sent a memorandum to F/SER3 requesting initiation of the section 7 consultation process on Amendment 15 to the CMPR FMP. Through this amendment and its associated rule, F/SER2 sought to implement two actions: (1) Establish an indefinite limited access program for the federal king mackerel fishery, and (2) change the fishing year for Atlantic migratory group king and Spanish mackerel from April 1 through March 31 to March 1 through February 28 or 29 for the Atlantic groups of king and Spanish mackerel. To help restrict harvest in the king mackerel fishery, a moratorium on the issuance of new commercial vessel permits was established in 1998 and was scheduled to expire in October 2005. Amendment 15 effectively extended that moratorium indefinitely, by establishing a limited access program for the federal king mackerel fishery. The intent of the program was to maintain the commercial king mackerel fishery at current levels of participation and possible reductions through attrition. The fishing year change was intended to ensure mackerel fisheries in the Atlantic would be open during March when several other fisheries (e.g., snapper-grouper) would be closed.

When consulting on FMP amendments, NMFS must consider not only the effects of specific management measures being proposed, but also the effects of all discretionary fishing activity authorized under the amended FMP. Therefore, the proposed action potentially

subject to section 7 consultation was the continued authorization of fishing under the CMPR FMP.

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) if a new species is listed or critical habitat designated that may be affected by the identified action. These criteria were considered by F/SER3 in determining whether to reinitiate section 7 consultation on CMPR fisheries.

Based on F/SER3's review of the reinitiation criteria, we determined reinitiation of formal consultation was warranted on fishing activities authorized under the CMPR FMP to address new information on sea turtles and the newly listed smalltooth sawfish, elkhorn coral, and staghorn coral. NMFS had no data indicating the take specified in the August 20, 1992, ITS had been exceeded. However, over the twelve years that have elapsed since then, new information on the status of listed sea turtle species and the effect actions have on them had become available. Thus, the environmental baseline to which effects from the CMPR fisheries are added onto when considering overall impact to each sea turtle species had changed. Additionally, two new species have been listed under the ESA. In April 2003, NMFS listed the U.S. distinct population segment (DPS) of smalltooth sawfish, which may be adversely affected by hook-and-line and gillnet fisheries, as endangered under the ESA. In May 2006, NMFS listed elkhorn and staghorn corals as threatened under the ESA.

In a February 14, 2005, memorandum to the file (File 1514-22.d, CMPR FMP), we determined that allowing the CMPR fisheries to continue during the reinitiation period would not violate Section 7(a)(2) or 7(d). This allowed review and implementation of Amendment 15 to proceed while the consultation process for the entire fishery continued. The final rule implementing Amendment 15 was published on July 7, 2005 (70 FR 39187).

On April 6, 2005, F/SER2 requested initiation of the section 7 consultation process on the proposed implementation of Final Generic Amendment 3 for addressing essential fish habitat requirements, habitat areas of particular concern, and adverse effects of fishing in FMPs of the GMFMC. The proposed action included establishing essential fish habitat for CMPR species in the Gulf of Mexico.

F/SER3 reviewed Generic Amendment 3 to determine if the changes to the agency action (i.e., management and operation of the CMPR fisheries) to be implemented triggered any additional basis for reinitiating formal consultation on the CMPR fishery. The measures proposed were determined to not modify fishing activities under the CMPR FMP in a manner that causes an effect to listed species of critical habitat. On August 25, 2005, we determined that the measures proposed in Generic Amendment 3 would not modify fishing activities under the CMPR FMP during the consultation period in any way that would invalidate the

previous Section 7(a)(2) or 7(d) determination. The final rule to implement Generic Amendment 3 was published on December 20, 2005.

During this consultation period, F/SER3 sought additional information numerous times from F/SER2, NEFSC, SEFSC, and Council staff to gather the best data for this consultation. Consequently, this consultation has had an extended consultation period.

2.0 Proposed Action

F/SER2 is proposing to continue its authorization of the CMPR fishery via the CMPR FMP and implementing regulations at 50 CFR Part 622 under the authority of the MSFMCA. The MSFMCA is the governing authority for all fishery management activities that occur in federal waters within the United States' 200-nautical-mile limit, or Exclusive Economic Zone (EEZ). Responsibility for federal fishery management decision making under the CMPR FMP is divided between NMFS, and jointly, the Gulf of Mexico Fishery Management Council (GMFMC), South Atlantic Fishery Management Council (SAFMC), and Mid-Atlantic Fishery Management Council (MAFMC). This opinion analyzes the effects of all fishing activities prosecuted under the CMPR FMP, as amended to date.

Amendment 15 to the CMPR FMP provides a detailed description of the fishing activity authorized under the CMPR FMP. Amendment 17 to the CMPR FMP provides additional background on the for-hire component of the fishery. The following sections provide a brief summary of the biology and status of the three major species managed under the CMPR FMP and the fishery authorized under the FMP for these species, with an emphasis on the characteristics relevant to the analysis of its potential effects on threatened and endangered species.

2.1 Description of Managed Species

The CMPR fishery management unit includes king mackerel, Spanish mackerel, cobia, cero, little tunny, dolphin (Gulf of Mexico only), and bluefish (Gulf of Mexico only). Species for which there are species-specific regulations include king mackerel, Spanish mackerel, and cobia. The biology and stock status of these three species are briefly described here.

2.1.1 Biology

King Mackerel

King mackerel is a pelagic species, which occurs to depths of 200 m throughout the Gulf of Mexico and Caribbean Sea, and in the western Atlantic, from the Gulf of Maine, USA, to Brazil. Adults are typically found in the southern portion of the species range in the winter and in the northern portion of the range in the summer. This seasonal migratory pattern is likely a response to both water temperature and food availability. Larger individuals are often solitary and occur around structures, such as wrecks and oil rigs (GMFMC and SAFMC 1981). Smaller individuals form immense schools, which tend to congregate in areas of bottom relief, such as holes or reefs. Sometimes small king mackerel run in schools of similarly sized Spanish mackerel (GMFMC and SAFMC 1985; MSAP 1996; Brooks and

Ortiz 2004). Their diet is composed primarily of other fish species, such as herring, sardines, and menhaden; however, they also eat squid. They are preyed on by larger pelagic species, such as sharks (GMFMC and SAFMC 1985).

Spanish Mackerel

Spanish mackerel is a pelagic species, which occurs to depths of 75 m throughout the Gulf of Mexico and in the western Atlantic from southern New England to the Florida Keys (Collette and Russo 1979). This species is usually found inshore and, like king mackerel, exhibits seasonal migratory behavior. Adults generally move from wintering areas off south Florida and Mexico to more northern latitudes in the spring and summer. Spanish mackerel form immense schools of similar sized individuals (GMFMC and SAFMC 1981), and feed primarily on other fish species, such as herring, sardines, and menhaden, but also on crustaceans and squid. They are preyed on by larger pelagic species, such as sharks, tunas, and the bottlenose dolphin (GMFMC et al. 2004).

Cobia

Cobia is a large, pelagic and epibenthic species, which occurs to depths of 125 m. They range throughout the Gulf of Mexico and Caribbean, and in the western Atlantic, from Massachusetts, USA, to Argentina. Adults generally migrate south to warmer waters during the fall and winter seasons, and then swim north when temperatures increase in the spring. This species is often found near wrecks, reefs, pilings, buoys, and floating objects (GMFMC and SAFMC 1981), and feeds on crabs, fishes, and squids.

2.1.2 Status

The Gulf migratory groups of king and Spanish mackerel were determined to be overfished in the mid 1980s, and a rebuilding program was implemented. Neither the Atlantic nor Gulf groups of king mackerel or Spanish mackerel are currently considered overfished or undergoing overfishing. However, the Gulf group of king mackerel has not been rebuilt to a biomass level that supports harvests at maximum sustainable yield (MSY). In 2004, cobia's status was moved from unknown to not undergoing overfishing and not overfished (NMFS 2005).

2.2 Description of Fishing Gear Characteristics and Techniques

The three main gear types used in the CMPR fishery are hook-and-line, cast net, and gillnet.

2.2.1 Hook-and-Line Gear

Hook-and-line gear includes handline, rod-and-reel, and bandit gear. Commercial vessels use all three types of hook-and-line-gear. Recreational fishers use only rod-and-reel gear. Trolling is the most common fishing technique employing hook-and-line gear, and is used by both commercial and recreational fishers. Recreational fishers also employ a technique called jigging.

Trolling

Trolling involves towing one or more monofilament lines with artificial spoons, feathered jigs, or hooks commonly baited with mullet or menhaden through the water behind a slow moving vessel. Commercial fishers typically troll in concentric circles over schools of fish. They may employ as many as eight lines simultaneously, and generally retrieve their lines with electric reels. Commercial vessels targeting Spanish mackerel typically troll at speeds between 3 and 5 knots. Those vessels targeting king mackerel sometimes troll at faster speeds (B. Hartig, pers. comm., South Atlantic King and Spanish Mackerel Advisory Panel).

Charter vessel fishers often use four lines: two unweighted lines for fishing at the surface, and two weighted lines at some depth below the surface. Private boat fishers also use this technique, but generally troll fewer lines and remain closer to shore (GMFMC and SAFMC 1981). Most recreational fishers retrieve their lines manually. Recreational fishers typically troll in a straight line back and forth on the perimeter of a school.

The commercial hook-and-line vessels operating off Florida typically troll for king mackerel with no. 8 or 9 trolling wire. Planers are used to capture fish at the surface and at various depths. Mullet is the most frequently used bait with planers. Some commercial fishers also troll bandit gear, fishing just below the surface (B. Hartig, pers. comm., South Atlantic King and Spanish Mackerel Advisory Panel).

The commercial hook-and-line vessels operating off North Carolina typically troll with bandit gear and large planers during daylight hours. They also use rod and electric reels to troll 100-pound monofilament line along the surface. In both cases, spoons and SeaWitch lures with dead bait (e.g., frozen cigar minnows or strip bait) are used. Trolling speeds are typically 4 to 6 knots. Vessels fishing at night often use rod-and-reels equipped with much smaller 17-20 pound test line, with a wire leader to target mackerel at the surface (J. Gay, pers. comm., South Atlantic King and Spanish Mackerel Advisory Panel Member).

Jigging

Jigging involves casting a lure or bait into the water and retrieving it with a jerking motion, keeping the lure or bait near the surface of the water. This fishing method is used from fixed platforms or from boats when the boat is near a surface or underwater structure. Fishers using this technique catch mostly Spanish mackerel. They often use rod-and-reel with a Clark spoon, fished from a drifting or anchored boat using Clark spoons along the surface. When spoons are used, their size depends on the size of the target species; #2 Clark and #4 Clark are commonly used, or sometimes a king mackerel 3 1/2 spoon, if fishing for large fish (B. Hartig, pers. comm., South Atlantic King and Spanish Mackerel Advisory Panel). Chum is used to bring fish to the surface; glass minnows or small sardines are most frequently used.

2.2.2 Cast Nets

A cast net is a circular, hand-held net with weights attached to the perimeter. The basic structure of a cast net includes a handline,¹ swivel,² horn,³ brail lines,⁴ netting, and leadline

¹ A rope, attached at one end to a swivel and the caster's wrist at the other.

² Two metal loops or rings attached together that turn at both ends.

(http://www.justcastnets.com/about_nets.php).⁵ When cast properly, the net opens up and lands on the surface of the water in a flat circular shape. The leadline causes the net to sink quickly, trapping fish underneath the net. When the handline is pulled, the brail lines draw up, closing the net to form a pocket, catching the trapped fish. The whole net is then pulled out of the water.

Cast nets used by commercial fishers to target mackerel are different from standard cast nets used to target bait (M. Gamby, pers. comm., NMFS Port Agent). The net is constructed of panels just like a regular cast net, but there is no horn. The mesh size used varies, but normally ranges from 3.25-inches to 4.5-inches stretched. Some fishers carry several different mesh sizes onboard so they can select the one they expect to best gill the size of target species they encounter. Commercial cast nets used for mackerel are normally about 14 feet in length from the top mesh to the leadline. However, some fishers prefer shorter nets (11-12 ft long) because they are easier to throw or hold. The weight of the leadline also varies; some prefer heavier line, and others prefer lighter line.

2.2.3 Gillnets

A gillnet is a vertical wall of monofilament or twine netting designed to wedge and gill fish as they attempt to swim through. Wedging occurs when an animal is stuck in the mesh at its point of greatest girth. Gillnetting occurs when a fish penetrates the mesh and the twine slips behind the gill cover preventing the fish from escaping. Gillnets are also known to entangle non-targeted fish and other marine organisms (DeAlteris 1998).

Gillnets are generally characterized as drift (unanchored), set (anchored), or run-around. A drift gillnet is defined in 50 CFR Part 622.2 as a gillnet, other than a long gillnet or a run-around, that is unattached to the ocean bottom, regardless of whether attached to a vessel. A long gillnet is defined in 50 CFR Part 622.2 as any gillnet that has a float line longer than 1,000 yards (914 m). Both driftnets and long gillnets are prohibited in the CMPR fishery. Set nets are not defined in NMFS' regulations at 50 CFR Part 622.2, but typically refer to stationary anchored nets. Set nets may be further characterized as sinking or floating. Run-around gillnets are defined in 50 CFR Part 622.2 as gillnets other than long gillnets that, when used, enclose an area of water. Sink gillnets and run-around gillnets are used in the CMPR fishery and are discussed in more detail below.

Sink Gillnets

A sink gillnet is not explicitly defined in 50 CFR Part 600.10 or 622, but refers to a gillnet that has the top line submerged beneath the water. Most sink gillnets used are stabnets. A stabnet is legally defined in 50 CFR Part 622.2 as a gillnet, other than a long gillnet or

³ A ring with an indentation around the center where the top of the net is tied.

⁴ Lines attached to the swivel at one end and to the leadline at the other. Their function is to pucker the net, thus trapping the catch.

⁵ A rope with sinkers attached, this rope is at the outside perimeter of the net to sink it.

trammel net⁶, whose weight line sinks to the bottom and submerges the float line. The term is commonly used to refer to a type of sink gillnet fishing technique that is fished in an active manner. Stabnets are set near schools of mackerel located with fish finders. Soak times are relatively short because fishers generally believe any catches will occur shortly after setting the net. Although federal regulations do not require fishers to tend their nets, they often do to avoid capturing unwanted bycatch and to ensure strong currents do not foul the gear.

Sink gillnets are commonly used in federal waters off North Carolina, and frequently used to target Spanish mackerel. Sink gillnets also are used to target king mackerel in the Atlantic. Fishers usually fish 5 or 6 nets (each 400 yards-in length) simultaneously, moving from one net to another throughout the day. They generally fish the gear within a couple of hours, depending on the catch (GMFMC et al. 2004).

Run-Around (Strike) Gillnets

Run-around gillnets are often used in conjunction with spotter aircraft to actively encircle a school of fish (Steve et al. 2001). The aircraft are used to spot schools of mackerel before the nets are struck or set. The pilots instruct the vessel in how to deploy the net. In general, the nets are set encircling the school, or a part of the school, and then closed off. The process of setting, retrieving, and unloading a net can take several hours. If the net is set during the day, it is frequently left in the water until dusk when the fish cannot see as well, thus are unlikely to find a way to escape. Following placement of the net, movement of fish into the net to become gilled is stimulated by the use of noise (e.g. revving the engine, striking the water) or light. The net is then retrieved using a mechanical drum elevated above the rear deck of the vessel, starting with the last part set, and laying the net on the deck for storage. The fish are typically not removed from the net until the boat is docked. Virtually all fish have to be cut out of the net. Any animals not gilled would be able to escape as the net is being pulled in (i.e. not retrieved like a seine) (M. Godcharles pers. comm. 2006).

Run-around gillnets are used in Gulf of Mexico federal waters off Collier and Monroe Counties to target king mackerel. These nets are most commonly 4.75-inch stretched nylon mesh (the minimum size mesh allowed), with a center band of monofilament. They can fish most effectively in waters 55 to 60 feet in depth. Spotter planes are utilized in this fishery and net deployment and retrieval techniques are similar to those mentioned above (GMFMC et al. 2004).

The run-around gillnets used to target king mackerel in the Atlantic are very similar to the sink gillnets also used to target king mackerel in the Atlantic. Fishers utilize 5- to 6-inch (12.7 to 15.24 cm) stretched-mesh nets and often fish 5 or 6 nets (400 yards in length) simultaneously, working from one net to another throughout the day. They generally fish the gear for a couple of hours depending on the catch (GMFMC et al. 2004).

⁶ 50 CFR 622.4 defines a trammel net as two or more panels of netting, suspended vertically in the water by a common float line and common weight line, with one panel having a larger mesh size than the other(s), to entrap fish in a pocket of netting

2.3 Description of Fishery

2.3.1 Gulf of Mexico

King mackerel and Spanish mackerel are important target species of commercial, recreational, and for-hire fishers throughout the Gulf of Mexico region, particularly in South Florida. King mackerel are particularly important to the charter boat and offshore private boat fleets (GMFMC et al. 2004).

King Mackerel

Commercial king mackerel fisheries operating off the west coast of Florida utilize both hook-and-line and gillnet gear. Those operating off Alabama, Mississippi, Louisiana, and Texas utilize only hook-and-line gear. The majority of king mackerel landings come from the western Gulf of Mexico (S. Branstetter pers. comm.) and off south Florida from November through March. A winter troll fishery operates along the east and south Gulf of Mexico coast, and a run-around gillnet fishery operates off the Florida Keys (Monroe County) during January (GMFMC et al. 2004).

Run-around gillnets accounted for the majority of the catch from the late 1950s through 1982, in 1986, and in 1993 (Vondruska, 2000). The commercial gillnet fishery has a long history in south Florida, particularly in the Florida Keys. However, the use of this gear has been greatly restricted under state and federal regulations. Compared with 100 vessels in 1998, 27 vessels were permitted to participate in this fishery in 2004. Although the vessels have the capacity to land more, they are restricted by area and seasonal closures, as well as a 25,000-pound trip limit. Only 10 percent of the logbook-reported gillnet trips during 2000-2003 landed more than 7,000 to 20,000 pounds of king mackerel. Currently, only about 16 percent of commercial catches are taken with run-around gillnets; the remaining 84%, with hook-and-line gear. Handline gear has been the predominant gear used in the commercial king mackerel fishery since 1993, and accounted for 69 percent of the catch in 2003 (GMFMC et al. 2004).

Recreational fishing for king mackerel is an important component of the coastal economies in many areas. This fishery, which utilizes hook-and-line gear, landed between 6.0 and 7.5 million pounds annually from 1992 to 1997, and from 4.0 to 5.2 million pounds during the last three years (1999/00 through 2001/02) (Ortiz 2004).

Spanish Mackerel

Historically, the majority of commercial Spanish mackerel landings was taken by gillnets in state waters off the west coast of Florida. Commercial landings of Gulf group Spanish mackerel ranged from approximately 1.1 to 4.2 million pounds from fishing years 1987/88 through 1994/95 (MSAP 2003) before declining significantly following the passage of a constitutional amendment banning gillnets and certain other net gear in Florida state waters in 1995. Catches during the last three years (2001/02 through 2003/04) ranged from approximately 0.6 to 1.6 million pounds (NMFS unpublished data in CMPR Amendment 15). Run-around gillnets are still the primary gear used to harvest Spanish mackerel, followed distantly by handlines and cast nets.

Recreational catches of Spanish mackerel in the Gulf of Mexico have remained relatively stable at around 2.0 to 3.0 million pounds since the early 1990's, despite Council action to increase the bag limit from 3 fish in 1987, to 10 fish in 1992, and to 15 fish in 2000 (NMFS 2003a). The reduced popularity of Spanish mackerel compared with king mackerel and other offshore stocks is believed to keep catches from increasing in response to less restrictive management measures.

2.3.2 Atlantic

King and Spanish mackerel are major target species of commercial fisheries off Florida and North Carolina, as well as major target species for the private boat and charter boat recreational fishery throughout the Atlantic region. Only small amounts of king and Spanish mackerel are taken as incidental or supplemental catch during fishery operations off Georgia and South Carolina. Even smaller amounts of king and Spanish mackerel, <1,000 and <10,000 pounds respectively, are harvest by hook-and-line gear north of North Carolina.

King Mackerel

Gillnets were the predominant gear used to harvest Atlantic group king mackerel from 1966 to 1988. However, because of various state and federal restrictions on the use of gillnets, most (98%) king mackerel are now captured with handline gear (GMFMC et al. 2004).

Commercial landings were relatively stable at approximately 1.7 to 2.0 million pounds (MP) during the 2001/02 through 2003/04 fishing season (NMFS 2003a; NMFS unpublished data). Landings have increased to approximately 2.8 and 2.1 MP during the 2004/05 & 2005/06 fishing season, respectively (SAFMC et al. 2006). These increases are still well below the quota allocation of 3.7 million pounds. Ninety-eight percent of the commercial allocation is taken with hook-and-line gear; the remaining 2 percent is taken primarily in state waters off North Carolina using sink nets, with most effort expended in November and December. From 1999 to 2003, 90 percent of gillnet trips targeting king mackerel were conducted south of Cape Hatteras within three miles from shore using sink gillnets. Fishers also used sink gillnets in federal waters, although a small proportion (0.2 %) used run-around gillnets. The peak gillnet fishing months for king mackerel are September through April. Typically, not more than 15 boats participate in this fishery, although this number fluctuates (GMFMC et al. 2004).

The recreational fishery utilizes hook-and-line gear. While the number of recreational participants has generally increased over time, catches of Atlantic group king mackerel have remained relatively stable at slightly over 4.0 million pounds during most years from the early 1990s through 2002 (SEDAR 5 2004a).

Spanish Mackerel

Though the effect of the State of Florida's 1995 prohibition on the use of various net gear had more of an impact on the Florida west coast (state waters extend to 9 nautical miles from shore), it also reduced landings on the Florida east coast (state waters extend to 3 nautical miles from shore). Reportedly, Spanish mackerel were concentrated more in state rather than federal waters off the Florida east coast in 2001-2003 than in 1995-2000, and cast nets may

be used in state waters. Consequently, cast nets have become an increasingly important gear in the Spanish mackerel fishery, accounting for 1.88 MP out of 3.20 MP in 2003, or approximately 59 percent of the total South Atlantic Spanish mackerel harvest, followed by “other” gillnets (14%), run-around gillnets (11%), and handlines (10%). The majority of the landings from the Atlantic occur in the late fall-early winter seasons (December through February). Most cast net fisheries operate from October through March off the east coast of Florida, and from May through October further north (GMFMC et al. 2004).

Though cast nets account for a greater percentage (58%) of the total Spanish mackerel landings, Spanish mackerel remains the primary species targeted by gillnets off the Florida east coast. The main season for this activity is September through December. Beginning in January, many of the fishers using gillnets switch to shark fishing or participate in the cast net fishery that occurs in state waters. The Spanish mackerel gillnet fishery occurs primarily in an area between Fort Pierce to just north of Cape Canaveral, Florida. Less than 30 vessels are active in the fishery with many being outfitted to use either run-around gillnets or stab nets.

Fisheries operating off North Carolina also target Spanish mackerel with gillnets. North of Cape Hatteras, fishers use sink gillnets only. The federal fishery south of Cape Hatteras uses sink gillnets and run-around gillnets. Over 100 gillnet trips targeting Spanish mackerel were conducted each month from May through October between 1999 and 2003, with effort being greatest during October (over 300 trips). Most trips (90%) occurred south of Cape Hatteras and 96 percent of those trips occurred within state waters. Sink gillnets are the primary gillnet gear used on Spanish mackerel trips (over 99%), followed by float gillnets (0.5%) and run-around gillnets (0.3%). About 10 to 14 vessels typically participate in the summer fishery. An additional 10 to 12 vessels usually participate in the fall fishery, which lands most of the catch after the first of September.

2.4 History of Management

Responsibility for federal fishery management decision-making under the CMPR FMP is divided between NMFS, and jointly, the Gulf of Mexico Fishery Management Council (GMFMC), Mid-Atlantic Fishery Management Council (MAFMC) and the South Atlantic Fishery Management Council (SAFMC) (collectively, referred to as the Councils). These Councils represent the expertise and interests of constituent stakeholders and states. The Councils are responsible for monitoring and proposing revisions to the CMPR FMP, as necessary. The Gulf of Mexico Fishery Management Council was designated as the lead Council for CMPR fishery management responsibilities. NMFS is responsible for implementing the Councils’ proposed management measures after ensuring they are consistent with the MSFCMA and with other applicable laws (e.g., ESA, National Environmental Policy Act, and Administrative Procedure Act).

The original CMPR FMP became effective in February of 1983, and as of December 2006, had been amended 31 times (14 regulatory amendments, one emergency rule, and 16 FMP amendments). The goal of the FMP is to manage the CMPR fisheries to provide the

optimum yield, consistent with the MSFMCA national standards and the following eight FMP objectives:

1. To stabilize yield at MSY, allow recovery of overfished populations, and maintain population levels sufficient to ensure adequate recruitment.⁷
2. To provide a flexible management system for the resource which minimizes regulatory delay while retaining substantial Council and public input in management decisions and which can rapidly adapt to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups or by areas.
3. To provide necessary information for effective management and establish a mandatory reporting system for monitoring catch.
4. To minimize gear and user group conflict.
5. To distribute the TAC of Atlantic migratory group Spanish mackerel between recreational and commercial user groups based on the catches that occurred during the early to mid 1970s which is prior to the development of the deep-water run-around gillnet fishery and when the resource was not overfished.
6. To minimize waste and bycatch in the fishery.
7. To provide appropriate management to address specific migratory groups of king mackerel.
8. To optimize the social and economic benefits of the coastal migratory pelagic fisheries.

A more complete summary of the history of management of the CMP fishery is provided in Appendix 1. All CMPR FMP amendments are posted on the SAFMC's website (<http://www.safmc.net/Library/FisheryManagementPlansAmendments/tabid/395/Default.aspx>).

2.5 Current Regulations

Commercial and recreational fisheries for king mackerel, Spanish mackerel, and cobia are divided into Atlantic migratory and Gulf migratory groups. Fisheries for Atlantic migratory groups and Gulf migratory groups are allocated separate quotas, and managed to constrain catches within those quotas. Primary regulations governing the harvest of CMPR species by each group are described below and summarized in Tables 2.1 and 2.2.

King Mackerel

The Gulf and Atlantic groups of king mackerel mix on the east coast of Florida; however, the extent of mixing is not well understood. For management and assessment purposes, the boundary between groups is specified as the Volusia-Flagler County border on the Florida east coast in the winter (November 1-March 31) and the Monroe-Collier County border on the Florida southwest coast in the summer (April 1-October 31) (Figures 2.1 and 2.2).

The Gulf and Atlantic group fisheries are managed with total allowable catch (TAC) quotas, which are divided between the recreational and commercial sectors. The Gulf group TAC of 10 million pounds is allocated to the commercial and recreational sectors in a 32/68 split.

⁷ This is denoted in the CMPR FMP as the FMP's primary objective

The Atlantic group TAC of 10 million pounds is allocated to the commercial and recreational sectors in a 37/63 split.

The Gulf group commercial allocation is further divided into Eastern and Western Zones at the Florida-Alabama border, with 69 percent of the commercial allocation provided to the Eastern Zone and 31 percent provided to the Western Zone (Figure 1 and 2). The Eastern Zone is further subdivided into two subzones, with 7.5 percent of the allocation going to the area between the Alabama/Florida border and the Collier/Lee County line on the west coast of Florida (Northern Subzone). The remaining 92.5 percent of the commercial quota for the Eastern Zone is allocated between the Florida east coast and Florida west coast (Monroe and Collier Counties – Southern Subzone) in a 50/50 split. The 50 percent of the Eastern Zone quota allocated to the Florida west coast is further divided between the net fishery and hook-and-line fishery in a 50/50 split.

Commercial allocations are managed with minimum size limits, gear, area, and mesh size restrictions, seasonal closures, and trip limit regulations, which vary by geographic area and gear type. The gillnet fishery is restricted to Monroe and Collier counties, and the fishing season opens in January on the Tuesday following the Martin Luther King, Jr., federal holiday. The fishery is open during the first weekend thereafter, but closed on subsequent weekends, until the quota is met and the fishery is closed for the year. Recreational allocations are managed with minimum size limit and bag limit regulations, and some area restrictions imposed on Atlantic group participants.

Spanish Mackerel

For management and assessment purposes, the boundary between Gulf and Atlantic group fisheries is specified as the Dade/Monroe County line in Florida (see Figure 1 or 2). These fisheries are managed with TACs, which are divided between the recreational and commercial sectors. The Gulf group TAC of 9.1 million pounds is allocated to the commercial and recreational sectors in a 57/43 split. The Atlantic group TAC of 7.04 million pounds is allocated to the commercial and recreational sectors in a 55/45 split.

Commercial allocations are managed with minimum size limits, gear and mesh size restrictions, and trip limits. The fishing season extends from April 1 through March 31 of each year, or until the quota has been taken. Gillnet fishers pursuing Spanish mackerel in the South Atlantic EEZ off Florida north of the line directly east from the Miami-Dade/Monroe County, Florida boundary (25°20.4' N. lat.) may not use a float line longer than 800 yds (732 m), set more than one net at a time, or soak their net for more than one hour. Recreational allocations are managed with minimum size limit and bag limit regulations.

Cobia

Commercial and recreational fisheries in the South Atlantic and Gulf of Mexico are managed by a minimum size limit, gear restrictions, and a bag and possession limit.

Table 1.1 Summary of Atlantic CMPR Regulations

Commercial			
Species	Size Limit	Fishing Season/Quota	Bag/Trip Limit
King Mackerel ^{1,2}	24" FL ³	Season opens March 1 and closes when quota met; Quota: 3.71 MP ⁴ In Florida between the Volusia/Brevard and Miami-Dade/Monroe County boundaries, king mackerel are considered to be part of the Atlantic group from April – October 31.	NY to Flagler/Volusia County (FL) from March 1–March 31, the trip limit is 3,500 pounds. Flagler/Volusia to Volusia/Brevard County lines from April 1– October 31, the trip limit is 3,500 pounds. Volusia/Brevard to Miami-Dade/Monroe County from March 1 – October 31, the trip limit is 75 fish. Monroe County (Florida Keys) from March 1 – October 31, the trip limit is 1,250 pounds.
Spanish Mackerel ^{1,5}	12" FL	Season opens March 1 and closes when quota met; Quota: 3.87 MP ⁴	Northern area (GA-NY), the trip limit is 3,500 pounds. Florida trip limit regimes have been modified into stages. Stage I - For the first part of the fishing year, M 1-November 31 the daily trip limit is 3,500 pounds. Stage II Beginning December 1 unlimited daily harvest is allowed on Monday through Friday, with a 1,500-pound trip limit on Saturday and Sunday. When 75% of the adjusted quota is taken (Stage III) all trip limits equal 1,500 pounds. Once the adjusted quota is met (Stage IV), trip limits are further reduced to 500 pounds for the remainder of the fishing year.
Cobia	33" FL ^{1,5}	None	No person may possess more than two cobia, regardless of the number of trips or duration of a trip. ⁴

Recreational			
Species	Size Limit	Fishing Season/Quota	Bag/Trip Limit
King Mackerel	24" FL	No Closed Season; Quota: 6.29 MP ⁴	3 per person off Georgia through New York and 2 per person off Florida. (Bag limit in federal waters off Florida same as state bag limit). Cannot combine state and federal bag limits. ⁶
Spanish Mackerel	12" FL	No Closed Season; Quota: 3.16 MP ⁴	15 per person off Florida through New York. Cannot combine state and federal bag limits.
Cobia	33" FL	None ⁴	2 per person Note: Florida state regulations only allow 1 per person

¹ Permit required

² Authorized gear: For Atlantic king mackerel north of the Cape Lookout, NC Light (34°37.3'N. lat.) all gear is authorized except for drift gillnets and long gillnets. South of the Cape Lookout Light the following gear is authorized: automatic reel, bandit gear, handline, rod & reel. A minimum size of 4.75" stretch mesh required for run-around gillnets. No more than 400,000 pounds may be harvested by purse seines.

³ Fishers may possess undersized king mackerel less than or equal to 5% by weight of the king mackerel on board

⁴ Fish must be landed with heads and fins intact.

⁵ Authorized gear: automatic reel, bandit gear, handline, rod and reel, cast net, run-around gillnet, and stab net. Minimum size of 3.5-in stretch mesh required for all run-around gillnets.

⁶ Charter/headboat operators must possess a charter/headboat vessel permit for Coastal Migratory Pelagics and must comply with bag limits. Persons on charterboats on trips of more than 24 hours may possess up to 2 bag limits

Table 1.2 Summary of Gulf of Mexico CMPR Regulations¹

Commercial			
Species	Size Limit	Fishing Season/Quota	Bag/Trip Limit
King Mackerel	24" FL ¹	No Closed Season; Quota 3.26 MP (subdivided as shown): Eastern Zone: 2,252,160 lbs (total) FL-east subzone: 1,040,625 lbs FL-west subzone: 1,209,374 lbs Northern Hook-and-line 168,750 lbs Southern Gillnets 520,312 lbs Southern Hook-and-line 520,312 lbs Western Zone: 1,010,000 lbs	Eastern Zone: FL East Coast subzone: 11/1 to 3/31 - 50 fish per trip until Feb. 1. If <75% of quota filled, the fish per trip limit is increased to 75 fish until quota reached. 4/1 to 10/31—South Atlantic regulations apply, refer to South Atlantic Council regulation pamphlet. FL West Coast subzone: Gillnets 6:00 a.m. day after the Martin Luther King Jr. federal holiday until gear quota reached—25,000 lbs/ trip FL West Coast subzone: Hook-and-line 7/1 until 75% gear quota—1,250 lbs/trip then 500 lbs/trip until gear quota filled. Western Zone: 3,000 lbs/trip until quota filled.
Spanish Mackerel	12" FL	Season opens April 1 and closes when quota met; Quota: 5.18 MP	None
Cobia	33" FL	No Closed Season	2 per person per day
Recreational			
Species	Size Limit	Fishing Season/Quota	Bag/Trip Limit
King Mackerel	24" FL	No Closed Season; Quota: 6.8 MP	2 per person including captain and crew of for-hire vessels
Spanish Mackerel	12" FL	No Closed Season; Quota: 3.91 MP	15 per person
Cobia	33" FL	No Closed Season	2 per person per day
¹ Fishers may possess undersized king mackerel less than or equal to 5% by weight of the king mackerel on board			

Figure 1.1 King Mackerel Winter Management Boundaries

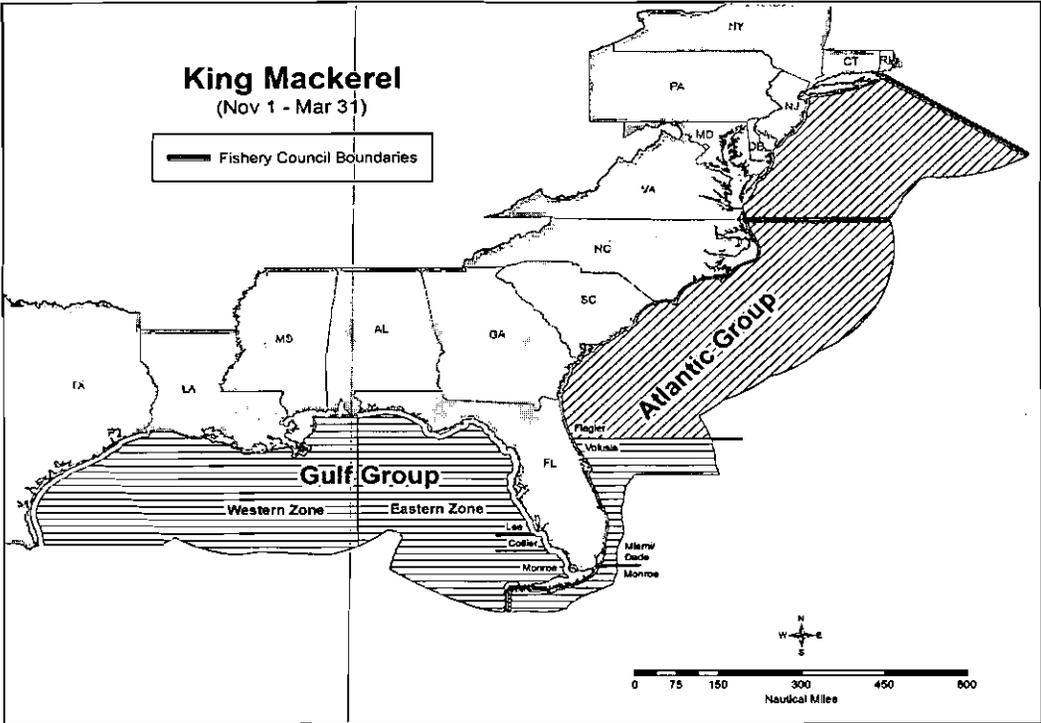
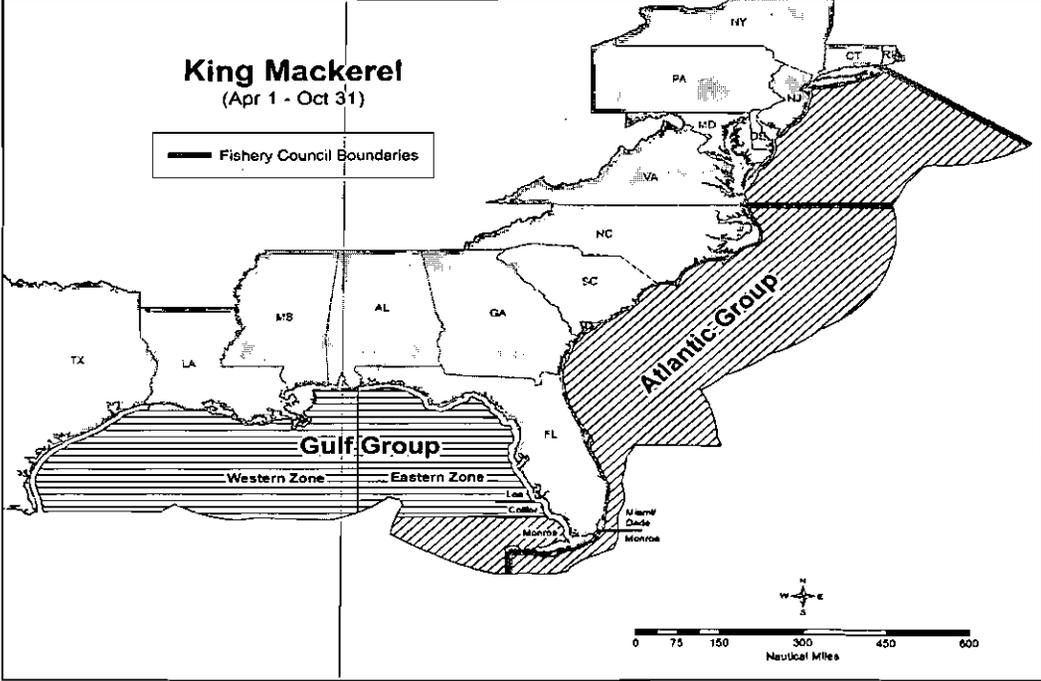


Figure 1.2 King Mackerel Summer Management Boundaries (Apr 1 - Oct 31)



2.6 Current Monitoring and Reporting Requirements

Commercial and charter/headboat participation in the CMPR fishery is monitored via permits. Commercial permits have been required for king mackerel since September 1985. Commercial Spanish mackerel and charter vessel permits were first required in the CMPR fishery in July 1987.

CMPR commercial and headboat catch and effort data per trip are monitored via the Coastal Fisheries Logbook Program (CFLP) and the NMFS Headboat Survey, respectively. CMPR commercial fishers have been required to submit logbooks under this program since 1998. Data collected include the quantity (reported in pounds) caught of each CMPR species, the area of catch, the type and quantity of gear, the dates of departure and return, the dealer and location (county and state where the trip is unloaded), the duration of the trip (time away from dock), an estimate of the fishing time, and the number of crew. Headboat catch and effort data per trip are collected using the NMFS Headboat Survey.

Bycatch data are collected via the Supplementary Discard Data Program (SDDP), implemented in August 2001 to comply with the bycatch reporting mandate of the MSFCMA. The program requires a stratified, random sample (20 percent coverage) of commercial CMPR permit holders to record the number and average size of discards by species and the reasons for those discards (e.g., regulatory, market conditions) for each trip they make during a given year and to submit the information along with their CFLP forms (Poffenberger 2004).

There is currently no observer program in place for the commercial CMPR fishery. However, mackerel gillnet sets are sometimes observed indirectly via other observer programs. For example, between November 1994 and July 2005, NMFS' Northeast Fishery Science Center observed 1,142 mackerel sets off North Carolina, a small percentage of which were conducted in EEZ waters (M. Tork, pers comm.). Also, a few commercial mackerel sets in the Florida EEZ are now occasionally observed indirectly via the Atlantic Shark Observer Program. All directed Atlantic shark permit holders are required to take an observer on a trip, if requested, regardless of the target species. Some observers began to voluntarily record target species data in April 2005. However, a target species field was added to the data form in September 2005, and this information has been required since January 1, 2006.

Participation of private fishers in the CMPR fishery and catch and effort data of both private and charter recreational fishers in the CMPR fishery are monitored mainly by the Marine Recreational Fishery Statistics Survey (MRFSS).

2.7 Exempted Fishing, Scientific Research, and Exempted Educational Activity Involving CMPR Species

Regulations at 50 CFR 600.745 allow NMFS SERO's Regional Administrator to authorize the target or incidental harvest of species managed under an FMP or fishery regulations that would otherwise be prohibited for scientific research activity, limited testing, public display,

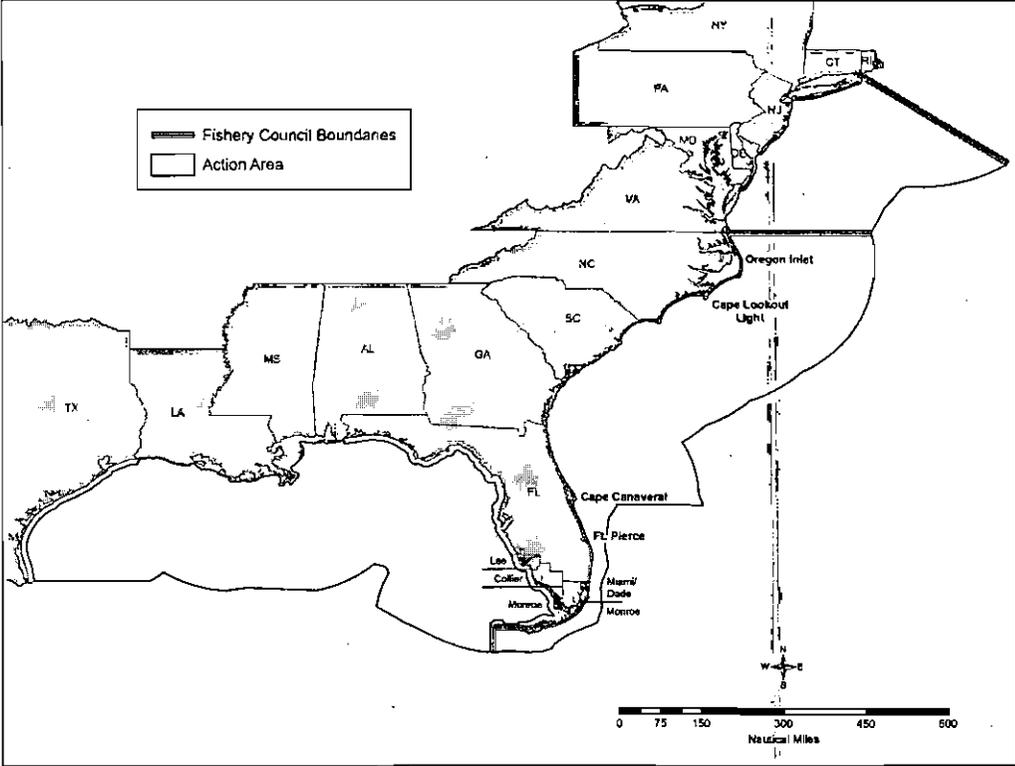
data collection, exploratory, health and safety, environmental cleanup, hazardous waste removal purposes, or for educational activity. Every year, the SERO may issue a small number (e.g., three in 2006, three in 2005, one in 2004) of exempted fishing permits (EFPs), scientific research permits (SRPs), and/or exempted educational activity authorizations (EEAA) exempting the collection of a limited number of CMPR species from the Gulf of Mexico and/or Atlantic EEZ from regulations implementing the CMPR FMP. These EFPs, SRPs, and EEAs involve fishing by commercial or research vessels, similar or identical to the fishing methods of the CMPR fishery, the subject of this opinion.

We consider EFPs, SRPs, and EEAs, involving fishing consistent with the description of CMPR fishing in Section 2, unlikely to increase fishing effort significantly enough to warrant separate consideration in this opinion. The types and rates of interactions with listed species from these types of EFP, SRP, and EEAA activities are expected to be similar to (and fall within) the level of effort and impacts analyzed in this opinion. For example, issuing an EFP to an active commercial vessel would not likely result in effects other than those that would result from the vessel's normal commercial activities. Similarly, issuing an EFP, SRP, or EEAA to a vessel to conduct a minimal number of CMPR trips with hook-and-line or gillnet gear would not likely increase fishing effort to a degree that would affect the total annual effort expended in the fishery.

2.8 Description of Action Area

The action area for an opinion is defined as all of the areas directly or indirectly affected by the federal action, and not merely the immediate area involved in the action. The CMPR fishery is authorized to operate within the U.S. Mid-Atlantic, South Atlantic, and the Gulf of Mexico EEZ. The U.S. Mid-Atlantic and South Atlantic EEZ extends from 3 to 200 nautical miles off the coasts of New York south through Florida. The actual outer boundaries of the EEZ vary according to areas where jurisdictional boundaries meet with Bermuda, the Bahamas and Cuba. The Gulf of Mexico EEZ extends from nine miles seaward of the states of Florida and Texas, and from 3 miles seaward of the states of Alabama, Mississippi, and Louisiana, to 200 nautical miles from the seaward boundary of each coastal state. As discussed in Section 5.0, the proposed action is not expected to directly or indirectly affect resources outside these EEZ areas. Therefore, the action area for this consultation is restricted to the EEZ within which the CMPR fishery is authorized to operate (Figure 2.3). A variety of biological (e.g., distribution of CMPR), socio-economic (e.g., market factors, location of ports, operating costs), and regulatory factors (e.g., gear-restricted areas and closed areas) have focused the majority of fishing activity to waters off North Carolina and Florida.

Figure 2.3 CMPR Fishery Action Area



3.0 Status of Species

The following endangered and threatened marine mammal, sea turtle, and fish species and designated critical habitat may occur in the action area:

Marine Mammals

	Status
Blue whale (<i>Balaenoptera musculus</i>)	Endangered
Fin whale (<i>Balaenoptera physalus</i>)	Endangered
Humpback whale (<i>Megaptera novaeangliae</i>)	Endangered
Northern right whale (<i>Eubalaena glacialis</i>)	Endangered
Sei whale (<i>Balaenoptera borealis</i>)	Endangered
Sperm whale (<i>Physeter macrocephalus</i>)	Endangered

Sea Turtles

Green turtle (<i>Chelonia mydas</i>)	Endangered/Threatened*
Hawksbill sea turtle (<i>Eretmochelys imbricata</i>)	Endangered
Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	Endangered
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	Endangered
Loggerhead sea turtle (<i>Caretta caretta</i>)	Threatened

Fish

Smalltooth sawfish (<i>Pristis pectinata</i>)	Endangered**
Gulf sturgeon (<i>Acipenser oxyrinchus desotoi</i>)	Threatened

Invertebrates

Elkhorn coral (<i>Acropora palmata</i>)	Threatened
Staghorn coral (<i>Acropora cervicornis</i>)	Threatened

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. distinct population segment (DPS).*

3.1 Analysis of the Species Not Likely to be Adversely Affected

Blue, Sei, and Sperm Whales

Blue, sei, and sperm whales are not likely to be adversely affected by the proposed action. We have analyzed the proposed action and determined the only potential route of effect is direct effects resulting from these whale species interacting with fishing gear. Although these species may be present within the action area, they are not expected to overlap with fishing activities authorized under the CMPR FMP. Blue, sei, and sperm whales are all typically found in the action area seaward of the continental shelf, well beyond the depths at

which CMPR species are targeted in the action area. Based on the 2005 List of Fisheries Final Rule (71 FR 247, January 6, 2006), there are no documented encounters between these species and hook-and-line gear or gillnet gear. Based on the rarity of these species in the action area where CMPR gear is used and absence of documented interactions between these species and the CMPR fishery, we believe any adverse effects resulting from the proposed action will be discountable.

Northern Right, Fin, and Humpback Whales

Northern right, fin, and humpback whales are considered coastal whale species. In the Gulf of Mexico portion of the action area, they are extremely rare. Individuals observed in the Gulf of Mexico have likely been inexperienced juveniles straying from the normal range of these stocks or occasional transients (Mullin et al. 1994, Würsig et al. 2000). In the South Atlantic portion of the action area, these species are more common, and may be present in the vicinity of CMPR fishing activities. These species are sighted most frequently in the South Atlantic along the southeastern United States from November through April during their annual migration.

Hook-and-line fishing, the primary CMPR fishing method, is not likely to adversely affect Northern right, fin, and humpback whales. There are no reported interactions between CMPR hook-and-line gear and these species. Longline gear is the only type of hook-and-line gear for which there are documented interactions with large whales, and this gear is not used to target CMPR species. The 2007 Final List of Fisheries (LOF) classifies the CMPR hook-and-line fishery as Category III. A Category III fishery is one in which the annual mortality and serious injury of a marine mammal stock resulting from the fishery is less than or equal to 1% of the potential biological removal level (PBR). The PBR level is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (72 FR 14466, March 28, 2007). Based on this information, effects on these whale species from CMPR hook-and-line fishing are considered discountable.

The gillnet gear components of the CMPR fishery pose entanglement risks to Northern right, fin, and humpback whales. However, there are also no documented interactions between CMPR gillnets (or any Gulf of Mexico gillnet fishery) and large whales. Large whale entanglements have been documented in other gillnet fisheries. Under the LOF the South Atlantic component of the CMPR gillnet fishery is classified as part of the Southeast Atlantic gillnet fishery. Similarly, the Gulf of Mexico component of the CMPR gillnet fishery is categorized as part of the Gulf of Mexico gillnet fishery. Both the Southeast Atlantic gillnet fishery and the Gulf of Mexico gillnet fishery are listed as Category II fisheries in the 2007 LOF (72 FR 14466, March 28, 2007). Category II fisheries have been determined to have occasional incidental mortality and serious injury of marine mammals, causing annual mortality and serious injury greater than 1 percent and less than 50 percent of the PBR level for a given marine mammal stock. Neither fishery has any documented interactions with large whales or any other marine mammal species, but NMFS classifies these fisheries as Category II based on analogy (i.e., similar risk to marine mammals) with other gillnet fisheries.

Reducing large whale entanglement risks is the primary responsibility of the Atlantic Large Whale Take Reduction Team (ALWTRT). The ALWTRT was created in 1996 to address entanglement issues of large whales in fishing gear, including gillnet gear. The ALWTRT was convened under the provisions of the Marine Mammal Protection Act, and through its efforts an Atlantic Large Whale Take Reduction Plan (ALWTRP) was finalized in 1999.

Under the ALWTRP, certain restrictions apply to the Southeast Atlantic gillnet fishery. Except as provided for shark gillnet gear, no person may fish with a straight set of gillnet gear at night in the Southeast U.S. Restricted Area during the restricted period (November 15-April 15) (50 CFR 229.32 (f)(4)(iii)). A straight set is defined as a set in which the gillnet is placed in a line in the water column, as opposed to a circular set in which the gillnet is placed to encircle an area in the water column. From November 15 through March 31, no person may fish with gillnet gear in the Southeast U.S. Observer Area unless the gear is marked. Gillnets must be marked with green and blue markings that are permanent and clearly visible when the gear is hauled from the water. Marks must be at least 4 inches long and the two color marks must be placed within 6 inches of each other. All buoy lines must be marked within 2 ft of the top of the buoy line and midway along the length of the buoy line, and each net panel must be marked along both the float line and the lead line at least once every 100 yards (50 CFR 229.32 (b)(3)(i) and (ii)).

The ALWTRP also includes management measures for the Mid-Atlantic gillnet fishery. Regulations are as follows: From December 1-March 31 in Mid-Atlantic gillnet waters, anchored gillnets (includes those weighted to the bottom of the sea) must abide by the universal gear requirements (no line floating at the surface, no wet storage of gear--anchored gear must be hauled out of the water at least once every 30 days). Fishers are also encouraged to maintain their buoy lines to be as knot-free as possible. All buoys attached to the main buoy line must have a weak link having a maximum breaking strength of 1,100 lb. All net panels are required to have a weak link with a maximum breaking strength of 1,100 lb in the center of the floatline of each 50-fathom net panel in a net string or every 25 fathoms for longer panels. Gillnets that do not return to port with the vessel must be anchored with the holding power of at least a 22-lb Danforth-style anchor at each end of the net string. No drift gillnet gear may be fished at night unless gear is tended (i.e. attached to the vessel), and all drift gillnet gear must be removed from the water and stowed on board before returning to port (50 CFR 229.32 (d)(7)).

On January 22, 2006, a dead right whale calf was reported off Jacksonville, Florida. Based on the best available data, NMFS determined the whale's death had resulted from entanglement in allowable gillnet gear while inside the Southeast U.S. Restricted Area during the restricted period. In accordance with ALWTRP's implementing regulations at 50 CFR 229.32(g)(1), an emergency rule was issued on February 16, 2006, prohibiting all gillnet fishing within the Southeast U.S. Restricted Area (71 FR 8223). The prohibitions on gillnet fishing expired on March 31, 2006. Under the ALWTRP, closure of this area during right whale season (November 15-March 31) must continue in perpetuity, unless other appropriate measures can be implemented to protect right whales.

In April of 2006, the Mid-Atlantic/Southeast Subgroup of the ALWTRT (SE Subgroup) was convened to discuss the right whale calf's death, the resultant emergency closure of the Southeast U.S. Restricted Area, and future management options that might avoid the total closure of this area in the future. The SE Subgroup suggested several potential management options that might allow the area to be reopened to gillnet fishing in the future.

Particularly relevant to this analysis are the SE Subgroup discussions of the characteristics and deployment methods of gillnet fishing for Spanish mackerel operating under the CMPR FMP to determine whether this fishing operation warranted an exemption under 229.32(g)(2) from the recommended prohibition on gillnets in the Southeast U.S. Restricted Area south of 29°00' N. lat. during the restricted period. The SE Subgroup concluded that the combination of existing gear requirements for Spanish mackerel gillnets at § 622.41 (c)(3)(ii) (i.e., headrope length limits, soak time limits, gear tending requirements); new gear requirements prohibiting the setting of gear at night or in low visibility and requiring nets not to be set and to be removed from the water if endangered whales (Northern right, humpback, or fin) are within 3 nautical miles; known and predicted right whale distribution patterns in the Southeast U.S. Restricted Area south of 29°00' N. lat. during December and March; and existing Florida regulations prohibiting gillnets in state waters, are operationally effective and will protect right whales from the risk of serious injury or mortality in the Southeast U.S. Restricted Area south of 29°00' N. lat. from December 1–31 and from March 1–31. Therefore, an exemption was warranted, pursuant to 50 CFR 229.32(g)(2)(I), to allow the use of gillnets to fish for Spanish mackerel during this time and in this area.

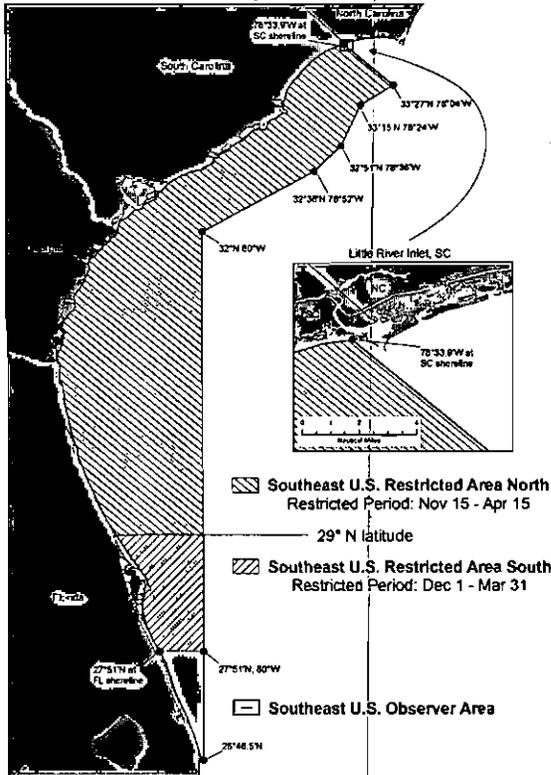
Following these discussions, NMFS published a proposed rule (71 FR 66485, November 15, 2006) amending the ALWTRP. Those proposed changes included expanding the Southeast U.S. Restricted Area to include waters within 35 nautical miles of the South Carolina coast; dividing the Southeast U.S. Restricted Area at 29°00' N latitude into two areas, Southeast U.S. Restricted Areas North and South; and restricting gillnetting within the Southeast U.S. Restricted Area during the right whale calving season. Specifically, the rule proposed to prohibit gillnet fishing and possession in the Southeast U.S. Restricted Area North each year from Nov. 15–April 15, with an exemption for transiting through this area if gear is stowed in accordance with the rule. Additionally, gillnet fishing would be prohibited annually in the Southeast U.S. Restricted Area South from Dec. 1–March 31, with limited exemptions for gillnet fishing for sharks and Spanish mackerel.

Because the proposed protections would not be in place until well after right whales arrived in the Southeast U.S. Restricted Area for the 2006/2007 calving season, NMFS simultaneously published an emergency rule to protect right whales from entanglement in the core right whale calving area during right whale calving season (71 FR 66469, November 15, 2006). This emergency rule prohibited gillnet fishing or gillnet possession in Atlantic Ocean waters from the shore out to 80°00' W between 29°00' N and 32°00' N and within 35 nautical miles of the South Carolina coast. This emergency rule is expired April 15, 2007.

A final rule, published June 25, 2007, (72 FR 34632), finalized the proposed amendments to the ALWTRP. The only difference between the proposed and final rules was an adjustment

of the northern boundary of the Southeast U.S. Restricted Area to exclude Little River Inlet, SC on the border between North Carolina and South Carolina (see Figure 3.1).

Figure 3.1 Southeast U.S. Restricted Area and Restricted Periods, as Amended by the June 25, 2007 ALWTRP Final Rule (72 FR 34632).



Additional conservation measures have been proposed under the ALWTRP to further protect endangered whales from the risk of entanglement in commercial fishing gear (70 FR 35894, June 21, 2005). A final rule amending the ALWTRP is expected to be published in the fall of 2007.

Although gillnets can pose a serious entanglement threat to whales, the primary gillnet used in the CMPR fishery is run-around gillnet. Run-around gillnets are thought to pose less of a risk to marine mammals because of their rapid deployment and retrieval. With no documented takes of large whales in the CMPR gillnet fishery in the past, existing CMPR gillnet practices, and continued management under the ALWTRP, we believe negative effects on Northern right, fin, and humpback whales are extremely unlikely and are therefore discountable.

Gulf Sturgeon

The CMPR fishery will have no effect on the Gulf sturgeon. The Gulf sturgeon is an anadromous, benthic species. It inhabits coastal rivers from Louisiana to Florida during the warmer months and over-winters in estuaries, bays, and the Gulf of Mexico. Available data indicate Gulf sturgeon in the marine environment show a preference for sandy shoreline habitats with water depths less than 3.5 m and salinity less than 6.3 parts per thousand (Fox

and Hightower 1998, Parauka et al. in press). CMPR are targeted at or near the surface of deeper federal waters, where Gulf sturgeon would not be present.

Elkhorn and Staghorn Corals

The CMPR fishery is not likely to adversely affect Elkhorn and Staghorn corals. These species are found in the action area, but typically only in waters 15 m or less in the Florida Keys and in the Atlantic, north to West Palm Beach, Florida (*Acropora* Biological Review Team 2005). Potential routes of effect on coral from fishing activities stem from physical contact by fishing vessels and gear, leading to coral breakage. The pelagic nature of Coastal Migratory Pelagic Resources means the gears used to target those species are typically deployed in the water column or at the surface, where corals are not present. Fishers also typically troll or drift when targeting these species, thus potential damage from anchoring by these fishers is also unlikely. It is possible that hook-and-line gear could break off during fishing and by drifting, becoming entangled on coral. However, this is extremely unlikely given the location of these corals within the action area. Based on this information, we believe effects from the proposed action are discountable.

Northern Right Whale Critical Habitat

Northern right whale critical habitat (50 FR 28793, June 3, 1994) has been designated in the action area in coastal Florida and Georgia. The unit is defined from the mouth of the Altamaha River, Georgia, to Jacksonville, Florida, out 15 nautical miles and from Jacksonville, Florida, to Sebastian Inlet, Florida, out five nautical miles. The area was designated because of its importance as a calving area. Although sightings of Northern right whales off Georgia and Florida primarily include adult females and calves, juveniles and adult males have also been observed. Northern right whales are most abundant in this area from Mid-November through March (Slay et al. 1996).

The environmental features (typically referred to as the primary constituent elements) of the southeastern critical habitat area relate to water depth, water temperature, and bathymetry. Fishing activities conducted under the CMPR FMP (gillnet, trolled, and jigged rod and reel) will have no impact on these features. Thus, the proposed action will not affect designated critical habitat for the Northern right whale.

3.2 Analysis of the Species Likely to be Adversely Affected

The following subsections are synopses of the best available information on the life history, distribution, population trends, and current status of the five species of sea turtles and the smalltooth sawfish that are likely to be adversely affected by one or more components of the proposed action. Additional background information on the status of sea turtle species can be found in a number of published documents, including: recovery plans for the Atlantic green sea turtle (NMFS and USFWS 1991a), hawksbill sea turtle (NMFS and USFWS 1993), Kemp's ridley sea turtle (USFWS and NMFS 1992), leatherback sea turtle (NMFS and USFWS 1992), loggerhead sea turtle (NMFS and USFWS 1991b) and; Pacific Sea Turtle Recovery Plans (NMFS and USFWS, 1998a-e); sea turtle status reviews and biological reports (NMFS and USFWS 1995, Marine Turtle Expert Working Group (TEWG) 1998 and 2000, NMFS SEFSC 2001). Sources of background information on the smalltooth sawfish

include the smalltooth sawfish status review (NMFS 2000a), the proposed and final listing rules, and several publications (Simpfendorfer 2001, Seitz and Poulakis 2002, Simpfendorfer and Wiley 2004, Poulakis and Seitz 2004).

3.2.1 Green Sea Turtle

Federal listing of the green sea turtle occurred on July 28, 1978, with all populations listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are endangered. The nesting range of the green sea turtles in the southeastern United States and includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina and the U.S. Virgin Islands (U.S.V.I.) and Puerto Rico (NMFS and USFWS 1991a). Principal U.S. nesting areas for green sea turtles are in eastern Florida, predominantly Brevard through Broward counties (Ehrhart and Witherington 1992). Green sea turtle nesting also occurs regularly on St. Croix, U.S.V.I, and on Vieques, Culebra, Mona, and the main island of Puerto Rico (Mackay and Rebholz 1996).

3.2.1.1 Pacific Ocean

Green sea turtles are thought to be declining throughout the Pacific Ocean, with the exception of Hawaii, from a combination of overexploitation and habitat loss (Eckert 1993, Seminoff 2002). In the western Pacific, the only major (>2,000 nesting females) populations of green sea turtles occur in Australia and Malaysia, with smaller colonies throughout the area. Indonesia has a widespread distribution of green sea turtles, but has experienced large declines over the past 50 years. Hawaii green sea turtles are genetically distinct and geographically isolated, and the population appears to be increasing in size despite the prevalence of fibropapilloma and spirochidiasis (Aguirre et al. 1998 in Balazs and Chaloupka 2003). In the Eastern Pacific, mitochondrial DNA analysis has indicated that there are three key nesting populations: Michoacan, Mexico; Galapagos Islands, Ecuador; and Islas Revillagigedos, Mexico (Dutton 2003). There is also sporadic green turtle nesting along the Pacific coast of Costa Rica.

3.2.1.2 Atlantic Ocean

Life History and Distribution

The estimated age at sexual maturity for green sea sea turtles is between 20-50 years (Balazs 1982, Frazer and Ehrhart 1985). Green sea turtle mating occurs in the waters off the nesting beaches. Each female deposits 1-7 clutches (usually 2-3) during the breeding season at 12-14 day intervals. Mean clutch size is highly variable among populations, but averages 110-115 eggs/nest. Females usually have 2-4 or more years between breeding seasons, whereas males may mate every year (Balazs 1983). After hatching, green sea turtles go through a post-hatchling pelagic stage where they are associated with drift lines of algae and other debris. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas (Bjorndal 1997).

Green sea turtles are primarily herbivorous, feeding on algae and sea grasses, but also occasionally consume jellyfish and sponges. The post-hatchling, pelagic-stage individuals are assumed to be omnivorous, but little data are available.

Green sea turtle foraging areas in the southeastern United States include any coastal shallow waters having macroalgae or sea grasses. This includes areas near mainland coastlines, islands, reefs, or shelves, and any open-ocean surface waters, especially where advection from wind and currents concentrates pelagic organisms (Hirth 1997, NMFS and USFWS 1991a). Principal benthic foraging areas in the southeastern United States include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Doughty 1984, Hildebrand 1982, Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957, Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon System, Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward counties (Wershoven and Wershoven 1992, Guseman and Ehrhart 1992). Adults of both sexes are presumed to migrate between nesting and foraging habitats along corridors adjacent to coastlines and reefs.

Population Dynamics and Status

The vast majority of green sea turtle nesting within the southeastern United States occurs in Florida (Meylan et al. 1995, Johnson and Ehrhart 1994). It is known that current nesting levels in Florida are reduced compared to historical levels, but the extent of the reduction is not known (Dodd 1981). However, green sea turtle nesting in Florida has been increasing since 1989 (Florida Fish and Wildlife Conservation Commission, Florida Wildlife Research Institute Index Nesting Beach Survey Program). Total nest counts and trends at index beach sites during the past 17 years suggest the numbers of green sea turtles that nest within the southeastern United States are increasing.

Although nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging and breeding grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida and the northwestern coast of the Yucatán Peninsula. Additional important foraging areas in the western Atlantic include the Mosquito and Indian River Lagoon systems and nearshore wormrock reefs between Sebastian and Ft. Pierce Inlets in Florida, Florida Bay, the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Miskito Coast of Nicaragua, the Caribbean coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). The summer developmental habitat for green sea turtles also encompasses estuarine and coastal waters from North Carolina to as far north as Long Island Sound (Musick and Limpus 1997).

There are no reliable estimates of the number of immature green sea turtles that inhabit coastal areas (where they come to forage) of the southeastern United States. However, information on incidental captures of immature green sea turtles at the St. Lucie Power Plant (215 green sea turtle captures per year since 1977) in St. Lucie County, Florida (on the Atlantic coast of Florida) show that the annual number of immature green sea turtles captured has increased significantly in the past 28 years (FPL 2004).

It is likely that immature green sea turtles foraging in the southeastern United States come from multiple genetic stocks; therefore, the status of immature green sea turtles in the southeastern United States might also be assessed from trends at all of the main regional nesting beaches, principally Florida, Yucatán, and Tortuguero. Trends at Florida beaches were previously discussed. Trends in nesting at Yucatán beaches cannot be assessed because of a lack of consistent beach surveys over time. Trends at Tortuguero (ca. 20,000-50,000 nests/year) showed a significant increase in nesting during the period 1971-1996 (Bjorndal et al. 1999), and more recent information continues to show increasing nest counts (Troëng and Rankin 2004). Therefore, it seems reasonable that there is an increase in immature green sea turtles inhabiting coastal areas of the southeastern United States; however, the magnitude of this increase is unknown.

Threats

The principal cause of past declines and extirpations of green sea turtle assemblages has been the over-exploitation of green sea turtles for food and other products. Although intentional take of green sea turtles and their eggs is not extensive within the southeastern United States, green sea turtles that nest and forage in the region may spend large portions of their life history outside the region and outside U.S. jurisdiction, where exploitation is still a threat. However, there are still significant and ongoing threats to green sea turtles from human-related causes in the United States. These threats include beach armoring, erosion control, artificial lighting, beach disturbance (e.g., driving on the beach), pollution, foraging habitat loss as a result of direct destruction by dredging, siltation, boat damage, and other human activities. A complete list of other indirect factors can be found in NMFS SEFSC (2001). Sea sampling coverage in the pelagic driftnet, pelagic longline, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green sea turtles. There is also the increasing threat from green sea turtle fibropapillomatosis disease. Presently, this disease is cosmopolitan and has been found to affect large numbers of animals in some areas, including Hawaii and Florida (Herbst 1994, Jacobson 1990, Jacobson et al. 1991).

3.2.1.3 Summary of Status for Atlantic Green Sea Turtles

Green sea turtles range in the western Atlantic from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean, but are considered rare in benthic areas north of Cape Hatteras (Wynne and Schwartz 1999). Green sea turtles face many of the same natural and anthropogenic threats as for loggerhead sea turtles described below. In addition, green sea turtles are also susceptible to fibropapillomatosis, which can result in death. In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Recent population estimates for the western Atlantic area are not available. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the 17 years of regular monitoring since establishment of index beaches in 1989. However, given the species' late sexual maturity, caution is warranted about over-interpreting nesting trend data collected for less than 15 years.

3.2.2 Hawksbill Sea Turtle

The hawksbill turtle was listed as endangered under the precursor of the ESA on June 2, 1970, and is considered Critically Endangered by the International Union for the Conservation of Nature (IUCN). The hawksbill is a medium-sized sea turtle, with adults in the Caribbean ranging in size from approximately 62.5 to 94.0 cm straight carapace length. The species occurs in all ocean basins, although it is relatively rare in the Eastern Atlantic and Eastern Pacific, and absent from the Mediterranean Sea. Hawksbills are the most tropical sea turtle species, ranging from approximately 30°N latitude to 30°S latitude. They are closely associated with coral reefs and other hard-bottom habitats, but they are also found in other habitats including inlets, bays and coastal lagoons (NMFS and USFWS 1993). There are only five remaining regional nesting populations with more than 1,000 females nesting annually. These populations are in the Seychelles, Mexico, Indonesia, and two in Australia (Meylan and Donnelly 1999). There has been a global population decline of over 80 percent during the last three generations (105 years) (Meylan and Donnelly 1999).

3.2.2.1 Pacific Ocean

Anecdotal reports throughout the Pacific indicate that the current Pacific hawksbill population is well below historical levels (NMFS 2004a). It is believed that this species is rapidly approaching extinction in the Pacific because of harvesting for its meat, shell, and eggs as well as destruction of nesting habitat (NMFS 2001a). Hawksbill sea turtles nest in the Hawaiian Islands as well as the islands and mainland of southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands, and Australia (NMFS 2004a). However, along the eastern Pacific Rim where nesting was common in the 1930s, hawksbill's are now rare or absent (Cliffon et al. 1982, NMFS 2004a).

3.2.2.2 Atlantic Ocean

In the western Atlantic, the largest hawksbill nesting population occurs in the Yucatán Peninsula of Mexico (Garduño-Andrade et al. 1999). With respect to the United States, nesting occurs in Puerto Rico, the U.S. Virgin Islands, and the southeast coast of Florida. Nesting also occurs outside of the United States and its territories in Antigua, Barbados, Costa Rica, Cuba, and Jamaica (Meylan 1999a). Outside of the nesting areas, hawksbills have been seen off of the U.S. Gulf of Mexico states and along the eastern seaboard as far north as Massachusetts, although sightings north of Florida are rare (NMFS and USFWS 1993).

Life History and Distribution

The best estimate of age at sexual maturity for hawksbill sea turtles is about 20-40 years (Chaloupka and Limpus 1997, Crouse 1999a, NMFS 2004a). Reproductive females undertake periodic (usually non-annual) migrations to their natal beach to nest. Movements of reproductive males are less well known, but are presumed to involve migrations to their nesting beach or to courtship stations along the migratory corridor (Meylan 1999b). Females nest an average of 3-5 times per season (Meylan and Donnelly 1999, Richardson et al. 1999).

Clutch size is larger on average (up to 250 eggs) than that of other sea turtles (Hirth 1980). Reproductive females may exhibit a high degree of fidelity to their nest sites.

The life history of hawksbills consists of a pelagic stage that lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988, Meylan and Donnelly 1999), followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Adult foraging habitat, which may or may not overlap with developmental habitat, is typically coral reefs, although other hard-bottom communities and occasionally mangrove-fringed bays may be occupied. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998).

The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Other food items, notably corallimorphs and zooanthids, have been documented to be important in some areas of the Caribbean (van Dam and Diéz 1997, Mayor et al. 1998, Leon and Diéz 2000).

Population Dynamics and Status

Nesting within the southeastern United States and U.S. Caribbean is restricted to Puerto Rico (>650 nests/yr), the U.S. Virgin Islands (~400 nests/yr), and rarely Florida (0-4 nests/yr) (Eckert 1995, Meylan 1999a, Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute's Statewide Nesting Beach Survey data 2002). At the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out, populations appear to be increasing (Mona Island, Puerto Rico) or stable (Buck Island Reef National Monument, St. Croix, USVI) (Meylan 1999a).

Threats

As with other sea turtle species, hawksbill sea turtles are affected by habitat loss, habitat degradation, marine pollution, marine debris, fishery interactions, and poaching in some parts of their range. A complete list of other indirect factors can be found in NMFS SEFSC (2001). There continues to be a black market for hawksbill shell products ("tortoiseshell"), which likely contributes to the harvest of this species.

3.2.2.3 Summary of Status for Hawksbill Sea Turtles

Worldwide, hawksbill sea turtle populations are declining. They face many of the same threats affecting other sea turtle species. In addition, there continues to be a commercial market for hawksbill shell products, despite protections afforded to the species under U.S. law and international conventions.

3.2.3 Kemp's Ridley Sea Turtle

The Kemp's ridley was listed as endangered on December 2, 1970. Internationally, the Kemp's ridley is considered the most endangered sea turtle (Zwinenberg 1977, Groombridge 1982, TEWG 2000). Kemp's ridleys nest primarily at Rancho Nuevo, a stretch of beach in Mexico, Tamaulipas State. This species occurs mainly in coastal areas of the Gulf of Mexico

and the northwestern Atlantic Ocean. Occasional individuals reach European waters (Brongersma 1972). Adults of this species are usually confined to the Gulf of Mexico, although adult-sized individuals sometimes are found on the east coast of the United States.

Life History and Distribution

The TEWG (1998) estimates age at maturity from 7-15 years. Females return to their nesting beach about every 2 years (TEWG 1998). Nesting occurs from April into July and is essentially limited to the beaches of the western Gulf of Mexico, near Rancho Nuevo in southern Tamaulipas, Mexico. The mean clutch size for Kemp's ridleys is 100 eggs/nest, with an average of 2.5 nests/female/season.

Little is known of the movements of the post-hatchling stage (pelagic stage) within the Gulf of Mexico. Studies have shown the post-hatchling pelagic stage varies from 1-4 or more years, and the benthic immature stage lasts 7-9 years (Schmid and Witzell 1997). Benthic immature Kemp's ridleys have been found along the Eastern Seaboard of the United States and in the Gulf of Mexico. Atlantic benthic immature sea turtles travel northward as the water warms to feed in the productive, coastal waters off Georgia through New England, returning southward with the onset of winter (Lutcavage and Musick 1985, Henwood and Ogren 1987, Ogren 1989). Studies suggest that benthic immature Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud 1995).

Stomach contents of Kemp's ridleys along the lower Texas coast consisted of nearshore crabs and mollusks, as well as fish, shrimp, and other foods considered to be shrimp fishery discards (Shaver 1991). Pelagic stage Kemp's ridleys presumably feed on the available *Sargassum* and associated infauna or other epipelagic species found in the Gulf of Mexico.

Population Dynamics and Status

Of the seven extant species of sea turtles in the world, the Kemp's ridley has declined to the lowest population level. Most of the population of adult females nest on the Rancho Nuevo beaches (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the mid-1980s nesting numbers were below 1,000 (with a low of 702 nests in 1985). However, observations of increased nesting (with 6,277 nests recorded in 2000) suggest that the decline in the Kemp's ridley population has stopped and the population is now increasing (USFWS 2000). These trends are further supported by 2004-2006 nesting data from Mexico. The number of nests over that period has increased from 7,147 in 2004, to 10,099 in 2005, and 12,143 during the 2006 nesting season (Gladys Porter Zoo nesting database).

A period of steady increase in benthic immature Kemp's ridleys has been occurring since 1990 and appears to be due to increased hatchling production and an apparent increase in survival rates of immature sea turtles beginning in 1990. The increased survivorship of immature sea turtles is attributable, in part, to the introduction of TEDs in the United States and Mexican shrimping fleets. As demonstrated by nesting increases at the main nesting sites in Mexico, adult Kemp's ridley numbers have increased over the last decade. The

population model used by TEWG (2000) projected that Kemp's ridleys could reach the Recovery Plan's intermediate recovery goal of 10,000 nesters by the year 2015.

Next to loggerheads, Kemp's ridleys are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June (Keinath et al. 1987, Musick and Limpus 1997). The juvenile population of Kemp's ridleys in Chesapeake Bay is estimated to be 211 to 1,083 sea turtles (Musick and Limpus 1997). These juveniles frequently forage in submerged aquatic grass beds for crabs (Musick and Limpus 1997). Kemp's ridleys consume a variety of crab species, including *Callinectes* spp., *Ovalipes* spp., *Libinia* spp., and *Cancer* spp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal 1997). Upon leaving Chesapeake Bay in autumn, juvenile Kemp's ridleys migrate down the coast, passing Cape Hatteras in December and January (Musick and Limpus 1997). These larger juveniles are joined there by juveniles of the same size from North Carolina sounds and smaller juveniles from New York and New England to form one of the densest concentrations of Kemp's ridleys outside of the Gulf of Mexico (Musick and Limpus 1997, Epperly et al. 1995a, Epperly et al. 1995b).

Threats

Kemp's ridleys face many of the same threats as other sea turtle species, including destruction of nesting habitat from storm events, natural predators at sea, and oceanic events such as cold-stunning. Although cold-stunning can occur throughout the range of the species, it may be a greater risk for sea turtles that utilize the more northern habitats of Cape Cod Bay and Long Island Sound. For example, in the winter of 1999-2000, there was a major cold-stunning event where 218 Kemp's ridleys, 54 loggerheads, and 5 green sea turtles were found on Cape Cod beaches (R. Prescott, pers. comm. 2001). Annual cold-stunning events do not always occur at this magnitude; the extent of episodic major cold stun events may be associated with numbers of sea turtles utilizing Northeast waters in a given year, oceanographic conditions and the occurrence of storm events in the late fall. Many cold-stunned sea turtles can survive if found early enough, but cold-stunning events can still represent a significant cause of natural mortality. A complete list of other indirect factors can be found in NMFS SEFSC (2001).

Although changes in the use of shrimp trawls and other trawl gear have helped to reduce mortality of Kemp's ridleys, this species is also affected by other sources of anthropogenic impacts similar to those discussed in previous sections. For example, in the spring of 2000, a total of five Kemp's ridley carcasses were recovered from the same North Carolina beaches where 275 loggerhead carcasses were found. Cause of death for most of the sea turtles recovered was unknown, but the mass mortality event was suspected to have been from a large-mesh gillnet fishery operating offshore in the preceding weeks. The five Kemp's ridley carcasses that were found are likely to have been only a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction because it is unlikely that all of the carcasses washed ashore.

3.2.3.1 Summary of Kemp's Ridley Sea Turtle Status

The only major nesting site for ridleys is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). The number of nests observed at Rancho Nuevo and nearby beaches increased at a mean rate of 11.3 percent per year from 1985 to 1999. Current totals exceed 10,000 nests per year (Gladys Porter Zoo 2005). Kemp's ridleys mature at an earlier age (7-15 years) than other chelonids, thus "lag effects" as a result of unknown impacts to the non-breeding life stages would likely have been seen in the increasing nest trend beginning in 1985 (USFWS and NMFS 1992).

The largest contributors to the decline of Kemp's ridleys in the past were commercial and local exploitation, especially poaching of nests at the Rancho Nuevo site, as well as the Gulf of Mexico trawl fisheries. The advent of TED regulations for trawlers and protections for the nesting beaches has allowed the species to begin to rebound. Many threats to the future of the species remain, including interactions with fishery gear, marine pollution, foraging habitat destruction, illegal poaching of nests and potential threats to the nesting beaches from such sources as global climate change, development, and tourism pressures.

3.2.4 Leatherback Sea Turtle

The leatherback sea turtle was listed as endangered throughout its global range on June 2, 1970. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans (Ernst and Barbour 1972). Leatherback sea turtles are the largest living turtles and range farther than any other sea turtle species. The large size of adult leatherbacks and their tolerance to relatively low temperatures allows them to occur in northern waters such as off Labrador and in the Barents Sea (NMFS and USFWS 1995). Adult leatherbacks forage in temperate and subpolar regions from 71°N to 47°S latitude in all oceans and undergo extensive migrations to and from their tropical nesting beaches. In 1980, the leatherback population was estimated at approximately 115,000 adult females globally (Pritchard 1982). That number, however, is probably an overestimation as it was based on a particularly good nesting year in 1980 (Pritchard 1996). By 1995, the global population of adult females had declined to 34,500 (Spotila et al. 1996). Pritchard (1996) also called into question the population estimates from Spotila et al. (1996), and felt they may be somewhat low, because it ended the modeling on data from a particularly bad nesting year (1994) while excluding nesting data from 1995, which was a good nesting year. However, the most recent population estimate for leatherback sea turtles from just the North Atlantic breeding groups is a range of 34,000-90,000 adult individuals (20,000-56,000 adult females)(TEWG 2007).

3.2.4.1 Pacific Ocean

Based on published estimates of nesting female abundance, leatherback populations have collapsed or have been declining at all major Pacific basin nesting beaches for the last two decades (Spotila et al. 1996, NMFS and USFWS 1998, Sarti et al. 2000, Spotila et al. 2000). For example, the nesting assemblage on Terengganu, Malaysia – which was one of the most significant nesting sites in the western Pacific Ocean – has declined severely from an

estimated 3,103 females in 1968 to two nesting females in 1994 (Chan and Liew 1996). Nesting assemblages of leatherback turtles are in decline along the coasts of the Solomon Islands, a historically important nesting area (D. Broderick, pers. comm., in Dutton et al. 1999). In Fiji, Thailand, Australia, and Papua New Guinea (East Papua), leatherback turtles have only been known to nest in low densities and scattered colonies.

Only an Indonesian nesting assemblage has remained relatively abundant in the Pacific basin. The largest extant leatherback nesting assemblage in the Indo-Pacific lies on the north Vogelkop coast of Irian Jaya (West Papua), Indonesia, with over 3,000 nests recorded annually (Putrawidjaja 2000, Suarez et al. 2000). During the early-to-mid 1980s, the number of female leatherback turtles nesting on the two primary beaches of Irian Jaya appeared to be stable. More recently, this population has come under increasing threats that could cause this population to experience a collapse that is similar to what occurred at Terengganu, Malaysia. In 1999, for example, local Indonesian villagers started reporting dramatic declines in sea turtle populations near their villages (Suarez 1999). Unless hatchling and adult turtles on nesting beaches receive more protection, this population will continue to decline. Declines in nesting assemblages of leatherback turtles have been reported throughout the western Pacific region, with nesting assemblages well below abundance levels observed several decades ago (e.g., Suarez 1999).

In the western Pacific Ocean and South China Seas, leatherback turtles are captured, injured, or killed in numerous fisheries, including Japanese longline fisheries. The poaching of eggs, killing of nesting females, human encroachment on nesting beaches, beach erosion, and egg predation by animals also threaten leatherback turtles in the western Pacific.

In the eastern Pacific Ocean, nesting populations of leatherback turtles are declining along the Pacific coast of Mexico and Costa Rica. According to reports from the late 1970s and early 1980s, three beaches on the Pacific coast of Mexico supported as many as half of all leatherback turtle nests for the eastern Pacific. Since the early 1980s, the eastern Pacific Mexican population of adult female leatherback turtles has declined to slightly more than 200 individuals during 1998-99 and 1999-2000 (Sarti et al. 2000). Spotila et al. (2000) reported the decline of the leatherback turtle population at Playa Grande, Costa Rica, which had been the fourth largest nesting colony in the world. Between 1988 and 1999, the nesting colony declined from 1,367 to 117 female leatherback turtles. Based on their models, Spotila et al. (2000) estimated that the colony could fall to less than 50 females by 2003-2004.

Leatherback turtles in the eastern Pacific Ocean are captured, injured, or killed in commercial and artisanal swordfish fisheries off Chile, Columbia, Ecuador, and Peru, and purse seine fisheries for tuna in the eastern tropical Pacific Ocean, and California/Oregon drift gillnet fisheries. Because of the limited data, we cannot provide high-certainty estimates of the number of leatherback turtles captured, injured, or killed through interactions with these fisheries. However, between 8-17 leatherback turtles were estimated to have died annually between 1990 and 2000 in interactions with the California/Oregon drift gillnet fishery; 500 leatherback turtles are estimated to die annually in Chilean and Peruvian fisheries; 200 leatherback turtles are estimated to die in direct harvests in Indonesia; and before 1992, the

North Pacific driftnet fisheries for squid, tuna, and billfish captured an estimated 1,000 leatherback turtles each year, killing about 111 of them each year.

Although all causes of the declines in leatherback turtle colonies in the eastern Pacific have not been documented, Sarti et al. (1998) suggest that the declines result from egg poaching, adult and sub-adult mortalities incidental to high seas fisheries, and natural fluctuations due to changing environmental conditions. Some published reports support this suggestion. Sarti et al. (2000) reported that female leatherback turtles have been killed for meat on nesting beaches like Piedra de Tiacoyunque, Guerrero, Mexico. Eckert (1997) reported that swordfish gillnet fisheries in Peru and Chile contributed to the decline of leatherback turtles in the eastern Pacific. The decline in the nesting population at Mexiquillo, Mexico, occurred at the same time that effort doubled in the Chilean driftnet fishery. In response to these effects, the eastern Pacific population has continued to decline, leading some researchers to conclude that the leatherback is on the verge of extinction in the Pacific Ocean (e.g., Spotila et al. 1996, Spotila et al. 2000). The NMFS assessment of three nesting aggregations in its February 23, 2004, opinion supports this conclusion: If no action is taken to reverse their decline, leatherback sea turtles nesting in the Pacific Ocean either have high risks of extinction in a single human generation (for example, nesting aggregations at Terrenganu and Costa Rica) or they have a high risk of declining to levels where more precipitous declines become almost certain (e.g., Irian Jaya) (NMFS 2004a).

3.2.4.2 Atlantic Ocean

In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (NMFS SEFSC 2001). Previous genetic analyses of leatherbacks using only mitochondrial DNA (mtDNA) resulted in an earlier determination that within the Atlantic basin there are at least three genetically different nesting populations; the St. Croix nesting population (U.S. Virgin Islands), the mainland nesting Caribbean population (Florida, Costa Rica, Suriname/French Guiana), and the Trinidad nesting population (Dutton et al. 1999). Further genetic analyses using microsatellite markers in nuclear DNA along with the mtDNA data and tagging data has resulted in Atlantic Ocean leatherbacks now being divided into seven groups or breeding populations: Florida, Northern Caribbean, Western Caribbean, Southern Caribbean/Guianas, West Africa, South Africa, and Brazil (TEWG 2007). When the hatchlings leave the nesting beaches, they move offshore but eventually utilize both coastal and pelagic waters. Very little is known about the pelagic habits of the hatchlings and juveniles, and they have not been documented to be associated with the *Sargassum* areas as are other species. Leatherbacks are deep divers, with recorded dives to depths in excess of 1,000 m (Eckert et al. 1999, Hayes et al. 2004).

Life History and Distribution

Leatherbacks are a long-lived species, living for well over 30 years. It has been thought that they reach sexual maturity somewhat faster than other sea turtles (except Kemp's ridley),

with an estimated range from 3-6 years (Rhodin 1985) to 13-14 years (Zug and Parham 1996). However, some recent research using sophisticated methods of analyzing leatherback ossicles has cast doubt on the previously accepted age to maturity figures, with leatherbacks in the western North Atlantic possibly not reaching sexual maturity until as late as 29 years of age (Avens and Goshe 2007). Continued research in this area is vitally important to understanding the life history of leatherbacks and has important implications in management of the species.

They nest frequently (up to 10 nests per year) during a nesting season and nest about every 2-3 years. During each nesting, they produce 100 eggs or more in each clutch and, thus, can produce 700 eggs or more per nesting season (Schultz 1975). However, a significant portion (up to approximately 30 percent) of the eggs can be infertile. Thus, the actual proportion of eggs that can result in hatchlings is less than this seasonal estimate. The eggs incubate for 55-75 days before hatching. Based on a review of all sightings of leatherback sea turtles of <145 cm curved carapace length (ccl), Eckert (1999) found that leatherback juveniles remain in waters warmer than 26°C until they exceed 100 cm ccl.

Although leatherbacks are the most pelagic of the sea turtles, they enter coastal waters on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherback sea turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates.

Evidence from tag returns and strandings in the western Atlantic suggests that adult leatherback sea turtles engage in routine migrations between boreal, temperate, and tropical waters (NMFS and USFWS 1992). A 1979 aerial survey of the outer continental shelf from Cape Hatteras, North Carolina, to Cape Sable, Nova Scotia, showed leatherbacks to be present throughout the area with the most numerous sightings made from the Gulf of Maine south to Long Island. Leatherbacks were sighted in waters where depths ranged from 1-4,151 m, but 84.4 percent of sightings were in areas where the water was less than 180 m deep (Shoop and Kenney 1992). Leatherbacks were sighted in waters of a similar sea surface temperature as loggerheads; from 7-27.2°C (Shoop and Kenney 1992). However, this species appears to have a greater tolerance for colder waters because more leatherbacks were found at the lower temperatures (Shoop and Kenney 1992). This aerial survey estimated the in-water leatherback population from near Nova Scotia, Canada, to Cape Hatteras, North Carolina, at approximately 300-600 animals.

General differences in migration patterns and foraging grounds may occur between the seven nesting assemblages, but data is limited. Per TEWG 2007: *“Marked or satellite tracked turtles from the Florida and North Caribbean assemblages have been re-sighted off North America, in the Gulf of Mexico and along the Atlantic coast and a few have moved to western Africa, north of the equator. In contrast, Western Caribbean and Southern Caribbean/Guianas animals have been found more commonly in the eastern Atlantic, off Europe and northern Africa, as well as along the North American coast. There are no reports of marked animals from the Western North Atlantic assemblages entering the Mediterranean Sea or the South Atlantic Ocean, though in the case of the Mediterranean this may be due more to a lack of data rather than failure of Western North Atlantic turtles moving into the Sea. The tagging data coupled with the satellite telemetry data indicate that*

animals from the western North Atlantic nesting subpopulations use virtually the entire North Atlantic Ocean and the South Atlantic Ocean, tracking and tag return data follow three primary patterns. Although telemetry data from the West African nesting assemblage showed that all but one remained on the shallow continental shelf, there clearly is movement to foraging areas of the south coast of Brazil and Argentina. There is also a small nesting aggregation of leatherbacks in Brazil, and while data is limited to a few satellite tracks, these turtles seem to remain in the southwest Atlantic foraging along the continental shelf margin as far south as Argentina. South African nesting turtles apparently forage primarily south, around the tip of the continent.”

Population Dynamics and Status

The status of the Atlantic leatherback population has been less clear than the Pacific population. This uncertainty has been a result of inconsistent beach and aerial surveys, cycles of erosion and reformation of nesting beaches in the Guianas (representing the largest nesting area), a lesser degree of nest-site fidelity than occurs with the hardshell sea turtle species, and inconsistencies in the availability and analyses of data. However, recent coordinated efforts at data collection and analyses by the Leatherback Turtle Expert Working Group have helped to clarify the understanding of the Atlantic population status (TEWG 2007).

The Southern Caribbean/Guianas stock is the largest known Atlantic leatherback nesting aggregation (TEWG 2007). This area includes the Guianas (Guyana, Suriname, and French Guiana), Trinidad, Dominica, and Venezuela, with the vast majority of the nesting occurring in the Guianas and Trinidad. Past analyses had shown that the nesting aggregation in French Guiana had been declining at about 15 percent per year since 1987 (NMFS SEFSC 2001). However, from 1979-1986, the number of nests was increasing at about 15 percent annually which could mean that the current decline could be part of a nesting cycle which coincides with the erosion cycle of Guiana beaches described by Schultz (1975). It is thought that the cycle of erosion and reformation of beaches has resulted in shifting nesting beaches throughout this region. This was supported by the increased nesting seen in Suriname, where leatherback nest numbers have shown large recent increases concurrent with declines elsewhere (with more than 10,000 nests per year since 1999 and a peak of 30,000 nests in 2001), and the long-term trend for the overall Suriname and French Guiana population was thought to possibly show an increase (Girondot 2002 in Hilterman and Goverse 2003). In the past many sea turtle scientists have agreed that the Guianas (and some would include Trinidad) should be viewed as one population and that a synoptic evaluation of nesting at all beaches in the region is necessary to develop a true picture of population status (Reichart et al. 2001). Genetics studies have added support to this notion and have resulted in the designation of the Southern Caribbean/Guianas stock. Using both Bayesian modeling and regression analyses, the TEWG (2007) determined that the Southern Caribbean/Guianas stock had demonstrated a long-term, positive population growth rate (using nesting females as a proxy for population). This positive growth was seen within major nesting areas for the stock, including Trinidad, Guyana, and the combined beaches of Suriname and French Guiana (TEWG 2007).

The Western Caribbean stock includes nesting beaches from Honduras to Columbia. The most intense nesting in that area occurs in Costa Rica, Panama, and the Gulf of Uraba in Columbia (Duque et al. 2000). The Caribbean coast of Costa Rica and extending through to Chiriqui Beach, Panama, represents the fourth largest known leatherback rookery in the world (Troëng et al. 2004). Examination of data from three index nesting beaches in the region (Tortuguero, Gandoca, and Pacuare, in Costa Rica) using various Bayesian and regression analyses indicated that the nesting population was likely not growing over the 1995-2005 time series of available data (TEWG 2007), though modeling of the nesting data for Tortuguero indicates a possible 67.8 percent decline between 1995 and 2006 (Troëng et al. in press).

Nesting data for the Northern Caribbean stock is available from Puerto Rico, the U.S. Virgin Islands (St. Croix), and the British Virgin Islands (Tortola). In Puerto Rico the primary nesting beaches are at Fajardo, and on the island of Culebra. Nesting between 1978-2005 has ranged between 469-882 nests, and the population has been growing since 1978, with an overall annual growth rate of 1.1 (TEWG 2007). At the primary nesting beach on St. Croix, the Sandy Point National Wildlife Refuge, nesting has fluctuated from a few hundred nests to a high of 1008 in 2001, and the average annual growth rate has been approximately 1.1 from 1986-2004 (TEWG 2007). Nesting in Tortola is limited, but has been increasing from 0-6 nests/year in the late 1980's to 35-65/year in the 2000's, with an annual growth rate of approximately 1.2 between 1994-2004 (TEWG 2007).

The Florida nesting stock nests primarily along the east coast of Florida. This stock is of growing importance; with total nests between 800-900 per year in the 2000's following nesting totals fewer than 100 nests per year in the 1980's (Florida Fish and Wildlife Conservation Commission, unpublished data). Using data from the Index Nesting Beach Surveys, the TEWG (2007) has estimated a significant annual nesting growth rate of 1.17 between 1989 and 2005.

The West African nesting stock of leatherbacks is a large, important, but mostly unstudied aggregation. Nesting occurs in various countries along Africa's Atlantic coast, but much of the nesting is undocumented and the data is inconsistent. However, it is known that Gabon has a very large amount of leatherback nesting, with at least 30,000 nests laid along their coast in one season (Fretey et al. in press). Fretey et al. (in press) also provide detailed information about other known nesting beaches and survey efforts along the Atlantic African coast. Because of the lack of consistent effort and minimal available data, trend analyses were not possible for this stock (TEWG 2007).

Two other small but growing nesting stocks include Brazil and South Africa. For the Brazilian stock the TEWG (2007) analyzed the available data and determined that between 1988 and 2003 there was a positive annual average growth rate of 1.07 using the regression analyses, and 1.08 using Bayesian modeling. The South African stock has an annual average growth rate of 1.06 based on regression modeling and 1.04 using the Bayesian approach (TEWG 2007).

Estimates of total population size for Atlantic leatherbacks are difficult to ascertain due to the inconsistent nature of the available nesting data. In 1996, the entire western Atlantic population was characterized as stable at best (Spotila et al. 1996), with numbers of nesting females reported to be on the order of 18,800. A subsequent analysis by Spotila (pers. comm.) indicated that by 2000, the western Atlantic nesting population had decreased to about 15,000 nesting females. Spotila et al. (1996) estimated that the leatherback population for the entire Atlantic basin, including all nesting beaches in the Americas, the Caribbean, and West Africa totaled approximately 27,600 nesting females, with an estimated range of 20,082-35,133. This is similar to the estimated figures of 34,000-95,000 total adults (20,000-56,000 adult females; 10,000-21,000 nesting females) determined by the TEWG (2007).

Threats

Zug and Parham (1996) pointed out that the main threat to leatherback populations in the Atlantic is the combination of fishery-related mortality (especially entanglement in gear and drowning in trawls) and the intense egg harvesting on the main nesting beaches. Other important ongoing threats to the population include pollution, loss of nesting habitat, and boat strikes.

Of sea turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear. This susceptibility may be the result of their body type (large size, long pectoral flippers, and lack of a hard shell), their attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, possibly their method of locomotion, and perhaps their attraction to the light sticks used to attract target species in longline fisheries. They are also susceptible to entanglement in gillnets and pot/trap lines (used in various fisheries) and capture in trawl gear (e.g., shrimp trawls).

Leatherbacks are exposed to pelagic longline fisheries in many areas of their range. Unlike loggerhead turtle interactions with longline gear, leatherback turtles do not usually ingest longline bait. Instead, leatherbacks are typically foul hooked by longline gear (e.g., on the flipper or shoulder area) rather than getting mouth hooked or swallowing the hook (NMFS SEFSC 2001). A total of 24 nations, including the U.S. (accounting for 5-8 percent of the hooks fished), have fleets participating in pelagic longline fisheries in the area. Basin-wide, Lewison et al. (2004) estimated that 30,000-60,000 leatherback sea turtle captures occurred in Atlantic pelagic longline fisheries in the year 2000 alone (note that multiple captures of the same individual are known to occur, so the actual number of individuals captured may not be as high). Genetic studies performed within the Northeast Distant Fishery Experiment indicate that the leatherbacks captured in the Atlantic highly migratory species pelagic longline fishery were primarily from the French Guiana and Trinidad nesting stocks (over 95 percent). Individuals from West African stocks were surprisingly absent (Roden et al. in press).

Leatherbacks are also susceptible to entanglement in the lines associated with trap/pot gear used in several fisheries. From 1990-2000, 92 entangled leatherbacks were reported from New York through Maine (Dwyer et al. 2002). Additional leatherbacks stranded wrapped in line of unknown origin or with evidence of a past entanglement (Dwyer et al. 2002). Fixed gear fisheries in the mid-Atlantic have also contributed to leatherback entanglements. In

North Carolina, two leatherback sea turtles were reported entangled in a crab pot buoy inside Hatteras Inlet (D. Fletcher, pers. comm. to S. Epperly in NMFS SEFSC 2001). A third leatherback was reported entangled in a crab pot buoy in Pamlico Sound near Ocracoke. This turtle was disentangled and released alive; however, lacerations on the front flippers from the lines were evident (D. Fletcher, pers. comm. to S. Epperly in NMFS SEFSC 2001). In the Southeast, leatherbacks are vulnerable to entanglement in Florida's lobster pot and stone crab fisheries. In the U.S. Virgin Islands, where one of five leatherback strandings from 1982 to 1997 was due to entanglement (Boulon 2000), leatherbacks have been observed with their flippers wrapped in the line of West Indian fish traps (R. Boulon, pers. comm. to J. Braun-McNeill in NMFS SEFSC 2001). Because many entanglements of this typically pelagic species likely go unnoticed, entanglements in fishing gear may be much higher.

Leatherback interactions with the southeast Atlantic shrimp fishery, which operates predominately from North Carolina through southeast Florida (NMFS 2002), have also been a common occurrence. Leatherbacks, which migrate north annually, are likely to encounter shrimp trawls working in the coastal waters off the Atlantic coast from Cape Canaveral, Florida, to the Virginia/North Carolina border. Leatherbacks also interact with the Gulf of Mexico shrimp fishery. For many years, TEDs required for use in these fisheries were less effective at excluding leatherbacks than the smaller, hard-shelled turtle species. To address this problem, on February 21, 2003, the NMFS issued a final rule to amend the TED regulations (68 FR 8456). Modifications to the design of TEDs are now required in order to exclude leatherbacks and large and sexually mature loggerhead and green turtles.

Other trawl fisheries are also known to interact with leatherback sea turtles. In October 2001, a Northeast Fisheries Science Center observer documented the take of a leatherback in a bottom otter trawl fishing for *Loligo* squid off of Delaware; TEDs are not required in this fishery. The winter trawl flounder fishery, which did not come under the revised TED regulations, may also interact with leatherback sea turtles.

Gillnet fisheries operating in the nearshore waters of the mid-Atlantic states are also suspected of capturing, injuring, and/or killing leatherbacks when these fisheries and leatherbacks co-occur. Data collected by the NEFSC Fisheries Observer Program from 1994 through 1998 (excluding 1997) indicate that a total of 37 leatherbacks were incidentally captured (16 lethally) in drift gillnets set in offshore waters from Maine to Florida during this period. Observer coverage for this period ranged from 54 to 92 percent.

Poaching is not known to be a problem for nesting populations in the continental U.S. However, in 2001 the NMFS Southeast Fishery Science Center (SEFSC) noted that poaching of juveniles and adults was still occurring in the U.S. Virgin Islands and the Guianas. In all, four of the five strandings in St. Croix were the result of poaching (Boulon 2000). A few cases of fishermen poaching leatherbacks have been reported from Puerto Rico, but most of the poaching is on eggs.

Leatherback sea turtles may be more susceptible to marine debris ingestion than other species due to their pelagic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding areas and migratory routes

(Lutcavage et al. 1997, Shoop and Kenney 1992). Investigations of the stomach contents of leatherback sea turtles revealed that a substantial percentage (44 percent of the 16 cases examined) contained plastic (Mrosovsky 1981). Along the coast of Peru, intestinal contents of 19 of 140 (13 percent) leatherback carcasses were found to contain plastic bags and film (Fritts 1982). The presence of plastic debris in the digestive tract suggests that leatherbacks might not be able to distinguish between prey items and plastic debris (Mrosovsky 1981). Balazs (1985) speculated that the object might resemble a food item by its shape, color, size or even movement as it drifts about, and induce a feeding response in leatherbacks.

It is important to note that, like marine debris, fishing gear interactions and poaching are problems for leatherbacks throughout their range. Entanglements are common in Canadian waters where Goff and Lien (1988) reported that 14 of 20 leatherbacks encountered off the coast of Newfoundland/Labrador were entangled in fishing gear including salmon net, herring net, gillnet, trawl line and crab pot line. Leatherbacks are reported taken by many other nations that participate in Atlantic pelagic longline fisheries, including Taipei, Brazil, Trinidad, Morocco, Cyprus, Venezuela, Korea, Mexico, Cuba, U.K., Bermuda, People's Republic of China, Grenada, Canada, Belize, France, and Ireland (see NMFS SEFSC 2001, for a description of take records). Leatherbacks are known to drown in fish nets set in coastal waters of Sao Tome, West Africa (Castroviejo et al. 1994, Graff 1995). Gillnets are one of the suspected causes for the decline in the leatherback sea turtle population in French Guiana (Chevalier et al. 1999), and gillnets targeting green and hawksbill turtles in the waters of coastal Nicaragua also incidentally catch leatherback turtles (Lagueux et al. 1998).

Observers on shrimp trawlers operating in the northeastern region of Venezuela documented the capture of six leatherbacks from 13,600 trawls (Marcano and Alio-M 2000). A study by the Trinidad and Tobago's Institute for Marine Affairs (IMA), in 2002 confirmed that bycatch of leatherbacks is high in Trinidad. IMA estimated that more than 3,000 leatherbacks were captured incidental to gillnet fishing in the coastal waters of Trinidad in 2000. As much as one half or more of the gravid turtles may be killed (Lee Lum 2003). However, many of the turtles do not die as a result of drowning, but rather because the fishermen butcher them in order to get them out of their nets (NMFS SEFSC 2001).

3.2.4.3 Summary of Leatherback Status

In the Pacific Ocean, the abundance of leatherback turtle nesting individuals and colonies has declined dramatically over the past 10 to 20 years. Nesting colonies throughout the eastern and western Pacific Ocean have been reduced to a fraction of their former abundance by the combined effects of human activities that have reduced the number of nesting females. In addition, egg poaching has reduced the reproductive success of the remaining nesting females. At current rates of decline, leatherback turtles in the Pacific basin are a critically endangered species with a low probability of surviving and recovering in the wild.

In the Atlantic Ocean, our understanding of the status and trends of leatherback turtles is somewhat more confounded, although the overall trend appears to be stable to increasing, compared to the bleak situation in the Pacific. The data indicates increasing or stable nesting populations in all of the regions except West Africa (no long-term data are available) and the Western Caribbean (TEWG 2007). Some of the same factors that led to precipitous declines

of leatherbacks in the Pacific also affect leatherbacks in the Atlantic: leatherbacks are captured and killed in many kinds of fishing gear and interact with fisheries in state, federal, and international waters. Poaching is a problem and affects leatherbacks that occur in U.S. waters. Leatherbacks also appear to be more susceptible to death or injury from ingesting marine debris than other turtle species.

3.2.5 Loggerhead Sea Turtle

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. It was listed because of direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. Loggerhead sea turtles inhabit the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. In the Atlantic, developmental habitat for small juveniles is the pelagic waters of the North Atlantic and the Mediterranean Sea (NMFS and USFWS 1991b). Within the continental United States, loggerhead sea turtles nest from Texas to New Jersey. Major nesting areas include coastal islands of Georgia, South Carolina, and North Carolina, and the Atlantic and Gulf of Mexico coasts of Florida, with the bulk of the nesting occurring on the Atlantic coast of Florida.

3.2.5.1 Pacific Ocean

In the Pacific Ocean, major loggerhead nesting grounds are generally located in temperate and subtropical regions with scattered nesting in the tropics. Within the Pacific Ocean, loggerhead sea turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) and a smaller southwestern nesting aggregation that occurs in eastern Australia (Great Barrier Reef and Queensland) and New Caledonia (NMFS SEFSC 2001). There are no reported loggerhead nesting sites in the eastern or central Pacific Ocean basin. Data from 1995 estimated the Japanese nesting aggregation at 1,000 female loggerhead sea turtles (Bolten et al. 1996). Recent genetic analyses on female loggerheads nesting in Japan suggest that this "subpopulation" is comprised of genetically distinct nesting colonies (Hatase et al. 2002) with precise natal homing of individual females. As a result, Hatase et al. (2002) indicate that loss of one of these colonies would decrease the genetic diversity of Japanese loggerheads; recolonization of the site would not be expected on an ecological time scale. In Australia, long-term census data have been collected at some rookeries since the late 1960s and early 1970s, and nearly all the data show marked declines in nesting populations since the mid-1980s (Limpus and Limpus 2003). The nesting aggregation in Queensland, Australia, was as low as 300 females in 1997.

Pacific loggerhead turtles are captured, injured, or killed in numerous Pacific fisheries including Japanese longline fisheries in the western Pacific Ocean and South China Seas; direct harvest and commercial fisheries off Baja California, Mexico; commercial and artisanal swordfish fisheries off Chile, Columbia, Ecuador, and Peru; purse seine fisheries for tuna in the eastern tropical Pacific Ocean; and California/Oregon drift gillnet fisheries. In addition, the abundance of loggerhead sea turtles on nesting colonies throughout the Pacific basin has declined dramatically over the past 10 to 20 years. Loggerhead turtle colonies in the western Pacific Ocean have been reduced to a fraction of their former abundance by the

combined effects of human activities that have reduced the number of nesting females and reduced the reproductive success of females that manage to nest (e.g., due to egg poaching).

3.2.5.2 Atlantic Ocean

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. There are at least five western Atlantic subpopulations, divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to northeast Florida at about 29°N; (2) a south Florida nesting subpopulation, occurring from 29°N on the east coast to Sarasota on the west coast; (3) a Florida Panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida; (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez 1990 and TEWG 2000); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (NMFS SEFSC 2001). The fidelity of nesting females to their nesting beach is the reason these subpopulations can be differentiated from one another. Fidelity for nesting beaches makes recolonization of nesting beaches with sea turtles from other subpopulations unlikely.

Life History and Distribution

Past literature gave an estimated age at maturity of 21-35 years (Frazer and Ehrhart 1985, Frazer et al. 1994) with the benthic immature stage lasting at least 10-25 years. However, based on new data from tag returns, strandings, and nesting surveys NMFS SEFSC (2001) estimated ages of maturity ranging from 20-38 years and benthic immature stage lasting from 14-32 years.

Mating takes place in late March-early June, and eggs are laid throughout the summer, with a mean clutch size of 100-126 eggs in the southeastern United States. Individual females nest multiple times during a nesting season, with a mean of 4.1 nests/individual (Murphy and Hopkins 1984). Nesting migrations for an individual female loggerhead are usually on an interval of 2-3 years, but can vary from 1-7 years (Dodd 1988). Generally, loggerhead sea turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years or more. Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico, although some loggerheads may move back and forth between the pelagic and benthic environment (Witzell 2002). Benthic immature loggerheads (sea turtles that have come back to inshore and nearshore waters), the life stage following the pelagic immature stage, have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in Northeastern Mexico.

Tagging studies have shown loggerheads that have entered the benthic environment undertake routine migrations along the coast that are limited by seasonal water temperatures. Loggerhead sea turtles occur year round in offshore waters off of North Carolina where water temperature is influenced by the Gulf Stream. As coastal water temperatures warm in the spring, loggerheads begin to immigrate to North Carolina inshore waters (e.g., Pamlico and

Core Sounds) and also move up the coast (Epperly et al. 1995a, Epperly et al. 1995b, Epperly et al. 1995c), occurring in Virginia foraging areas as early as April and on the most northern foraging grounds in the Gulf of Maine in June. The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by mid-September but some may remain in Mid-Atlantic and Northeast areas until late fall. By December loggerheads have emigrated from inshore North Carolina waters and coastal waters to the north to waters offshore of North Carolina, particularly off of Cape Hatteras, and waters further south where the influence of the Gulf Stream provides temperatures favorable to sea turtles ($\geq 1^{\circ}\text{C}$) (Epperly et al. 1995a-c). Loggerhead sea turtles are year-round residents of central and south Florida.

Pelagic and benthic juveniles are omnivorous and forage on crabs, mollusks, jellyfish, and vegetation at or near the surface (Dodd 1988). Sub-adult and adult loggerheads are primarily coastal dwelling and typically prey on benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats.

Population Dynamics and Status

A number of stock assessments (TEWG 1998; TEWG 2000; NMFS 2001a; Heppell et al. 2003) have examined the stock status of loggerheads in the waters of the United States, but have been unable to develop any reliable estimates of absolute population size. Based on nesting data of the five western Atlantic subpopulations, the south Florida-nesting and the northern-nesting subpopulations are the most abundant (TEWG 2000; NMFS 2001a). Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182, annually with a mean of 73,751 (TEWG 2000). On average, 90.7 percent of these nests were of the south Florida subpopulation and 8.5 percent were from the northern subpopulation (TEWG 2000). The TEWG (2000) assessment of the status of these two better-studied populations concluded that the south Florida subpopulation was increasing at that time, while no trend was evident (may be stable but possibly declining) for the northern subpopulation. A more recent, yet-to-be-published, analysis of nesting data from 1989-2005 by the Florida Wildlife Research Institute indicates there is a significant declining trend in nesting at beaches utilized by the south Florida nesting subpopulation (McRae letter to NMFS 2006). Nesting data obtained for the 2006 nesting season is also consistent with the decline in loggerhead nests (Meylan pers. comm. 2006). It is unclear at this time whether the nesting decline reflects a decline in population, or is indicative of a failure to nest by the reproductively mature females as a result of other factors (resource depletion, nesting beach problems, oceanographic conditions, etc.). NMFS has convened a new Turtle Expert Working Group for loggerhead sea turtles that will gather available data and examine the potential causes of the nesting decline and what the decline means in terms of population status. A final report by the loggerhead TEWG is expected by the end of winter 2007.

Another consideration that may add to the importance and vulnerability of the northern subpopulation is the sex ratios of this subpopulation. NMFS scientists have estimated that the northern subpopulation produces 65 percent males (NMFS SEFSC 2001). However, new research conducted over a limited time frame has found opposing sex ratios (Wyneken et al. 2004) so further information is needed to clarify the issue. Since nesting female loggerhead

sea turtles exhibit nest fidelity, the continued existence of the northern subpopulation is related to the number of female hatchlings that are produced. Producing fewer females will limit the number of subsequent offspring produced by the subpopulation.

The remaining three subpopulations (the Dry Tortugas, Florida Panhandle, and Yucatán) are much smaller subpopulations but no less relevant to the continued existence of the species. Nesting surveys for the Dry Tortugas subpopulation are conducted as part of Florida's statewide survey program. Survey effort has been relatively stable during the 9-year period from 1995-2003 (although the 2002 year was missed). Nest counts ranged from 168-270 but with no detectable trend during this period (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide Nesting Beach Survey Data). Nest counts for the Florida Panhandle subpopulation are focused on index beaches rather than all beaches where nesting occurs. Currently, there is not enough information to detect a trend for the subpopulation (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Index Nesting Beach Survey Database). Similarly, nesting survey effort has been inconsistent among the Yucatán nesting beaches and no trend can be determined for this subpopulation. However, there is some optimistic news. Zurita et al. (2003) found a statistically significant increase in the number of nests on seven of the beaches on Quintana Roo, Mexico from 1987-2001 where survey effort was consistent during the period.

Actions have been taken to reduce anthropogenic impacts to loggerhead sea turtles from various sources, particularly since the early 1990's. These include lighting ordinances, predation control, and nest relocations to help increase hatchling survival, as well as measures to reduce the mortality of pelagic immatures, benthic immatures, and sexually mature age classes in various fisheries and other marine activities. Recent actions have taken significant steps towards reducing the environmental baseline and improving the status of all loggerhead subpopulations. For example, the TED regulation published on February 21, 2003, (68 FR 8456) represents a significant improvement in the baseline affecting loggerhead sea turtles. Shrimp trawling is considered to be the largest source of anthropogenic mortality on loggerheads.

Threats

The diversity of a sea turtle's life history leaves them susceptible to many natural and human impacts, including impacts while they are on land, in the benthic environment, and in the pelagic environment. Hurricanes are particularly destructive to sea turtle nests. Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. For example, in 1992, all of the eggs over a 90-mile length of coastal Florida were destroyed by storm surges on beaches that were closest to the eye of Hurricane Andrew (Milton et al. 1994). Also, many nests were destroyed during the 2004 and 2005 hurricane seasons. Other sources of natural mortality include cold stunning and biotoxin exposure.

Anthropogenic factors that impact hatchlings and adult female sea turtles on land, or the success of nesting and hatching include: beach erosion, beach armoring and nourishment, artificial lighting, beach cleaning, increased human presence, recreational beach equipment,

beach driving, coastal construction and fishing piers, exotic dune and beach vegetation, and poaching. An increase in human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, feral hogs, dogs and an increased presence of native species (e.g., raccoons, armadillos, and opossums) which raid and feed on turtle eggs. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merritt Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection. Sea turtle nesting and hatching success on unprotected high density east Florida nesting beaches from Indian River to Broward County are affected by all of the above threats.

Loggerhead sea turtles are affected by a completely different set of anthropogenic threats in the marine environment. These include oil and gas exploration, coastal development, and transportation, marine pollution, underwater explosions, hopper dredging, offshore artificial lighting, power plant entrainment and/or impingement, entanglement in debris, ingestion of marine debris, marina and dock construction and operation, boat collisions, poaching, and fishery interactions. Loggerheads in the pelagic environment are exposed to a series of longline fisheries, which include the Atlantic highly migratory species (HMS) pelagic longline fisheries, an Azorean longline fleet, a Spanish longline fleet, and various longline fleets in the Mediterranean Sea (Aguilar et al. 1995, Bolten et al. 1994, Crouse 1999b). Loggerheads in the benthic environment in waters off the coastal U.S. are exposed to a suite of fisheries in federal and state waters including trawl, purse seine, hook and line, gillnet, pound net, longline, and trap fisheries (see further discussion in Section 4.0, Environmental Baseline).

Loggerheads may also be facing a new threat that could be either natural or anthropogenic. A little understood disease may pose a new threat to loggerheads sea turtles. From October 5, 2000, to March 24, 2001, 49 debilitated loggerheads associated with the disease were found in southern Florida from Manatee County on the west coast through Brevard County on the east coast (Foley 2002). From the onset of the epizootic through its conclusion, affected sea turtles were found throughout south Florida. Most (N=34) were found in the Florida Keys (Monroe County). The number of dead or debilitated loggerheads found during the epizootic (N=189) was almost six times greater than the average number found in south Florida from October to March during the previous ten years. After determining that no other unusual mortality factors appeared to have been operating during the epizootic, 156 of the strandings were likely to be attributed to disease outbreak. These numbers may represent only 10 percent to 20 percent of the sea turtles that were affected by this disease because many dead or dying sea turtles likely never wash ashore. Overall mortality associated with the epizootic was estimated between 156 and 2,229 loggerheads (Foley 2002). Scientists were unable to attribute the illness and epidemic to any one specific pathogen or toxin. If the agent responsible for debilitating these sea turtles re-emerges in Florida, and if the agent is infectious, nesting females could spread the disease throughout the range of the adult loggerhead population.

3.2.5.3 Summary of Status for Loggerhead Sea Turtles

In the Pacific Ocean, loggerhead sea turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) and a smaller southwestern nesting aggregation that occurs in Australia (Great Barrier Reef and Queensland) and New Caledonia. The abundance of loggerhead sea turtles on nesting colonies throughout the Pacific basin has declined dramatically over the past 10 to 20 years. Data from 1995 estimated the Japanese nesting aggregation at 1,000 female loggerhead sea turtles (Bolten et al. 1996), but it has probably declined since 1995 and continues to decline (Tillman 2000). The nesting aggregation in Queensland, Australia, was as low as 300 females in 1997.

In the Atlantic Ocean, absolute population size is not known, but based on extrapolation of nesting information, loggerheads are likely much more numerous than in the Pacific Ocean. The NMFS recognizes five subpopulations of loggerhead sea turtles in the western north Atlantic based on genetic studies. Cohorts from all of these are known to occur within the action area of this consultation. There are no detectable nesting trends for the two largest western Atlantic subpopulations: the South Florida subpopulation and the northern subpopulation. Because of its size, the South Florida subpopulation may be critical to the survival of the species in the Atlantic Ocean. In the past, this nesting aggregation was considered second in size only to the nesting aggregation on islands in the Arabian Sea off Oman (Ross 1979, Ehrhart 1989, NMFS and USFWS 1991b). However, the status of the Oman colony has not been evaluated recently and it is located in an area of the world where it is highly vulnerable to disruptive events such as political upheavals, wars, catastrophic oil spills, and lack of strong protections for sea turtles (Meylan et al. 1995). Given the lack of updated information on this population, the status of loggerheads in the Indian Ocean basin overall is essentially unknown.

All loggerhead subpopulations are faced with a multitude of natural and anthropogenic effects that negatively influence the status of the species. Many anthropogenic effects occur as a result of activities outside of U.S. jurisdiction (i.e., fisheries in international waters).

3.2.6 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 off of New York. Based on smalltooth sawfish encounter data, the current core range for the smalltooth sawfish is currently from the Caloosahatchee River 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 appear to 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 still 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 five months and concluded that females probably produce litters every second year.

Bigelow and Schroeder (1953) describe smalltooth sawfish as generally about two 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 very a 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). Mature animals are known to occur in water depths of 100 m or more (C. Simpfendorfer pers. comm. 2006).

Mote Marine Lab (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).

Smalltooth sawfish historically occurred commonly in the shallow waters of the Gulf of Mexico and along the eastern seaboard as far north as North Carolina, with rare records of occurrence as far north as New York. The smalltooth sawfish range has subsequently contracted to predominantly peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. Historic records of smalltooth sawfish indicate that some large mature individuals migrate 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 – a smalltooth sawfish captured off of Georgia in July 2000 – 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. NMFS observers have been collecting data in the Atlantic longline fishery since 1992 and have no documented interactions between the HMS pelagic longline fishery and smalltooth sawfish, which provides some additional support to these range estimates. 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 degradation of habitat contributed to the decline of many marine species and is expected to have impacted 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 percent 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 fishers, scuba divers, mosquito control districts, and newspapers. To date, a total of 2,620 smalltooth sawfish encounters have been reported (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). As of October 2006, a total of 754 sawfish encounters have been reported 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 2003 is the first record north of Florida since 1963. New reports during 2004 extend the current range of the species from 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 so might 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 effort is 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 percent.

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 historically abundant 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, sea wall 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 to shallow, estuarine systems (NMFS 2000a).

Fisheries also 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 2000a). 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.

The current and future abundance of smalltooth sawfish is limited by its life history characteristics (NMFS 2000a). Slow growing, late maturing, and long-lived species such as the smalltooth sawfish are not able to respond effectively (rapidly) to increasing 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

This section contains an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, their habitat, and ecosystem, within the action area. The environmental baseline is a snapshot of a species' health at a specified point in time and includes state, tribal, local and private actions already affecting the species, or that will occur contemporaneously with the consultation in progress. Unrelated federal actions affecting the same species or critical habitat that have completed formal consultation are also part of the environmental baseline, as are federal and other actions within the action area that may benefit listed species or critical habitat.

The environmental baseline for this opinion includes the effects of several activities that affect the survival and recovery of threatened and endangered species in the action area. The activities that shape the environmental baseline in the action area of this consultation primarily are federal and state fisheries. Other environmental impacts include effects of vessel operations, additional military activities, dredging, oil and gas exploration, nuclear and coal power plant operations, and permits allowing take under the ESA. This analysis also addresses ways the potential indirect effects of international activities, marine pollution, disease, and acoustic interference may impact sea turtles.

4.1 Factors Affecting Sea Turtles within the Action Area

The five species of sea turtles that occur in the action area are all highly migratory. NMFS believes that no individual members of any of the species are likely to be year-round residents of the action area. Individual animals will make migrations into near shore waters as well as other areas of the North Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Therefore, the range-wide status of the five species of sea turtles, given in section 3.0 above, most accurately reflects the species status within the action area. Likewise, while the following discussion of factors affecting species reflects conditions both inside and outside of the immediate action area, this discussion most accurately reflects those factors acting on sea turtles that may occur within the action area seasonally or transiently.

4.1.1. Federal Actions

In recent years, NMFS has undertaken several ESA section 7 consultations to address the effects of federally permitted fisheries and other federal actions on threatened and endangered sea turtle species, and when appropriate, has authorized the incidental taking of these species. Each of those consultations sought to develop ways of reducing the probability of adverse effects of the action on sea turtles. Similarly, NMFS has undertaken recovery actions under the ESA to address sea turtle takes in the fishing and shipping industries and other activities such as Army Corps of Engineers (COE) dredging operations. The summaries below address anticipated sources of incidental take of sea turtles and include only those federal actions in the U.S. Mid-Atlantic, South Atlantic, and Gulf of Mexico, which have already concluded formal section 7 consultation.

Fisheries

Adverse effects on threatened and endangered sea turtles from several types of fishing gear occur in the action area. Gillnet, longline, trawl gear, and pot fisheries have all been documented as interacting with sea turtles. For all fisheries for which there is an FMP or for which any federal action is taken to manage that fishery, impacts have been evaluated under section 7. Formal section 7 consultations have been conducted on the following fisheries occurring at least in part within the action area and likely to adversely affect threatened and endangered sea turtles: Atlantic bluefish, Atlantic herring, Atlantic mackerel/squid/butterfish, dolphin/wahoo, monkfish, northeast multispecies, spiny dogfish, southeastern shrimp trawl fishery, summer flounder/scup/black sea bass, southern flounder gillnet fishery, tilefish fisheries, Atlantic swordfish/tuna/shark/billfish, South Atlantic snapper-grouper, and Gulf of Mexico reef fish fisheries. An Incidental Take Statement (ITS) has been issued for the take of sea turtles in each of these fisheries. A summary of each consultation is provided below, but more detailed information can be found in the respective opinions.

In a July 2, 1999, biological opinion on the *Atlantic Bluefish fishery*, NMFS found the operation of the fishery was likely to adversely affect Kemp's ridley and loggerhead sea turtles, but not likely to jeopardize their continued existence (NMFS 1999a). The Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council jointly manage bluefish under Amendment 1 to the Bluefish FMP. The majority of commercial fishing activity in the Mid-Atlantic occurs in the late spring to early fall when bluefish (and sea turtles) are most abundant in these areas. Gillnets are the primary gear used to commercially land bluefish and sea turtles can become entangled in the buoy lines of gillnets or in the net panels. Because of that entanglement risk, NMFS provided an ITS authorizing the take of six loggerhead sea turtles (no more than three shall be lethal) and six lethal or non-lethal of Kemp's ridley sea turtles annually.

Section 7 consultation was completed on the *Atlantic Herring fishery* on September 17, 1999 (NMFS 1999b). This fishery is now managed under the Atlantic Herring FMP, which was implemented in December 11, 2000. NMFS concluded authorization of the federal herring fishery under the Atlantic Herring FMP may adversely affect loggerhead, leatherback, Kemp's ridley, and green sea turtles as a result of capture in gear used in the fishery, but was

not likely to jeopardize their continued existence. The primary gear types used in the fishery include mid-water pair trawl, single vessel mid-water trawl, purse seine, bottom trawl, and weirs (fixed gear). Although there is no direct evidence of takes of ESA-listed species in this fishery from the NMFS sea sampling program, observer coverage of this fishery has been minimal. An ITS was provided for sea turtles with the opinion based on the observed capture of sea turtles in other fisheries using comparable gear.

Atlantic Mackerel/Squid/Butterfish fisheries are managed under a single FMP, which was first implemented on April 1, 1983. The most recent opinion on federal *Atlantic Mackerel/Squid/Butterfish fisheries* was completed on April 28, 1999. The opinion concluded that the continued authorization of the FMP was likely to adversely affect sea turtles, but not jeopardize their continued existence (NMFS 1999c). Trawl gear is the primary fishing gear for these fisheries, but several other types of gear may also be used, including hook-and-line, pot/trap, dredge, pound net, and bandit gear. Entanglements or entrapments of sea turtles have been recorded in one or more of these gear types. An ITS for sea turtles was provided with the opinion.

The FMP for the *Dolphin/Wahoo fishery* was approved in December 2003. NMFS conducted a formal section 7 consultation to consider the effects of implementation of the FMP on sea turtles (NMFS 2003b). Allowable gears for dolphin and wahoo in the Atlantic EEZ include longline (except surface and pelagic longline gear within any "time or area closure" in the South Atlantic Council's area of jurisdiction), other types of hook-and-line gear, and spearfishing gear. The August 27, 2003, opinion concluded that loggerhead, leatherback, hawksbill, green, and Kemp's ridley sea turtles may be adversely affected by operation of the fishery, but was not expected to jeopardize their continued existence.

The federal *Monkfish fishery* occurs in all waters under federal jurisdiction from Maine to the North Carolina/South Carolina border. The monkfish fishery uses several gear types that may capture ESA-listed species including gillnet and trawl gear. A section 7 consultation conducted in 2001 concluded that the operation of the fishery may adversely affect sea turtles, but was not likely to jeopardize their continued existence. Although the estimated capture of sea turtles in monkfish gillnet gear was low, there was concern that that much higher levels of interactions could occur. Regulations to reduce the impact of the monkfish and other large-mesh gillnet fisheries on endangered and threatened species of sea turtles in areas where they are known to concentrate, were implemented in 2002 and modified in 2006 (see Section 4.4.3.1.). In 2003, proposed changes to the Monkfish FMP led to reinitiation of consultation to determine the effects of those actions on ESA-listed species. The resulting opinion concluded the proposed changes were likely to adversely affect green, Kemp's ridley, loggerhead and leatherback sea turtles, but were not likely to jeopardize their continued existence (NMFS 2003c).

A June 14, 2001, opinion evaluated the impacts of the multiple gear types used in the *Northeast Multispecies fishery* on protected species (NMFS 2001b). The gear type considered of greatest concern in that opinion was sink gillnet gear, which can entangle sea turtles (i.e., in buoy lines and/or net panels). The northeast multispecies sink gillnet fishery has historically occurred from the periphery of the Gulf of Maine to Rhode Island in water as

deep as 60 fathoms. In recent years, more of the effort in the fishery has occurred in offshore waters and into the Mid-Atlantic. Participation in this fishery has declined because extensive groundfish conservation measures have been implemented; the latest of these occurring under Amendment 13 to the Multispecies FMP. A significant reduction in effort in the fishery is expected as a result of the Amendment 13 measures.

The primary gear types for the *Spiny Dogfish fishery* are sink gillnets, otter trawls, bottom longline, and driftnet gear. Spiny dogfish are landed in every state from Maine to North Carolina, throughout a broad area with the distribution of landings varying by area and season. During the fall and winter months, spiny dogfish are captured principally in Mid-Atlantic waters from New Jersey to North Carolina. During the spring and summer months, spiny dogfish are landed mainly in northern waters from NY to ME. Sea turtles can be incidentally captured in all gear sectors of this fishery. NMFS reinitiated consultation on the Spiny Dogfish FMP on May 4, 2000, to reevaluate, in part, the effects of the spiny dogfish gillnet fishery on sea turtles (NMFS 2001c). A new ITS was provided for the take of sea turtles in the fishery. The FMP for spiny dogfish called for a 30 percent reduction in quota allocation levels for 2000 and a 90 percent reduction in 2001. Although there have been delays in implementing the plan, quota allocations are expected to be substantially reduced over the 4½ year rebuilding schedule; this should result in a substantial decrease in effort directed at spiny dogfish. The reduction in effort should be of benefit to protected species by reducing the number of gear interactions that occur.

The *Southeast shrimp trawl fishery* affects more sea turtles than all other activities combined (NRC 1990). On December 2, 2002, NMFS completed the opinion for shrimp trawling in the southeastern United States (NMFS 2002a) under proposed revisions to the TED regulations (68 FR 8456, February 21, 2003). This opinion determined that the shrimp trawl fishery under the revised TED regulations would not jeopardize the continued existence of any sea turtle species. This determination was based, in part, on the opinion's analysis that shows the revised TED regulations are expected to reduce shrimp trawl related mortality by 94 % for loggerheads and 97 % for leatherbacks.

The *Summer Flounder, Scup, and Black Sea Bass fisheries* are known to interact with sea turtles. Summer flounder, scup, and black sea bass are managed under one FMP since these species occupy similar habitat and are often caught at the same time. The primary gear types used in the summer flounder, scup, and black sea bass fisheries are mobile trawl gear, pots and traps, gillnets, pound nets, and handlines. Significant measures have been developed to reduce the take of sea turtles in summer flounder trawls and trawls that meet the definition of a summer flounder trawl (which would include fisheries for other species like scup and black sea bass) by requiring the use TEDs throughout the year for trawl nets fished from the North Carolina/South Carolina border to Oregon Inlet, North Carolina and seasonally (March 16-January 14) for trawl vessels fishing between Oregon Inlet, North Carolina and Cape Charles, Virginia. Due to the availability of new information not previously considered, NMFS reinitiated consultation on the fishery in 2001 to consider the effects of the fisheries on whales and sea turtles. The resulting biological opinion (NMFS 2001d) found the fishery was likely to adversely affect Kemp's ridley and green sea turtles. The opinion did not anticipate the take of any other sea turtles.

The North Carolina inshore fall *Southern Flounder gillnet fishery* was identified as a source of large numbers of sea turtle mortalities in 1999 and 2000, especially loggerhead sea turtles. In 2001, NMFS issued an ESA section 10 permit (64 FR 47715, August 3, 2000) to North Carolina with mitigative measures for the southern flounder fishery. Subsequently, the sea turtle mortalities in these fisheries were drastically reduced. The reduction of sea turtle mortalities in these fisheries reduces the negative effects these fisheries have on the environmental baseline.

The effects of the *Tilefish* fishery on ESA-listed species were considered during formal consultation on the implementation of a new Tilefish FMP, completed in March 2001. The management unit for the *Tilefish* FMP is all golden tilefish under U.S. jurisdiction in the Atlantic Ocean north of the Virginia/North Carolina border. Tilefish have some unique habitat characteristics, and are found in a warm water band (8°C-18°C) approximately 250 to 1200 feet deep on the outer continental shelf and upper slope of the U.S. Atlantic coast. Because of their restricted habitat and low biomass, the tilefish fishery in recent years has occurred in a relatively small area in the Mid-Atlantic Bight, south of New England and west of New Jersey. Bottom longline gear equipped with circle hooks is the primary gear type used in the tilefish fishery. Consultation was concluded on March 13, 2001, with the issuance of a non-jeopardy biological opinion. The opinion includes an ITS for loggerhead and leatherback sea turtles (NMFS 2001e).

Atlantic Pelagic Fisheries for Swordfish, Tuna, Shark, and Billfish are known to incidentally capture large numbers of sea turtles, particularly in the pelagic longline component. Consultation was last completed on the continued operation of Atlantic shark fisheries and the July 2003, Proposed Rule for Draft Amendment 1 to the HMS FMP on October 29, 2003. The opinion concluded the proposed action was not likely to jeopardize the continued existence of any listed sea turtles (NMFS 2003d). Subsequently, NMFS reinitiated consultation on the pelagic longline component of this fishery (NMFS 2004b); as a result of exceeded incidental take levels for loggerheads and leatherbacks sea turtles. The resulting opinion stated the long-term continued operation this sector of the fishery was likely to jeopardize the continued existence of leatherback sea turtles. During the consultation process, Reasonable and Prudent Alternatives (RPAs) were developed to allow for the continued authorization of the pelagic longline fishing that would not jeopardize leatherback sea turtles.

NMFS recently completed a section 7 consultation on the continued authorization of the *Gulf of Mexico Reef Fish fishery* (NMFS 2005b). The fishery uses three basic types of gear: spear and powerhead, trap and hook-and-line gear. Hook-and-line gear used in the fishery includes both commercial bottom longline and commercial and recreational vertical line (e.g., handline, bandit gear, rod and reel). The biological opinion concluded that loggerhead, leatherback, hawksbill, green, and Kemp's ridley sea turtles may be adversely affected by operation of the fishery. However, the proposed action was not expected to jeopardize the continued existence of any of these species.

A Section 7 consultation on the *South Atlantic Snapper-Grouper fishery* (NMFS 2006a) has also recently been completed by NMFS. The fishery uses: spear and powerhead, black sea

bass pot and hook-and-line gear. Hook-and-line gear used in the fishery includes commercial bottom longline gear and commercial and recreational vertical line gear (e.g., handline, bandit gear, rod and reel). The consultation found only hook-and-line gear likely to adversely affect, green, hawksbill, Kemp's ridley leatherback, and loggerhead sea turtles. The consultation concluded the proposed action was not likely to jeopardize the continued existence of any of these species.

Vessel Operations

Potential sources of adverse effects from federal vessel operations in the action area and throughout the range of sea turtles include operations of the U.S. Navy (USN) and Coast Guard (USCG), the Environmental Protection Agency, the National Oceanic and Atmospheric Administration (NOAA), and the COE. NMFS has conducted formal consultations with the USCG, the USN, and NOAA on their vessel operations. Through the section 7 process, where applicable, NMFS has and will continue to establish conservation measures for all these agency vessel operations to avoid or minimize adverse effects to listed species. At the present time, however, they present the potential for some level of interaction. Refer to the biological opinions for the USCG (NMFS 1995, 1996) and the USN (NMFS 1997a) for details on the scope of vessel operations for these agencies and conservation measures being implemented as standard operating procedures.

The USN consultation only covered operations out of Mayport, Florida, and the potential exists for USN vessels to adversely affect sea turtles when they are operating in other areas within the range of these species. Similarly, operations of vessels by other federal agencies within the action area (NOAA, EPA, ACOE) may adversely affect sea turtles. However, the in-water activities of those agencies are limited in scope, as they operate a limited number of vessels or are engaged in research/operational activities that are unlikely to contribute a large amount of risk.

Additional Military Activities

Additional activities including ordnance detonation, also affect listed species of sea turtles. USN aerial bombing training in the ocean off the southeast U.S. coast, involving drops of live ordnance (500 and 1,000-lb bombs), is estimated to have the potential to injure or kill, annually, 84 loggerheads, 12 leatherbacks, and 12 greens or Kemp's ridley, in combination (NMFS 1997a). Operation of the USCG's boats and cutters in the U.S. Atlantic, meanwhile, is estimated to take no more than one individual turtle of any species per year (NMFS 1995). Formal consultation on overall USCG or USN activities in the Gulf of Mexico has not been conducted.

Dredging

The construction and maintenance of Federal navigation channels has also been identified as a source of turtle mortality. Hopper dredges, which are frequently used in ocean bar channels and sometimes in harbor channels and offshore borrow areas, move relatively rapidly (compared to sea turtle swimming speeds) and can entrain and kill sea turtles, presumably as the drag arm of the moving dredge overtakes the slower moving turtle. Along the Atlantic coast of the southeastern United States, NMFS estimates that annual, observed injury or mortality of sea turtles from hopper dredging may reach 35 loggerheads, seven

greens, seven Kemp's ridleys, and two hawksbills (NMFS 1997b). A regional opinion for the COE's Gulf of Mexico hopper dredging operations was completed in November 2003 (NMFS 2003e). The opinion concluded "no jeopardy" for sea turtles. An ITS was provided, as well as reasonable and prudent measures specified to minimize impacts included the use of temporal dredging windows, intake and overflow screening, the use of sea turtle deflector dragheads, observer and reporting requirements, and sea turtle relocation trawling.

Oil and Gas Exploration

The COE and the Minerals Management Service (MMS) authorize oil and gas exploration, well development, production, and abandonment/rig removal activities that may adversely affect sea turtles. Both of these agencies have consulted numerous times with NMFS on these types of activities. These activities include the use of seismic arrays for oil and gas exploration in the Gulf of Mexico, the impacts of which have been analyzed in opinions for individual and multi-lease sales.⁸

Explosive removal of offshore structures may adversely affect sea turtles. For COE activities, an incidental take (by injury or mortality) of one Kemp's ridley, green, hawksbill, leatherback, or loggerhead turtle is anticipated under a rig removal consultation for the New Orleans District (NMFS 1998). MMS activities are anticipated to result in annual incidental take (by injury or mortality) of 30 sea turtles, including no more than five Kemp's ridley, green, hawksbill, or leatherback sea turtles and no more than 10 loggerhead sea turtles. In July 2004, MMS completed a programmatic environmental assessment (PEA) on geological and geophysical exploration on the Gulf of Mexico Outer Continental Shelf (MMS 2004). The MMS has also recently completed a PEA on removal and abandonment of offshore structures and effects on protected species in the Gulf of Mexico (MMS 2005).

Nuclear and Coal-Fueled Generating Plants

Another action with federal oversight (the Nuclear Regulatory Commission) impacting sea turtles is the operation of nuclear generating plants. Sea turtles entering coastal or inshore areas have been affected by entrainment in the cooling-water systems of coal-fueled and nuclear generating plants; though it is important to note that the majority of sea turtles caught are released alive. In the Gulf of Mexico, NMFS has conducted section 7 consultations on the operation of the Crystal River Energy Complex's (CREC) cooling water intake system located near the Gulf of Mexico in Citrus County, Florida. The most recent opinion, dated August 8, 2002, concluded the proposed action is not likely to jeopardize the continued existence of loggerhead, Kemp's ridley, green, hawksbill, and leatherback sea turtles (NMFS 2002b). NMFS anticipates an annual incidental take of up to seventy-five live sea turtles and three sea turtles killed as a result of CREC operations. Most these takes are expected to be loggerhead, Kemp's ridley, and green sea turtles.

A 2001 opinion (NMFS 2001f) evaluated the impacts of the operation of the St. Lucie nuclear power plant at Hutchinson Island, Florida, due to documented sea turtle entrainment in the cooling-water systems at this electrical generating plant. NMFS anticipated up to 1,000 green and loggerhead sea turtles may have been taken during a 10-year period.

⁸ e.g. NMFS anticipates incidental takes of sea turtles from vessel strikes, noise, marine debris, and the use of explosives to remove oil and gas structures.

Additionally, two Kemp's ridley, and one hawksbill or leatherback would be taken every two years over a 10-year period. Since most of the turtles are caught and released alive, NMFS estimates the survival rate at 98.5 percent or greater. The opinion stated that the continued operation of the plant was likely to adversely affect sea turtles, but not jeopardize their continued existence.

A biological opinion completed in January 2000 estimates that the operations at the Brunswick Steam Electric Plant in Brunswick, North Carolina, may take 50 sea turtles in any combination annually that are released alive. NMFS also estimated the total lethal take of sea turtles at this plant may reach 6 loggerhead, 2 Kemp's ridley or 3 green sea turtles annually (NMFS 2000b).

ESA Permits

Regulations developed under the ESA allow for the issuance of permits allowing take of certain ESA-listed species for the purposes of scientific research under section 10(a)(1)(a) of the ESA. In addition, the ESA allows for NMFS to enter into cooperative agreements with states developed under section 6 of the ESA, to assist in recovery actions of listed species. Prior to issuance of these authorizations, the proposal must be reviewed for compliance with section 7 of the ESA.

Sea turtles are the focus of research activities authorized by section 10 permits under the ESA. There are currently 35 active scientific research permits directed toward sea turtles that are applicable to the action area of this opinion. Authorized activities range from photographing, weighing, and tagging sea turtles incidentally taken in fisheries, blood sampling, tissue sampling (biopsy) and performing laparoscopy on intentionally captured sea turtles. The number of authorized takes varies widely depending on the research and species involved but may involve the taking of hundreds of sea turtles annually. Most of takes authorized under these permits are expected to be non-lethal. Before any research permit is issued, the proposal must be reviewed under the permit regulations (i.e., must show a benefit to the species). In addition, since issuance of the permit is a federal activity, issuance of the permit by NMFS must also be reviewed for compliance with section 7(a)(2) of the ESA to ensure that issuance of the permit does not result in jeopardy to the species. However, despite these safeguards research activities may result in cumulative effects on sea turtle populations.

4.1.2 State or Private Actions

State Fisheries

Various fishing methods used in state commercial and recreational fisheries, including gillnets, fly nets, trawling, pot fisheries, pound nets, and vertical line are all known to incidentally take sea turtles, but information on these fisheries is sparse (NMFS SEFSC 2001). Most of the state data are based on extremely low observer coverage or sea turtles were not part of data collection; thus, these data provide insight into gear interactions that could occur but are not indicative of the magnitude of the overall problem. The following sections will briefly discuss the fisheries listed here.

A detailed summary of the gillnet fisheries currently operating along the mid- and southeast U.S. Atlantic coastline, and Gulf of Mexico, which are known to incidentally capture loggerheads, can be found in the TEWG reports (1998, 2000). Georgia and South Carolina prohibit gillnets for all but the shad fishery. No takes of protected species were observed during the one season the NMFS SEFSC observed this fishery in South Carolina (McFee et al. 1996). Florida banned all but very small nets in state waters, as has Texas. Louisiana, Mississippi, and Alabama have also placed restrictions on gillnet fisheries within state waters such that very little commercial gillnetting takes place in southeast waters, with the exception of North Carolina. Some illegal gillnet incidental captures have been reported in South Carolina, Florida, Louisiana, and Texas (NMFS SEFSC 2001).

Gillnetting is more prevalent in the Mid-Atlantic with fisheries operating in New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina state waters and/or federal waters. Incidental captures in these gillnet fisheries (both lethal and non-lethal) of loggerhead, leatherback, green and Kemp's ridley sea turtles have been reported (W. Teas, pers. comm., J. Braun-McNeill pers. comm.). Gillnetting activities in North Carolina associated with the southern flounder fishery had been implicated in large numbers of sea turtle mortalities. The Pamlico Sound portion of that fishery was closed and has subsequently been reopened under a section 10(a)(1)(B) permit.

The North Carolina Observer program documented 33 flynet trips from November through April of 1991-1994 and recorded no sea turtles caught in 218 hours of trawl effort. However, a NMFS-observed vessel fished for summer flounder for 27 tows with an otter trawl equipped with a TED and then fished for weakfish and Atlantic croaker with a flynet that was not equipped with a TED. They caught one loggerhead in 27 TED-equipped tows and seven loggerheads in nine flynet tows without TEDs. In addition, the same vessel using the flynet on a previous trip took 12 loggerheads in 11 out of 13 observed tows targeting Atlantic croaker. NMFS is testing designs for TEDs that may be required in the flynet fishery in the future.

Other state bottom trawl fisheries that are suspected of incidentally capturing sea turtles are the horseshoe crab fishery in Delaware (Spotila et al. 1998) and the whelk trawl fishery in South Carolina (S. Murphy, pers. comm. to J. Braun-McNeill, November 27, 2000) and Georgia (M. Dodd, pers. comm. to J. Braun-McNeill, December 21, 2000). In South Carolina, the whelk trawling season opens in late winter and early spring when offshore bottom waters are <55°F. One criterion for closure of this fishery is water temperature: whelk trawling closes for the season and does not reopen throughout the state until six days after water temperatures first reach 64°F in the Fort Johnson boat slip. Based on the South Carolina Department of Natural Resources Office of Fisheries Management data, approximately six days will usually lapse before water temperatures reach 68°F, the temperature at which sea turtles move into state waters (D. Cupka, pers. comm.). From 1996-1997, observers onboard whelk trawlers in Georgia reported a total of three Kemp's ridley, two green, and two loggerhead sea turtles captured in 28 tows for a CPUE of 0.3097 sea turtles/100 ft net hour. As of December 2000, TEDs are required in Georgia state waters when trawling for whelk. There has also been one report of a loggerhead captured in a

Florida try net (W. Teas, pers. comm.). Trawls for cannonball jellyfish may also be a source of interactions.

The incidental captures of loggerheads and leatherbacks in fish traps set in Massachusetts, Rhode Island, New York, New Jersey, Maryland and Florida have also been reported (W. Teas, pers. comm.). Although no incidental captures have been documented from fish traps set in North Carolina and Delaware (Anon 1995), they are another potential anthropogenic impact to loggerheads and other sea turtles. The lobster pot fisheries in Massachusetts (Prescott 1988), Rhode Island (Anon 1995), Connecticut (Anon 1995) and New York (S. Sadove, pers. comm.) are believed to be more likely to entangle leatherback sea turtles. No incidental capture data exist for the other states.

More passive than fish traps or lobster pots are pound nets. This stationary gear is known to incidentally capture loggerhead sea turtles in Massachusetts (R. Prescott pers. comm.), Rhode Island, New Jersey, Maryland (W. Teas pers. comm.), New York (Morreale and Standora 1998), Virginia (Bellmund et al. 1987) and North Carolina (Epperly et al. 2000). Although pound nets are not a significant source of mortality for loggerheads in New York (Morreale and Standora 1998) and North Carolina (Epperly et al. 2000), they have been implicated in the stranding deaths of loggerheads in the Chesapeake Bay from mid-May through early June (Bellmund et al. 1987). The sea turtles were reported entangled in the large mesh (>8 inches) pound net leads (NMFS SEFSC 2001).

The above fishing activities may be correlated to regular pulses of greatly elevated sea turtle strandings in the Mid-Atlantic area, particularly along North Carolina through southern Virginia in the late fall/early spring, coincident with their migrations. For example, in the last weeks of April through early May 2000, approximately 300 sea turtles, mostly loggerheads, stranded north of Oregon Inlet, NC. Gillnets were found with four of the carcasses. These strandings are likely caused by state fisheries as well as federal fisheries, although not any one fishery has been identified as the major cause. Fishing effort data indicate that fisheries targeting monkfish, dogfish, and bluefish were operating in the area of the strandings. Strandings in this area represent at best, 7-13 percent of the actual nearshore mortality (Epperly et al. 1996). Studies by Bass et al. (1998), Norrgard (1995) and Rankin-Baransky (1997) indicate that the percentage of northern loggerheads in this area is highly over-represented in the strandings when compared to the ~ 9 percent representation from this subpopulation in the overall U.S. sea turtle nesting populations. Specifically, the genetic composition of sea turtles in this area is 25-54 percent from the northern subpopulation, 46-64 percent from the South Florida sub-population, and 3-16 percent from the Yucatan subpopulation. The cumulative removal of these sea turtles on an annual basis would severely impact the northern subpopulation and leave it vulnerable to extirpation. The loss of genetic diversity as a result of distinct nesting aggregations would severely impede the recovery of this species.

Beyond commercial fisheries, observations of state recreational fisheries have shown that loggerhead, leatherback, Kemp's ridley, and green sea turtles are known to bite baited hooks and loggerheads and Kemp's ridleys frequently ingest the hooks. Data reported through MRFSS (Unpublished data, NMFS 2006) show recreational fishers have hooked sea turtles

when fishing from boats, piers, and beach, banks, and jetties. A detailed summary of the known impacts of hook-and-line incidental captures to loggerhead sea turtles can be found in the TEWG reports (1998, 2000).

Although few of these state regulated fisheries are currently authorized to incidentally take listed species, several state agencies have approached NMFS to discuss applications for a section 10(a)(1)(B) incidental take permit. Since NMFS' issuance of a section 10(a)(1)(B) permit requires formal consultation under section 7 of the ESA, the effects of these activities are considered in section 7 consultation. Any fisheries that come under a section 10(a)(1)(B) permit in the future will likewise be subject to section 7 consultation. Although the past and current effects of these fisheries on listed species is currently not determinable, NMFS believes that ongoing state fishing activities may be responsible for seasonally high levels of observed strandings of sea turtles on both the Atlantic and Gulf of Mexico coasts.

Vessel Traffic

Commercial traffic and recreational pursuits can adversely affect sea turtles through propeller and boat strikes. The Sea Turtle Stranding and Salvage Network (STSSN) includes many records of vessel interaction (propeller injury) with sea turtles off Gulf of Mexico coastal states such as Florida, where there are high levels of vessel traffic. The extent of the problem is difficult to assess because of not knowing whether the majority of sea turtles are struck pre- or post-mortem. Private vessels in the action area participating in high-speed marine events (e.g., boat races) are a particular threat to sea turtles. NMFS and the USCG have completed several formal consultations on individual marine events that may impact sea turtles. NMFS and USCG St. Petersburg Sector are currently conducting a formal consultation regarding high-speed boating events and fishing tournaments occurring off the west coast of Florida that may impact sea turtles.

Coastal Development

Increasing vessel traffic will be a result of continued coastal development. Beachfront development, lighting and beach erosion control all are ongoing activities along the Gulf of Mexico and Atlantic coasts. These activities potentially reduce or degrade sea turtle nesting habitats or interfere with hatchling movement to sea. Nocturnal human activities along nesting beaches may also discourage sea turtles from nesting sites. The extent to which these activities reduce sea turtle nesting and hatchling production is unknown. However, more and more coastal counties are adopting stringent protective measures to protect hatchling sea turtles from the disorienting effects of beach lighting.

4.1.3 Other Sources of Impacts

Marine Pollution

Anthropogenic sources of marine pollution, while difficult to attribute to a specific federal, state, local or private action, may indirectly affect sea turtles in the action area. Sources of pollutants in the action area include atmospheric loading of pollutants such as PCBs; storm water runoff from coastal towns, cities, and villages; and runoff into rivers that empty into bays and groundwater. Nutrient loading from land-based sources, such as coastal communities, are known to stimulate plankton blooms in closed or semi-closed estuarine

systems. The pathological effects of oil spills have been documented in laboratory studies of marine mammals and sea turtles (Vargo et al. 1986).

An example of the impacts of run-off on the marine environment is the large area of the Louisiana continental shelf with seasonally depleted oxygen levels (< 2mg/l), caused by eutrophication from both point and non-point sources. Most aquatic species cannot survive at such low oxygen levels and these areas are known as “dead zones.” The oxygen depletion, referred to as hypoxia, begins in late spring, reaches a maximum in mid summer, and disappears in the fall. Since 1993, the average extent of mid-summer bottom-water hypoxia in the northern Gulf of Mexico has been approximately 16,000 km², approximately twice the average size measured between 1985 and 1992. The hypoxic zone attained a maximum measured extent in 2002, when it was about 22,000 km², which is largest than the state of Massachusetts (U.S. Geological Service, 2005). The hypoxic zone has impacts on the animals found there, including sea turtles, and the ecosystem-level impacts continue to be investigated.

4.2 Conservation and Recovery Actions Benefiting Sea Turtles

NMFS and some States have implemented a series of regulations aimed at reducing potential for incidental mortality of sea turtles from commercial fisheries in the action area. The federal regulations include gear requirements and sea turtle release gear for Atlantic HMS and Gulf of Mexico Reef Fish fisheries; TED requirements for southeastern shrimp trawl and North Carolina Flynet fisheries; mesh size restrictions in the North Carolina gillnet fishery and both Virginia’s gill and pound net fisheries; and area closures in the North Carolina gillnet fishery and to create a leatherback conservation zone. States have also implemented measures in waters under their jurisdiction to reduce the risk of sea turtles encounters with fishing gears. Beyond these top-down regulations outreach programs have been established and sea turtle interaction questions are now being asked part of the Marine Recreational Fishing Statistical Survey. The summaries below discuss all of these measures in more detail.

Federal Regulatory Actions

NMFS published the final rule to implement sea turtle release gear requirements, sea turtle careful release protocols, and smalltooth sawfish safe handling guidelines 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.

On July 6, 2004, NMFS published a final rule to implement management measures to reduce bycatch and bycatch mortality of Atlantic sea turtles in the Atlantic pelagic longline fishery (69 FR 40734). The management measures include mandatory circle hook and bait requirements, and mandatory possession and use of sea turtle release equipment to reduce bycatch mortality. The rulemaking, based on the results of the 3-year Northeast Distant Closed Area research experiment and other available sea turtle bycatch reduction studies, is expected to have significant benefits to endangered and threatened Atlantic sea turtles.

NMFS has also implemented a series of regulations aimed at reducing potential for incidental mortality of sea turtles in commercial fisheries. In particular, NMFS has required the use of TEDs in southeast U.S. shrimp trawls since 1989 and in summer flounder trawls in the Mid-Atlantic area (south of Cape Charles, Virginia) since 1992. It has been estimated that TEDs exclude 97 percent of the sea turtles caught in such trawls. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (e.g., width of bar spacing), floatation, and more widespread use. Several states have regulations requiring the use of TEDs in state-regulated trawl fisheries, and the federal regulations also apply in state waters.

NMFS has also been working to develop a TED, which can be effectively used in a type of trawl known as a flynet, which is sometimes used in the mid-Atlantic and Northeast fisheries to target sciaenids and bluefish. Limited observer data indicate that takes can be quite high in this fishery. A top-opening flynet TED was certified this summer, but experiments are still ongoing to certify a bottom-opening TED.

Further conservation efforts in the south and Mid-Atlantic include restrictions published March 2002 for the use of gillnets with stretched mesh larger than 8-inch (20.3-cm) in federal waters (3-200 nautical miles) off of North Carolina and Virginia. These restrictions were published in an Interim Final Rule under the authority of the Endangered Species Act (67 FR 13098, March 21, 2002) and later made permanent through the publication of a Final Rule (67 FR 71895, December 3, 2002). They were implemented to reduce the impact of the monkfish and other large-mesh gillnet fisheries on endangered and threatened species of sea turtles in areas where sea turtles are known to concentrate. As a result, gillnets with larger than 8 inch stretched mesh are not allowed in federal waters (3-200 nautical miles) north of the North Carolina/South Carolina border at the coast to Oregon Inlet at all times; north of Oregon Inlet to Currituck Beach Light, North Carolina from March 16 through January 14; north of Currituck Beach Light, North Carolina to Wachapreague Inlet, Virginia from April 1 through January 14; and, north of Wachapreague Inlet, Virginia to Chincoteague, Virginia from April 16 through January 14. Federal waters north of Chincoteague, Virginia are not affected by these restrictions although NMFS is looking at additional information to determine whether expansion of the restrictions are necessary to protect sea turtles as they move into northern Mid-Atlantic and New England waters. These measures are in addition to Harbor Porpoise Take Reduction Plan measures that prohibit the use of large-mesh gillnets in southern Mid-Atlantic waters (territorial and federal waters from Delaware through North Carolina out to 72°30'W longitude) from February 15-March 15, annually.

Information indicates that pound nets with traditional large mesh and stringer leaders as used in the Chesapeake Bay incidentally take sea turtles. To address the high and increasing level of sea turtle strandings, NMFS published an Interim Final Rule in 2002 (67 FR 41196, June 17, 2002) that addressed the take of sea turtles in large-mesh pound net leaders and stringer leaders used in the Chesapeake Bay and its tributaries. Following new observations of sea turtle entanglements in pound net leaders in the spring of 2003, NMFS published a Final Rule (69 FR 24997, May 5, 2004) that) that prohibits the use of all off shore pound net leaders, set with the inland end of the leader greater than 10 horizontal feet (3 m) from the,

mean low water line, from May 6 to July 15 each year in the mainstream waters of the Chesapeake Bay, south of 37°19.0'N latitude and west of 76°13.0'W longitude, and all waters south of 37°13.0'N latitude to the Chesapeake Bay Bridge Tunnel at the mouth of the Chesapeake Bay, and the James and York Rivers downstream of the first bridge in each tributary. Those requirements were subsequently modified in a Final Rule (71 FR 36024, June 23, 2006) to allow the use of offshore pound nets as long as they meet the definition of a modified pound net as defined at 50 CFR § 222.102.

Beyond gear modification requirements, NMFS also uses closed areas to reduce interactions between sea turtles and fishers. NMFS closed part of Pamlico Sound to the setting of gillnets targeting southern flounder in fall 1999 after the strandings of relatively large numbers of loggerhead and Kemp's ridley sea turtles on inshore beaches. This is a state-regulated fishery. NMFS also closed the waters north of Cape Hatteras to 38°N latitude, including the mouth of the Chesapeake Bay, to large (>6-inch stretched) mesh gillnets for 30 days in mid-May 2000 due to the large numbers of loggerhead strandings in North Carolina, and will continue to implement such proactive measures as necessary.

Other actions undertaken by NMFS to protect sea turtles was the 1993 (with a final rule implemented in 1995), establishment of a Leatherback Conservation Zone to restrict shrimp trawl activities from the coast of Cape Canaveral, Florida, to the North Carolina/Virginia border. This provided for short-term closures when high concentrations of normally pelagic leatherbacks are recorded in near coastal waters where the shrimp fleet operates. This measure was necessary because the size of adult leatherbacks was larger than the escape openings of most NMFS-approved TEDs. With the implementation of the new TED rule requiring larger opening sizes on all TEDs, the reactive emergency closures within the Leatherback Conservation Zone became unnecessary, and the Leatherback Conservation Zone was removed from the regulations.

State Regulatory Actions

State actions to regulate fisheries within their jurisdiction include the 1998 implementation of the Year 1 requirements of Amendment 3 to the Atlantic States Marine Fisheries Commission's Coastal Fishery Management Plan for American Lobster (ASMFC 1997) by East Coast states from Maine through North Carolina. Regulations are geared toward reducing lobster fishing effort by 2005 to reverse the overfished status of the resource. States in the 6 coastal areas must implement regulations according to a compliance schedule established in Amendment 3. Several states implemented trap caps for 1998. Further trap limits, will generate some localized risk reduction for protected species in those areas. If all states elect to implement a significant trap reduction program, the overall entanglement risk would be substantially reduced.

The North Carolina Division of Marine Fisheries (NCDMF) took more unilateral conservation measures on October 27, 2000, when it closed waters in the southeastern portion of the Pamlico Sound as a result of elevated takes by the commercial large-mesh flounder gillnet fishery. The fishery was closed when anticipated incidental take levels were met for green sea turtles. The NCDMF estimated that there were 50 loggerheads captured at

the time of closure and that 44 of those had been drowned (NMFS SEFSC 2001). The fishery has subsequently been reopened under a section 10(a)(1)(B) permit.

In 2001, the Commonwealth of Virginia implemented restrictions on gillnets to reduce interactions with sea turtles. Specifically, from May 1 through June 30, each operation was limited to 8,400 feet of gillnet and the use of tie-downs was prohibited in the mainstem of Chesapeake Bay and Territorial Sea. From June 1-30, large mesh gillnets were prohibited south of Smith Island Light. On May 1, 2005, Virginia enacted a series of further restrictions on large-mesh gillnets which effectively precludes the development of a large-mesh gillnet monkfish fishery in state waters and adding additional restrictions to the other large-mesh gillnet fisheries (striped bass and black drum).

Other Federal Actions

NMFS has also been active in public outreach efforts to educate fishers regarding sea turtle handling and resuscitation techniques. As well as making this information widely available to all fishers, NMFS recently conducted a number of workshops with HMS pelagic longline fishers to discuss bycatch issues including protected species, and to educate them regarding handling and release guidelines. NMFS intends to continue these outreach efforts and hopes to reach all fishers participating in the HMS pelagic longline fishery over the next one to two years. There is also an extensive network of Sea Turtle Stranding and Salvage Network participants along the Atlantic and Gulf of Mexico coasts who not only collect data on dead sea turtles, but also rescue and rehabilitate any live stranded sea turtles.

Loggerheads, leatherbacks, greens, and Kemp's ridleys are known to bite a baited hook, frequently ingesting the hook. Hooked sea turtles have been reported by the public fishing from boats, piers, beaches, banks, and jetties. NMFS has added questions about encounters with sea turtles to the intercept interviews of recreational fishers conducted by MRFSS and is working to have them added to the Texas Parks and Wildlife Department and Surveys. NMFS is also exploring questioning recreational fishers aboard headboats throughout the southeast U.S. Atlantic and the Gulf of Mexico to quantify their encounters with sea turtles (TEWG 2000). A detailed summary of the impact of hook-and-line incidental captures on loggerhead sea turtles can be found in the TEWG reports (1998, 2000).

The Recovery Plans for loggerhead and Kemp's ridley sea turtles are in the process of being updated. Recovery teams comprised of sea turtle experts have been convened and are currently working towards revising these plans based upon the latest and best available information.

4.2 Factors Affecting Smalltooth Sawfish Within the Action Area

Smalltooth sawfish are not highly migratory species, although some large mature individuals may engage in seasonal north/south movement. The U.S. DPS of smalltooth sawfish is confined to only a small portion of the action area, mainly waters off Florida and possibly occasionally off Georgia. Smalltooth sawfish greater than 200 cm TL may be found in the southern portion (primarily off Florida) of the action area intermittently throughout the year, spending the rest of their time in shallower waters. Individuals found in the action area,

therefore, can potentially be affected by activities both within the southeast portion of the action area and adjacent nearshore waters. Based on this information, the range-wide status of smalltooth sawfish described in the preceding section most accurately reflects the species' status within the action area.

4.3.1 Federal Actions

In recent years, NMFS has undertaken ESA section 7 consultations to address the effects of federally permitted fisheries and other federal actions on smalltooth sawfish, and when appropriate, has authorized the incidental taking of these species. Each of those consultations sought to develop ways of reducing the probability of adverse effects of the action on smalltooth sawfish. The following sections summarize anticipated sources of incidental take of smalltooth sawfish in the South Atlantic, and Gulf of Mexico EEZ, which have already concluded formal section 7 consultation.

Fisheries

Shark fisheries operating in the South Atlantic and Gulf of Mexico 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 2003d). 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 one for which data are missing, were released alive. Only one 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.

NMFS completed a section 7 consultation on the continued authorization of the *Gulf of Mexico Reef Fish fishery* on February 15, 2005 (NMFS 2005b). The fishery uses three basic types of gear: spear and powerhead, trap, and hook-and-line gear. Hook-and-line gear used in the fishery includes both commercial bottom longline and commercial and recreational vertical line (e.g., handline, bandit gear, rod and reel). The biological opinion concluded that smalltooth sawfish may be adversely affected by operation of the fishery. However, the proposed action was not expected to jeopardize the continued existence of this species. An ITS has been provided.

A section 7 consultation on the *South Atlantic Snapper-Grouper fishery* completed by NMFS on June 7, 2006 (NMFS 2006a). The fishery uses: spear and powerhead, black sea bass pot, and hook-and-line gear. Hook-and-line gear used in the fishery includes both commercial bottom longline and commercial and recreational vertical line (e.g., handline, bandit gear, rod and reel). The consultation concluded the hook-and-line component of the fishery was likely to adversely affect smalltooth sawfish, but was not likely to jeopardize its continued existence. An ITS was issued for takes in the hook-and-line component of the fishery.

NMFS has also conducted Section 7 consultations on the impacts of the *Gulf of Mexico Shrimp Trawl fishery (NMFS 2006b)* and the *South Atlantic Shrimp Trawl fishery (NMFS 2005c)* on smalltooth sawfish. Both of these consultations found these fisheries likely to adversely affect smalltooth sawfish, but not likely jeopardize their continued existence. The ITS provided in those opinions anticipated the lethal take of up to one smalltooth sawfish annually in each of these two fisheries.

Smalltooth sawfish may infrequently be taken in other South Atlantic and Gulf of Mexico 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 issuance of permits allowing take of certain ESA-listed species for scientific research purposes under section 10(a)(1)(a). Prior to issuance of these authorizations for taking, the proposal must be reviewed for compliance with section 7 of the ESA. There are currently three active smalltooth sawfish research permits. Permit holders include Dr. Colin Simpfendorfer (Mote Marine Laboratory), Dr. John Carlson (SEFSC), and Florida Fish and Wildlife Commission. Although the permitted 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.

4.3.2 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, sea wall 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, particularly those in southwest Florida, are known to occasionally take smalltooth sawfish (Unpublished MRFSS data 2006). 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.

4.3.3 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). Florida's ban of the use of shrimp trawls within three miles of the Gulf of Mexico 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. In September 2003, NMFS convened a smalltooth sawfish recovery team composed of nine members from Federal, State, nongovernmental, and non-profit organizations. The team has completed a draft recovery plan. NMFS announced the release of the Draft Smalltooth Sawfish Recovery Plan for public review and comment in a notice published in the Federal Register on August 23, 2006. The release of the Final Smalltooth Sawfish Recovery Plan is anticipated by fall 2007.

The draft recovery plan for the U.S. DPS of smalltooth sawfish was prepared for NMFS by the smalltooth sawfish recovery team. The goal of the recovery plan is to rebuild and assure the long-term viability of the U.S. DPS of smalltooth sawfish in the wild, allowing initially for reclassification from endangered to threatened status (downlisting) and ultimately to recovery and subsequent removal from the List of Endangered and Threatened Wildlife (delisting).

Conservation efforts have been aided by the MML research projects on the conservation biology of smalltooth sawfish since 1999. 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 our opinion, we assess the direct and indirect effects of the proposed action on threatened and endangered species. The analyses in this section form the foundation for our jeopardy analysis in Section 7.0. A jeopardy determination is reached if we would reasonably expect the 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 ESA defines an endangered species as "...in danger of extinction throughout all or a significant portion of its range..." and a threatened species as "...likely to become an endangered species within the foreseeable future..." The status of each listed sea turtle species and the smalltooth sawfish likely to be adversely affected by the continued operation of the CMPR fishery are reviewed in Section 3.0. Sea turtle species are listed because of their global status; therefore, a jeopardy determination must find the proposed action will appreciably reduce the likelihood of each species globally. Only the U.S. DPS of

smalltooth sawfish is listed; therefore, a jeopardy determination must find the proposed action will appreciably reduce the likelihood of survival and recovery of the smalltooth sawfish U.S. DPS.

The quantitative and qualitative analyses in this section are based upon the best available commercial and scientific data on sea turtle biology and the effects of the proposed action. Frequently, the best available information may include a range of values for a particular aspect under consideration, or different analytical approaches may be applied to the same data set. In cases where uncertainty exists regarding a parameter that bears evaluating impacts of an action on listed species, the uncertainty should be resolved in favor of the species. The U.S. Congress provided guidance to this end [House of Representatives Conference Report No. 697, 96th Congress, Second Session, 12 (1979)] and NMFS will generally select the value yielding the most conservative outcome to provide the "benefit of the doubt" to threatened and endangered species (i.e., would lead to conclusions of higher, rather than lower, risk to endangered or threatened species).

When analyzing the effects of any action, it is important to consider both the indirect effects and the direct effects. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects include aspects such as habitat degradation, reduction of prey/foraging base, etc. The operation of the CMPR fishery (i.e., vessel operations, gear deployment and retrieval) is not expected to impact the water column or benthic habitat in any appreciable way. Unlike mobile trawls and dredges that physically disturb habitat as they are dragged along the bottom, the gears used in the CMPR fishery are suspended in the water column or essentially stationary on the bottom and do not affect water column or benthic habitat characteristics. The fishery's target and bycatch species are not foraged on by sea turtles nor are they a primary prey species for smalltooth sawfish (Hopkins et al. 2003, Simpfendorfer 2001) so prey competition is also not a factor. Therefore, all analyses will be based on direct effects

Direct effects of the CMPR fishery on threatened and endangered species are from interactions with its fishing gear resulting in the capture, injury, or death of an individual. Our analysis assumes sea turtles and smalltooth sawfish are not likely to be adversely affected by a gear type unless they interact with it. We also assume the potential effects of each gear type are proportional to the number of interactions between the gear and each species.

There are three basic types of gear used in the CMPR fishery: hook-and-line, cast nets, and gillnets. Section 2.0 describes these gears and how recreational and/or commercial fishers use them to target the two primary CMPR species, king, and Spanish mackerel. The type of fishing gear, the area, and the manner in which they are used, all affect the likelihood of sea turtle or smalltooth sawfish interactions. For this reason, each gear type is evaluated separately in the following subsections.

5.1. Hook-and-Line Gear

Sea turtles and smalltooth sawfish are not likely to be adversely affected by CMPR hook-and-line fishing. The hook-and-line gear used by both commercial and recreational fishers to target CMPR species is limited to trolled or, to a lesser degree, jigged handline, bandit, and rod-and-reel gear. Sea turtles and smalltooth sawfish are both vulnerable to capture on hook-and-line gear, but the techniques commonly used to target CMPR species makes effects on these listed species extremely unlikely and, therefore, discountable. Sea turtles are unlikely to be caught during hook-and-line trolling because of the speed (4-10 kts) at which the bait is pulled through the water. It is unlikely that a sea turtle of any size would actively pursue and be able to swallow the bait and get hooked. It is possible that a sea turtle could be incidentally snagged if it comes in contact with a trolled hook, but the chances of this occurring are extremely low. The same logic also applies to why we believe effects on smalltooth sawfish are extremely unlikely and discountable. Fishers who capture smalltooth sawfish most commonly report that they were fishing for snook, redfish, or sharks (Simpfendorfer and Wiley 2004). These species are not typically trolled for in the manner employed for CMPR species. Smalltooth sawfish are also a bottom-dwelling species, whereas CMPR lures and baits are typically fished near the surface of the water. This also greatly reduces the likelihood of smalltooth sawfish interactions with trolling gear.

5.2 Cast Net Gear

Sea turtles and smalltooth sawfish are not likely to be adversely affected by cast net gear. Only the commercial sector uses cast net gear to target CMPR species and there are no documented interactions between CMPR cast nets and sea turtles or smalltooth sawfish. As described in Section 2.0, cast nets are thrown over visually detected schools of CMPR species and the gear is retrieved almost immediately. Sea turtles and smalltooth sawfish are significantly larger than target CMPR species. In the rare event a sea turtle or smalltooth sawfish is amidst a school of mackerel, it would likely be easy for fishers to detect and avoid their incidental capture. The area these nets cover is relatively small, thus bycatch of sea turtles and smalltooth sawfish is extremely unlikely. Based on this information, we believe effects on sea turtles or smalltooth sawfish from cast nets are discountable.

5.3 Gillnet Gear: Effects on Sea Turtles

Gillnets can adversely affect sea turtles via entanglement and forced submergence. Captured sea turtles can be released alive or can be found dead upon retrieval of the gear as a result of forced submergence. Sea turtles released alive may later succumb to injuries sustained at the time of capture or from exacerbated trauma from netting that is still attached when they were released. Entangled sea turtles that do not die from their wounds may suffer impaired swimming or foraging abilities, altered migratory behavior, and altered breeding or reproductive patterns. The following discussion summarizes in greater detail the available information on how individual sea turtles are likely to respond to interactions with gillnet gear and the factors affecting the likelihood of such interactions.

5.3.1 Types of Interactions

Entanglement

Sea turtles, especially leatherbacks, are particularly prone to entanglement as a result of their body configuration and behavior. Records of stranded or entangled sea turtles reveal that gillnet gear can wrap around the neck, flipper, or body of a sea turtle and severely restrict swimming or feeding behavior. The gear can also inflict serious wounds, including constriction, and cuts that cause bleeding. Constriction may cut off blood flow, or cause deep gashes, some severe enough to remove an appendage. If entanglement restricts swimming capacity and prevents an individual from reaching the surface, it may begin to suffer the additional effects of forced submergence.

Forced Submergence

Sea turtles that are forcibly submerged undergo respiratory and metabolic stress that can lead to severe disturbance of their acid-base balance (i.e., pH level of the blood). Most voluntary dives by sea turtles appear to be an aerobic metabolic process, showing little if any increases in blood lactate and only minor changes in acid-base status. In contrast, sea turtles that are stressed as a result of being forcibly submerged due to entanglement, eventually consume all their oxygen stores. This oxygen consumption triggers anaerobic glycolysis, which can significantly alter their acid-base balance, sometimes leading to death (Lutcavage and Lutz 1997).

Numerous factors affect the survival rate of forcibly submerged sea turtles. It is likely that the rapidity and extent of the physiological changes that occur during forced submergence are functions of the intensity of struggling, as well as the length of submergence (Lutcavage and Lutz 1997). Other factors influencing the severity of effects from forced submergence include the size, activity level, and condition of the sea turtle; the ambient water temperature, and if multiple forced submergences have recently occurred. Disease factors and hormonal status may also influence survival during forced submergence. Larger sea turtles are capable of longer voluntary dives than small sea turtles, so juveniles may be more vulnerable to the stress from forced submergence. During the warmer months, routine metabolic rates are higher. Increased metabolic rates lead to faster consumption of oxygen stores, which triggers anaerobic glycolysis. Subsequently, the onset of impacts from forced submergence may occur more quickly during these months. With each forced submergence event, lactate levels increase and require a long (up to 20 hours) time to recover to normal levels. Sea turtles are probably more susceptible to lethal metabolic acidosis if they experience multiple forced submergence events in a short period of time. Recurring submergence does not allow sea turtles sufficient time to process lactic acid loads (Lutcavage and Lutz 1997). Stabenau and Vietti (2003) illustrated that sea turtles given time to stabilize their acid-base balance after being forcibly submerged have a higher survival rate. The rate of acid-base stabilization depends on the physiological condition of the turtle (e.g., overall health, age, size), time of last breath, time of submergence, environmental conditions (e.g., sea surface temperature, wave action, etc.), and the nature of any sustained injuries at the time of submergence (NRC 1990).

5.3.2. Factors Affecting the Likelihood of Entanglement and Forced Submergence

A variety of factors may affect the likelihood of sea turtle entanglement and forced submergence. The spatial overlap between fishing effort and sea turtle abundance is the most noteworthy variable involved in anticipating entanglement events. Other important factors for determining entanglement and forced submergence include gear configurations and soak times. It is also possible that mesh size compared to the sizes of sea turtles exposed may influence entanglement and forced submergence frequency.

Spatial Overlap of Fishing Effort and Sea Turtle Abundance

The most critical factor affecting the likelihood of sea turtle entanglement in gillnet gear is the spatial overlap between where they occur and fishing effort. The likelihood of sea turtle interactions with gillnet gear increases as the amount of gear in the water increases. The likelihood of interactions also increases as sea turtle abundance increases. The more abundant sea turtles are in a given area where fishing occurs, the probability a turtle will interact with gillnet gear increases.

Fishing Technique/Soak Times

Both length and profile (i.e., the percentage of the water column spanned by the net) of gillnets in the water column affect the likelihood of sea turtle exposure to gillnets. Gillnets spanning the entire water column (i.e., surface to bottom) are much more likely to catch sea turtles than low profile gillnets spanning only a narrow portion of the water column. The use of tie downs, which create a "pocket" or "bag" effect in gillnets, are also believed to increase the potential for entanglement.

The length of time gillnet gear is left in the water is another important consideration for both the likelihood of entanglement and the extent of impacts from forced submergence. The longer the soak time, the higher the likelihood of sea turtles encountering the gillnet gear and becoming entangled. Additionally, the mortality rate of captured sea turtles increases with soak time because of the higher potential for extended forced submergence times. Incidental captures of sea turtles are most frequently documented in long sets and in lost or broken off gear presumed to have been soaking for a long time.

Mesh Size

Generally, entanglement risks for sea turtles increase with increasing mesh size, although all mesh sizes are known to take sea turtles. In U.S. historical sea turtle fisheries, large mesh gillnets on the order of 12 inches (30 cm) were typically utilized (Witzell 1994). Various federal and state regulations have been promulgated to address the disparate impacts of gillnets with larger mesh sizes. Federal ESA regulations seasonally restrict gillnets larger than 7-inch stretched mesh in the Mid-Atlantic. North Carolina and Virginia also use regulations and proclamations to restrict and manage the use of larger mesh gillnets (above 7 inches) within their state waters during times of expected high seasonal abundance of sea turtles. It is possible that smaller sea turtles are more susceptible to entanglement in gillnets with smaller mesh sizes than are larger sea turtles. Therefore, the size classes within the area of consideration may also come into play when examining the potential impact of gillnet fisheries.

5.4. Extent of the Effects of CMPR Gillnets on Sea Turtles

To conduct our jeopardy analysis in section 7.0, we must estimate the number of sea turtles that are likely to be taken as a result of the proposed action. This section focuses on quantifying the impacts on individual animals from the proposed action. This analysis first estimates the sea turtle take in the CMPR gillnet fisheries over the last several years. We then evaluate how the proposed action would alter those take estimates.

5.4.1. Available Sea Turtle Take Data Sources

In considering potential methods for estimating CMPR gillnets takes, we reviewed the available data sources for any evidence of interactions between CMPR gillnets and sea turtles. We reviewed gillnet discards reported to the SDDP; Spanish mackerel sets observer data from the Atlantic Shark Observer Program; miscellaneous anecdotal reports of CMPR gillnets takes of sea turtles; NEFSC observer data on the North Carolina Spanish and king mackerel fishery; other miscellaneous observer data from gillnet fisheries and Sea Turtle Stranding and Salvage Network (STSSN) incidental capture and stranding reports.

SEFSC Logbook Data (CFLP and SDDP Data)

As discussed in Section 2.6, all permitted commercial CMPR fishers are required to report their catch and effort data via the CFLP. Approximately 20 percent of commercial CMPR permit holders are also required to submit discard data via the SDDP. Participants in this program have never reported an incidental capture of a sea turtle in CMPR gillnet gear.

Observer Data

Although there is no observer program implemented specifically for the CMPR gillnet fishery, occasional sets have been reported through other observer programs. Also, when data are not available for a specific fishery, observed or estimated incidental capture rates in similar fisheries are periodically used as a proxy. To explore this option, we looked at other gillnet fisheries and observer programs for potentially applicable observer data. Sources included sea turtle interaction data from the Southeast shark gillnet fishery, NEFSC observer data from the North Carolina Spanish and king mackerel gillnet fisheries, flounder gillnet fisheries throughout the Pamlico Sound, and the monkfish fishery.

Since 1993, an observer program has been underway to estimate catch and bycatch in the directed shark gillnet fisheries along the southeastern U.S. Atlantic coast. In 1999, 100 percent observer coverage was required for the gillnet component of the fishery at all times to improve estimates of catch, effort, bycatch, and bycatch mortality (Carlson and Lee 2000). Starting in 2005, a pilot observer program was begun to include all vessels that have an active directed shark permit and fish with sink gillnet gear. These vessels were not previously subject to observer coverage because they either were targeting non-highly migratory species or were not fishing gillnets in a drift or strike fashion. These vessels were selected for observer coverage in an effort to determine their impact on finetooth shark landings and their overall impact on shark resources when not targeting sharks (Carlson and Bethea 2006). As of November 30, 2005, this program has observed eight sink gillnet sets

that targeted Spanish mackerel and no interactions with sea turtles have been documented (D. Bethea, pers. comm. 2005).

The Northeast Domestic Fisheries Observer Program (NEFOP) collects, maintains and distributes data for scientific and management purposes in the northwest Atlantic Ocean. NEFOP monitors marine fisheries to identify those that take protected species. Fishery observers document each take of a protected species during a fishing trip as well as other catch and discard information when possible. The selection of which fishing vessels to cover is made based on historic information of takes in the area, the type of fishing gear used, the season, and amount of fishing effort in the area (NEFSC Fisheries Sampling Branch www.nefsc.noaa.gov/femad/fishsamp/fsb/). Data on CMPR fishing off North Carolina from 1994-2005 were available from this program. During that time 1,141 CMPR gillnet hauls were observed, most occurring in state waters, and eight turtle takes were documented during that period. Four sea turtles were taken during Spanish mackerel gillnet fishing (three loggerheads and one green) and four sea turtles were taken during king mackerel gillnet fishing (one loggerhead and three unknown).

Anecdotal Accounts of Sea Turtle Takes in CMPR Gillnets

We contacted SEFSC, Florida Fish and Wildlife Conservation Commission (FWCC), and North Carolina Division of Marine Fisheries (NCDMF) staff to see if they had any reported incidental captures or miscellaneous anecdotal information documenting sea turtle takes in CMPR gillnets. A SEFSC staff member had documented, via notes, several comments made regarding the incidental take of sea turtles in king mackerel gillnets set in North Carolina back in the early 1990s. One note, dated January 4, 1990, stated a pound net fisherman reported catching a couple of Kemp's ridleys offshore when setting gillnets for king mackerel in November. He also reported hearing of approximately 15 to 25 more sea turtles that were caught in that fishery. Another note, dated July 28, 1993, documented another anecdotal report of sea turtles being caught in king mackerel gillnets. The last note, dated November 2, 1993, stated a "volunteer" had reported the capture of two sea turtles in a king mackerel net. We found no other documented anecdotal reports of sea turtles being taken in the CMPR fishery.

Sea Turtle Stranding and Salvage Network

The Sea Turtle Stranding and Salvage Network (STSSN) was formally established in 1980 to collect information on and document strandings and incidental captures of sea turtles along the U.S. Gulf of Mexico and Atlantic coasts. The SEFSC currently maintains this database. The network encompasses the coastal areas of eighteen states, including all the states in the South Atlantic region. Network participants document marine turtle strandings and incidental captures, including any fishing gear or other marine debris associated with the turtle stranding/take in their respective states, and enter that data into a central STSSN database. From 1994 through 2004, nine offshore incidental captures and 54 offshore sea turtle strandings were documented in the Atlantic and Gulf of Mexico with netting associated with them. The offshore incidental capture data represent instances where sea turtle were documented as entangled in actively fished gillnet gear. Appendix A provides a table including all the relevant available information recorded for each incident and a map illustrating where each event was documented.

The lack of reported sea turtle interactions in the SDDP data and Spanish mackerel observer reports from the Atlantic HMS Shark Fishery Observer Program indicate incidental sea turtle takes do not occur during CMPR fishing in federal waters, are not reported, or occur too infrequently to be detected under these programs. Based on our review of the factors affecting the likelihood of sea turtle exposure to gillnets, the conduct of the CMPR gillnet fishery, and the current federal monitoring programs, we believe CMPR gillnet/sea turtle interactions are likely to be very rare. However, with documented anecdotal reports of sea turtle takes in the CMPR fishery in the past, and documented sea turtle takes by CMPR fishers operating in state waters, we believe sea turtle take is not discountable.

We segregated our analysis regionally into the two main areas where CMPR gillnet fishing occur, North Carolina and Florida, to address differences in fishing operations and in sea turtle abundance in these areas. The following subsections describe how each analysis was conducted.

5.4.2 Estimating Past North Carolina CMPR Sea Turtle Takes

The observer data from the North Carolina king and Spanish mackerel fisheries represented the best and most applicable dataset for evaluating CMPR sea turtle takes off North Carolina. Northeast Fisheries Science Center observer program data provided an estimate on the number of gillnet hauls conducted off of North Carolina from 1994-2005 and the number of protected species interactions over that time. The North Carolina Department of Marine Fisheries (NCDMF) provided effort statistics of the number of gillnet trips occurring off North Carolina from 1999-2003.

Ultimately, we used these data to produce a triennial sea turtle take estimate for the CMPR fisheries operating in the EEZ off North Carolina. Triennial estimates require more frequent evaluation of the take by the fishery. This can help identify trends in turtle take within the fishery that may be overlooked when evaluated over longer timeframes. For example, our data shows no observed sea turtle takes have occurred off North since 2001. Triennial estimates also allow for some fluctuation in annual sea turtles takes without triggering reinitiation, if the triennial take estimate is not exceeded. Three-year estimates also allow for more frequent evaluations of turtle status if consultation is reinitiated.

We attained our triennial estimate by calculating a turtle take rate for CMPR fishing occurring primarily in North Carolina state waters. Since data on CMPR/sea turtle interactions were not available for fishing in the EEZ off North Carolina, we used our estimated turtle catch rate for state waters as a surrogate for an EEZ take rate. We applied that rate to the available federal fishing effort data to produce a turtle take estimate for CMPR fishing occurring in the EEZ off North Carolina. The following sections lay out the specific steps taken in this analysis.

Our analysis began by excluding all hauls that occurred inshore of North Carolina's barrier islands. These hauls were excluded because they were in waters much shallower (2-20 ft) than the fishery operating offshore of the barrier islands (20 ft or more). Fishing at shallower

depths increases the likelihood of catching a turtle because the net spans a greater portion of the water column. We believe this increased likelihood was not representative of the offshore fisheries and would skew our take estimates, so we omitted these points.

Next we omitted NEFSC haul data that did not correspond with available effort data (i.e., 1994-1998 and 2004-2005). These omissions excluded one documented sea turtle take that occurred in 1996. The remaining NEFSC haul data were segregated by primary target species. Analysis of that data found that, from 1999 through 2003, Spanish mackerel fishers conducted 306 hauls and took four sea turtles, while king mackerel fishers conducted 161 hauls and took three sea turtles (Table 5.1, Figure 5.1, Figure 5.2). By dividing the number of sea turtles taken by Spanish and king mackerel fishers into the number of hauls conducted by each, we estimated sea turtle take rates. We estimate 0.013 sea turtles were taken per haul by Spanish mackerel fishers and 0.018 sea turtles were taken per haul by king mackerel fishers.

Table 5.1 Observed Gillnet Hauls and Incidental Captures of Sea Turtles in North Carolina CMPR Gear (NEFSC Observer Program Database, November 2005)

<i>Spanish Mackerel Gillnet Hauls</i>				
Year	Total Number of Hauls	Hauls Per NE Statistical Grid*	Number of Turtles Taken	Species
1999	52	701(13); 635(39)	2	Loggerhead, Loggerhead
2000	78	708(4); 707(2); 701(13); 635(59)	2	Loggerhead, Green
2001	42	701(7); 635(35)	0	N/A
2002	21	635(21)	0	N/A
2003	113	701(9); 635(104)	0	N/A
1999-2003	306	708(4); 707(2); 701(42); 635(258)	4	3 Loggerhead; 1 Green
<i>King Mackerel Gillnet Hauls</i>				
Year	Total Number of Hauls	Hauls Per NE Statistical Grid*	Number of Turtles Taken	Species of Turtle
1999	58	635(58)	0	N/A
2000	60	635(60)	3	Unknown, Unknown, Unknown
2001	43	635(43)	0	N/A
2002	0	N/A	0	N/A
2003	0	N/A	0	N/A
1999-2003	161	635(161)	3	3 Unknown

* Grid Number (Number of hauls in that grid)

Figure 5.1 Overview of the Northeast Statistical Areas (NEFSC Northeast Fisheries Observer Program)

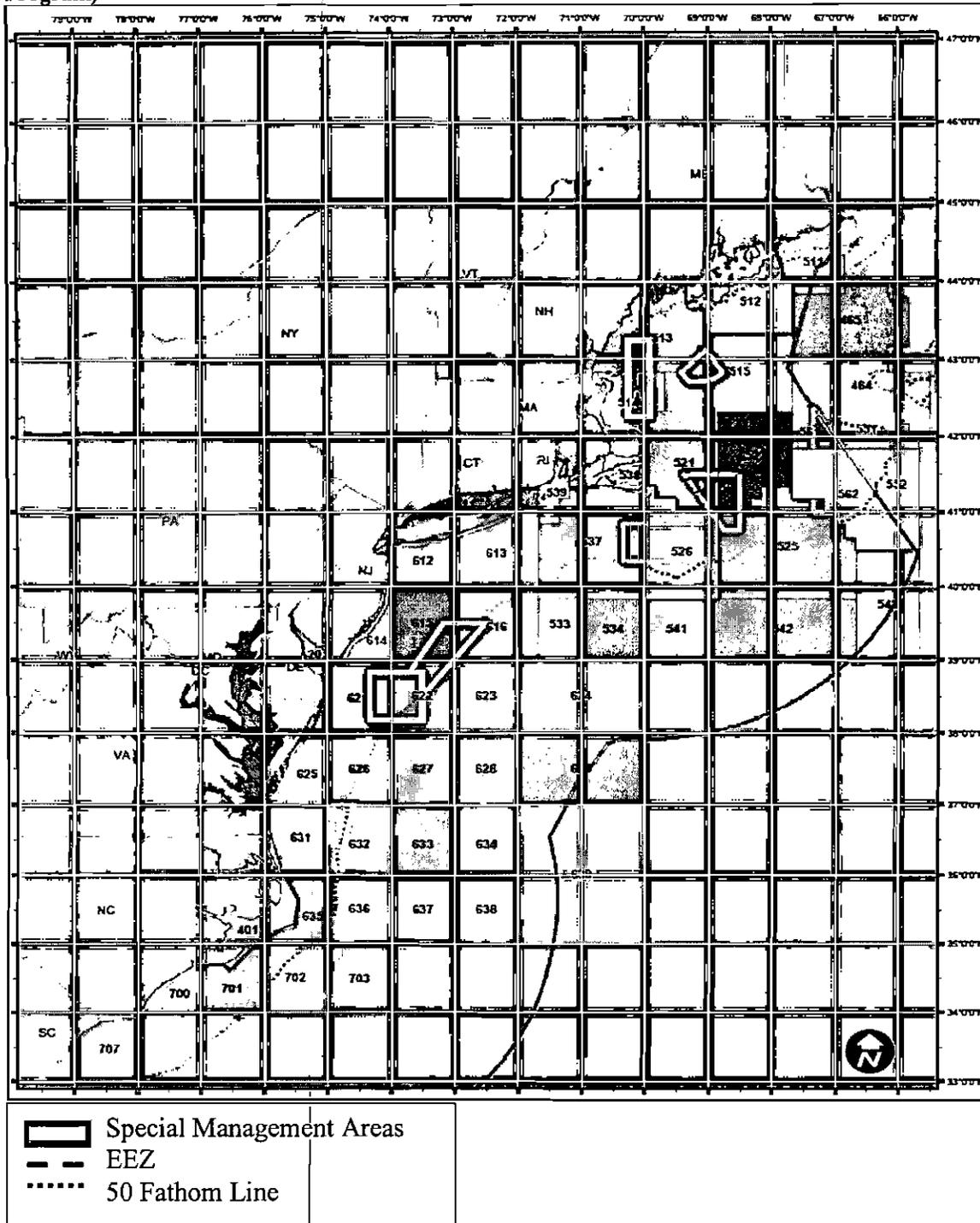
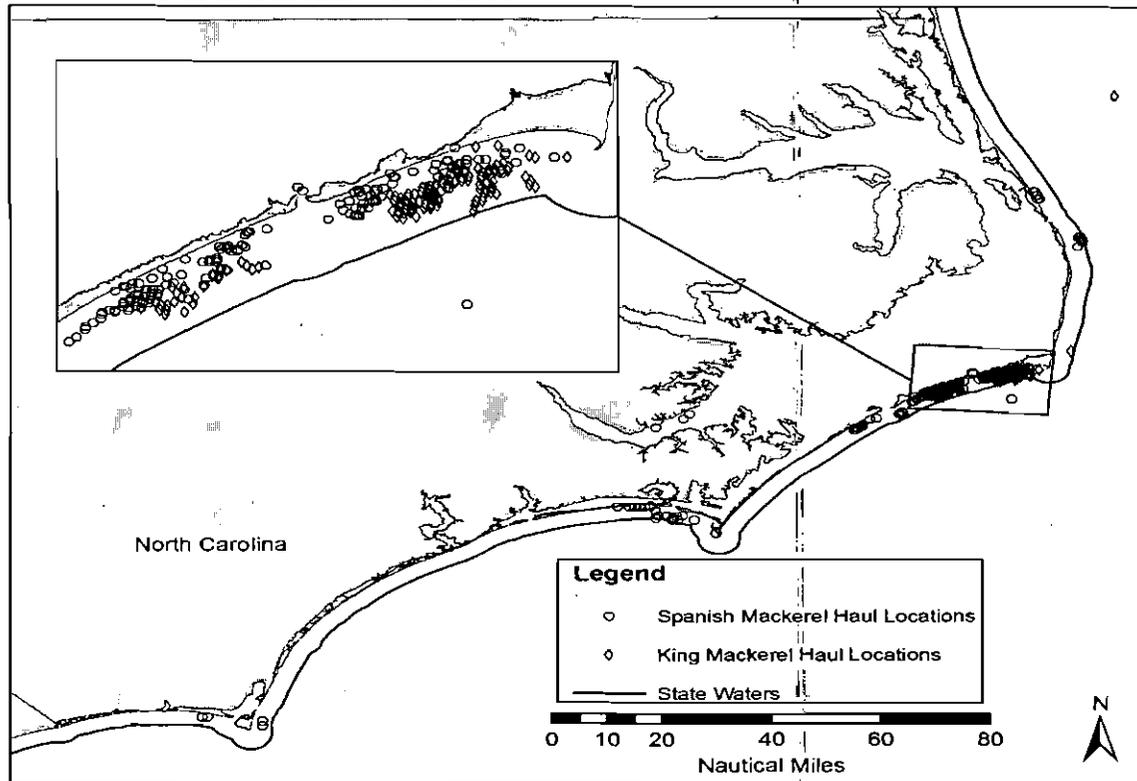


Figure 5.2 Location of NEFSC Observed King and Spanish Mackerel Hauls off North Carolina 1999–2003



The best available effort data on CMPR fishing occurring in federal waters were presented as the number of trips taken annually. To convert the above catch rate per haul to a catch rate per trip, we assumed two hauls were made per trip (A. Bianchi pers. comm. 2006). The NCDMF data show the number of trips occurring in the EEZ from 1999 through 2003 for the Spanish mackerel fishery ranged from 49 (2002) to 109 (1999) (North Carolina Department of Marine Fisheries unpublished data 2005). The number of trips in the king mackerel fishery ranged from 31 (2003) to 74 (1999) (North Carolina Department of Marine Fisheries unpublished data 2005). To be conservative, we used the greatest number of trips conducted annually in our take estimate calculations. Applying two hauls per trip to those numbers yielded an estimate of 218 hauls in the Spanish mackerel fishery, and 148 hauls per year in the king mackerel fishery. To produce a triennial take estimate, we multiplied the number of hauls conducted annually by three and then applied the respective sea turtle catch rates. Those calculations yielded three-year take estimates of nine (8.5) sea turtles in the Spanish mackerel fishery and 8 (7.9) in the king mackerel fishery.

During our analysis of the North Carolina CMPR fishery we applied a turtle take rate for fishing primarily within state waters, to federal fishing effort. We felt it was appropriate to apply that take rate to federal fishing effort because of the similarities between the state and federal fisheries. These fisheries use very similar gear types and techniques, and fish similar depth ranges. Sea turtle abundance is also not believed to be appreciably different between the areas of state waters for which we have data and the EEZ to which we apply that data. There are only minor geographic and bathymetric differences between the EEZ and state

waters here and we do not believe these differences are significant enough to alter sea turtle abundance in these areas.

Assessing North Carolina CMPR Sea Turtle Take by Species

To conduct our jeopardy analysis and effectively assess the impacts of our take estimate, we must allocate take for individual species. The NEFSC observer data did not provide species data in all cases for those documented interactions between North Carolina CMPR fishers and sea turtles. Therefore, we must rely on what we know about sea turtle relative abundance in the action area, and behavioral characteristics to apportion our take estimates by species.

Sea turtle species abundance can be derived from STSSN data. Culling sea turtle stranding data from 1999 through 2003 provides us a source of data from which we can estimate species abundance off North Carolina. Those data suggest loggerheads are the most abundant (71% of all strandings) followed by Kemp’s ridleys (12%) and green sea turtles (11%).

Table 5.2 Sea Turtle Stranding and Species Abundance Estimates For North Carolina (STSSN Database July 11, 2006)

Species	Number of Strandings	% of Total
Loggerhead	1,931	71.17%
Green	310	11.42%
Leatherback	82	3.02%
Hawksbill	4	0.14%
Kemp’s ridley	330	12.16%
Unknown	56	2.06%
Total	2,713	

We use this species composition estimate to apportion our triennial take estimates by species. Those estimates yield a triennial take estimate in the Spanish mackerel fishery of seven (6.4) loggerheads, one (1.0) greens, and one (1.0) Kemp’s ridley. In the king mackerel fishery we estimate that six (5.7) loggerheads, one (0.9) green, and one (0.9) Kemp’s ridley were taken during that period. These species abundances also suggest that leatherbacks and hawksbill sea turtles may also be taken,⁹ but only very rarely. Due to this rarity, we believe any adverse affects from the take of these species by North Carolina CMPR fishers is discountable.

Our analysis of best available data estimates that during any three-year period the CMPR fishers operating in the EEZ off North Carolina took a total of 17 sea turtles. Specifically, we believe a total of thirteen loggerheads, two greens, and two Kemp’s ridleys were taken. Table 5.4 provides a summary of these estimates.

⁹ Over a three-year period, we estimate the Spanish mackerel fishery to have taken 0.2 leatherbacks and 0.012 hawksbill sea turtles. The king mackerel fishery is estimated to have taken 0.2 leatherbacks and 0.01 hawksbills during the same period.

Table 5.3 Estimated Triennial Sea Turtle Take by North Carolina CMPR Fisheries

CMPR Fishery	Species		
	Loggerhead	Green	Kemp's Ridley
Spanish mackerel	7	1	1
King mackerel	6	1	1
Total	13	2	2

Sea Turtle Mortality Estimate

Estimating the overall mortality of sea turtle interactions with North Carolina CMPR gear is complicated by the same factors that affected our Florida CMPR mortality estimates. As with interactions off Florida, current monitoring efforts suggest incidents off North Carolina are rare.

The magnitude and severity of sea turtle/gillnet interactions is dependent upon individual fishing techniques and preferences (i.e., soak times, fishing location, mesh size, if the net has a "bag," etc.). These variables are rarely captured in the data. Because of these constraining factors, we believe the best available data may not accurately reflect the lethality of the sea turtle/gillnet interactions currently occurring off North Carolina. These same factors also prevent us from estimating the post-release survival of sea turtles with a great degree of certainty.

Due to these uncertainties, we believe it is reasonable to take a precautionary approach to estimating the lethality of sea turtle/gillnet interactions. This approach compels us to err on side of species conservation. Consequently, we assume all sea turtles taken in a given year ultimately die as a result of the interaction.

5.4.3 Estimating Past Sea Turtle Take in Florida CMPR Gillnet Gear

Unlike the CMPR fisheries off North Carolina, we were unable to find any observer data regarding sea turtle interactions with Florida's CMPR fisheries. In the absence of such data, we used the STSSN's incidental capture¹⁰ and stranding¹¹ data to estimate take. We contacted the SEFSC to query the database for data on any offshore¹² gillnet related stranding or incidental capture documented from 1994 through 2004. The strandings data consisted entirely of records for turtles with netting associated with them.¹³ The offshore incidental capture data consisted of documented cases of sea turtle being found in actively fished gillnet gear. Since gillnets are banned in Florida state waters, we believe it is reasonable to assume all Florida strandings were the result of federal fishing activities. From 1994 through 2004, nine offshore incidental captures and 54 offshore sea turtle strandings were documented in the Atlantic and Gulf of Mexico combined.

¹⁰ Includes sea turtles found in gear being actively fished.

¹¹ Includes sea turtles found that are not in gear being actively fished.

¹² Offshore means on, or seaward, of an Atlantic or Gulf of Mexico beach.

¹³ SEFSC data query return all incidental capture and stranding events noted as: 'entangled in fishing net'; 'caught in set net'; 'caught in gillnet'; 'caught in fishing net (type unknown)'; and 'caught in drift net.'

To identify possible correlations between these incidental capture and stranding events and Florida CMPR fishing, we compared when (i.e., month) and where (i.e., the latitude/longitude) they occurred to what we know about the times and locations CMPR fishing frequently occurs. We also compared the mesh sizes of any netting associated with the animal to the mesh sizes commonly used in the Florida CMPR gillnet fishing.

In our analysis, we defined fishing for each CMPR target species separately, based on their unique characteristics. The Atlantic and Gulf of Mexico Spanish mackerel fishery was defined as occurring between approximately Cape Canaveral, Florida, to just north of Fort Pierce, Florida, from September to December, using gillnets with 3.5-inch stretched mesh. The Gulf of Mexico king mackerel fishery was defined as occurring off Collier and Monroe Counties, Florida; during January, using gillnets with 4.75-inch stretched mesh. These parameters allowed us to evaluate the likelihood of a particular CMPR fishery's involvement in a stranding or incidental capture event.

Sea Turtle Take Estimates from STSSN Stranding Data

Of the initial 54 strandings records, we excluded 36 because they were reported outside of Florida, while the remaining 18 records were used in our analysis. Our analysis was conducted in three parts. First, we grouped each stranding with a CMPR fishery based on its geographic proximity to where the fishery is known to operate. Once each stranding event was matched with a particular fishery, we evaluated their temporal overlap. We looked at whether the incident was reported during the time of year (month) that particular fishery was known operate. Finally, we examined the stranding reports for any information on the mesh size involved in the incident. Depending on the correlation between those three factors, we assessed the likelihood of a Florida CMPR fishery being the cause a stranding event. The probability of a CMPR fishery being the cause of a stranding was denoted as either: "unlikely" (i.e., event did not match the CMPR target fishery's time, area, or mesh size), "possible" (event matched one of the time, area, or mesh size characteristics), or "likely" (matched both the time and area characteristics).

From 1994 through 2004, there were three sea turtle (two loggerheads, one green) strandings we believed were likely caused by CMPR fishing. An additional 10 (seven green, two loggerhead, and one hawksbill) sea turtle strandings were possibly caused by CMPR fishing. The remaining five sea turtle (two green, one loggerhead, one loggerhead, one hawksbill, and one unknown) strandings were unlikely to have been caused by the CMPR fishery. Results of our analysis are presented in Appendix A.

The Atlantic/Gulf of Mexico Spanish mackerel gillnet fishery showed the strongest correlation to strandings. There were 11 strandings with gillnet gear (eight greens, two loggerheads, and one hawksbill) reported on Florida's Atlantic coast since 1994. Three (two loggerheads and one green) of these we believed were likely the result of Spanish mackerel fishing, because they occurred during the time and in the area the fishery is known to operate. Six strandings (all greens) were also possibly the result of Spanish mackerel fishing. Three of these strandings correlated with the time of the fishery, two matched the area of the fishery, and one did not match the area or time, but had a net associated with it that had a mesh size very close to the minimum size used to target Spanish mackerel. Only two of the

strandings reported in Florida were considered unlikely to be attributed to gillnets targeting Spanish mackerel.

Of the seven strandings reported since 1994 on Florida's Gulf of Mexico coast, we believe none were likely the result to the Gulf of Mexico king mackerel fishery. However, four strandings (two loggerheads, one green, and one hawksbill) were possibly caused by the fishery. All of these matched the area of the fishery, and one (a loggerhead) also had fishing gear associated with it that closely matched the mesh size used to target king mackerel. The remaining three (one loggerhead, one green, and one unknown) strandings were unlikely to have been the result of the Gulf of Mexico king mackerel fishing.

Sea Turtle Take Estimates from STSSN Incidental Capture Data

Analysis of incidental captures was conducted in the same way as conducted for strandings. Of the 13 recorded CMPR gillnet incidental captures, all but two occurred outside of Florida. We used only those two events in our analysis. They occurred in 1995 and 2000. The first, a leatherback, occurred off the Gulf coast and was released alive. The latter, a loggerhead, occurred off the Atlantic coast and was reportedly dead.

To assess the likelihood these events may have been caused by Florida CMPR fishing, we used the same analysis noted above and applied the same probability notations ("likely," "possible," or "unlikely"). Through this analysis, we determined both events were possibly the result of CMPR fishing, because they occurred in the area where fishing is known to occur.

Aggregated Florida Sea Turtle Take Estimates

To estimate the total sea turtle take of CMPR fishing activity over the past ten years off Florida, we combined our take estimates from the incidental capture and strandings data. We believe 15 sea turtle takes have occurred from 1994 through 2004. To err on the side of species conservation, we assumed the CMPR fishery caused the three likely incidents noted in strandings analysis and all 10 possible incidents. Table 5.4 summarizes these results.

To be precautionary, we broke down the estimate of sea turtles taken over a ten-year period into a triennial estimate. Triennial estimates require more frequent evaluation of the take by the fishery. This can help identify trends in turtle take within the fishery that may be overlooked when evaluated over longer timeframes. For example, our data shows no sea turtles have been taken off Florida since 2001. Triennial estimates also allow for some fluctuation in annual sea turtles takes without triggering reinitiation, if the triennial take estimate is not exceeded. Three-year estimates also allow for more frequent evaluations of turtle status if consultation is reinitiated.

Table 5.4 Estimated Sea Turtle Take from 1994 through 2004

<i>Strandings Data</i>					
	Species				
CMPR Interaction Likelihood	Green	Loggerhead	Hawksbill	Leatherback	
Likely	1	2	0	0	
Possible	7	2	1	0	
Total	8	4	1	0	
<i>Incidental Capture Data</i>					
	Species				
CMPR Interaction Likelihood	Green	Loggerhead	Hawksbill	Leatherback	
Likely	0	0	0	0	
Possible	0	1	0	1	
Total	0	1	0	1	
<i>Total 10 Year Sea Turtle Take Estimate</i>					
	Species				
CMPR Interaction Likelihood	Green	Loggerhead	Hawksbill	Leatherback	
Likely	1	2	0	0	
Possible	7	3	1	1	
Total	8	5	1	1	

To estimate triennial sea turtle takes in the past, we divided the total number of strandings events we believe were likely the result of gillnet gear interactions (3) by ten, to estimate the number of likely strandings occurring each year (0.3). Next we multiplied that value by three to get a value of 0.9 for the number of strandings likely caused by gillnet gear during any three-year period. TEWG (1998) estimated that offshore sea turtle strandings may only represent 5-6 percent of actual at-sea mortality events. Therefore, to account for strandings that may have occurred, but were not recorded, we assume that all of our stranding data only accounts for 5 percent of the total number of interactions between sea turtles and gillnet gear. Thus, we estimate 18 sea turtles likely stranded as a result of gillnet gear interactions (0.9/5%).

Our analysis does not assume the possible stranding events are subject to the same underestimate of actual at-sea mortalities. Given the greater uncertainty of the possible records being attributable to CMPR gillnet gear, we did not believe it was appropriate to extrapolate these records. We did add these records to our total triennial take estimate to provide some degree of precaution. To calculate the number of turtles possibly taken triennially by Florida CMPR gear, we began by summing the total number of possible events, and divided them by the ten. That value, 1.2, represents an annual estimate of turtles possibly taken by CMPR gear. We then multiplied that number by three to yield a three-year take estimate of 3.6 turtles. That number was conservatively rounded up to four turtles. Our triennial take analysis estimates that 30 sea turtles were likely taken by Florida CMPR gear, and an additional four turtles may have possibly been taken by this gear. As a result, we estimate a total of up to 34 turtles may have been taken over any three-year period in the past by Florida CMPR gear.

Assessing Florida CMPR Sea Turtle Take by Species

To conduct our jeopardy analysis and effectively assess the impacts of our take estimate, we must allocate take for individual species. We do this by relying on what we know about sea turtle relative abundance in the action area, and behavioral characteristics to apportion our take estimates by species.

Sea turtle species abundance can be derived from STSSN data. Querying sea turtle stranding data from 1998 through 2005 provides us a source of data from which we can estimate species abundance off Florida. We queried the STSSN database for strandings occurring throughout the entire State of Florida, as well as those strandings only occurring off the areas where Florida CMPR fishing is known to occur.¹⁴ Tables 5.5 and 5.6 summarize those data. Those data suggest loggerheads are the most abundant followed by green turtles.

Table 5.5 Sea Turtle Stranding and Species Abundance Estimates for Florida
(STSSN Database August 29, 2006)

Species	Number of Strandings	% of Total
Loggerhead	5459	58%
Green	2517	27%
Leatherback	221	2%
Hawksbill	226	2%
Kemp's ridley	768	8%
Unknown	268	3%
Total	9462	

Table 5.6 Sea Turtle Stranding and Species Abundance Estimates for CMPR Gillnet Fishing Areas off Florida (STSSN Database August 29, 2006)

Species	Number of Strandings	% of Total
Loggerhead	1769	57%
Green	1069	34%
Leatherback	43	1%
Hawksbill	70	2%
Kemp's ridley	83	3%
Unknown	93	3%
Total	3128	

To apportion our take estimates we conservatively choose the species abundance percentage that is the highest for each species. Applying those species abundance percentages and rounding up to be conservative, we estimate up to 20 (19.7) loggerhead, 12 (11.6) green, but no more than two Kemp's ridley, hawksbill, or leatherbacks, in combination, were taken during any given three-year period. Table 5.7 summarizes these results.

¹⁴ These are Monroe and Collier County, Florida and the area between Cape Canaveral and Ft. Pierce, Florida.

Table 5.7 Estimated Past Triennial Sea Turtle Take Off Florida by Species

	Species				
	Loggerhead	Green	Kemp's ridley	Hawksbill	Leatherback
Total	20	12	2*	2*	2*

*These numbers represent the maximum number of sea turtles of these species taken triennially, in combination.

Estimated Sea Turtle Mortality

Estimating the sea turtle mortality from gillnet interactions is challenging with our current data. We believe sea turtle/gillnet interactions are rare, with only two recorded incidental captures off the coast of Florida since 1994, with one turtle being released alive while the other was not. Our strandings data from the same time period suggests that all of those sea turtle/gillnet interactions were fatal. However, the nature of strandings makes it difficult to know, with a high degree of certainty, if gillnets were the primary cause of death in those cases. Regardless of the type of data, our current monitoring efforts suggest that sea turtle/gillnet interactions are rare off the coast of Florida.

The magnitude and severity of sea turtle/gillnet interactions is dependent upon individual fishing techniques and preferences (i.e., soak times, fishing location, mesh size, if the net has a "bag," etc.). These variables are rarely captured in the data. Because of these constraining factors, we believe the best available data may not accurately reflect the lethality of the sea turtle/gillnet interactions currently occurring off Florida. These same factors also prevent us from estimating the post-release survival of sea turtles with a great degree of certainty.

Due to these uncertainties, we believe it is reasonable to take a precautionary approach when estimating the lethality of sea turtle/gillnet interactions. This approach compels us to err on side of species conservation. Consequently, we assume all sea turtles taken over a three-year period ultimately die as a result of the interaction.

5.5. CMPR Gillnet Gear: Effects on Smalltooth Sawfish

5.5.1 Types of Interaction

Entanglement

Smalltooth sawfish are particularly vulnerable to entanglement in gillnets. Early publications document their frequent capture in this gear type and gillnets are believed to be one of the primary causes for the species' decline. As previously mentioned in Section 3.2.6, the long, toothed rostrum of the smalltooth sawfish easily penetrates netting, causing entanglement when the animal attempts to escape. The monofilament mesh can inflict abrasions and cuts, cause bleeding, and hinder feeding behavior. Even a few strands of monofilament can cause significant damage (C. Simpfendorfer pers. comm., Figure 5.3)

Figure 5.3 Example of an Injury from Gillnet Gear

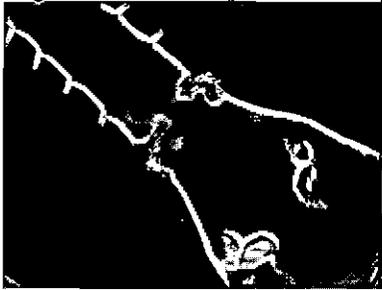


photo credit: C. Simpfendorfer.

The toothed rostrum also makes it very difficult to disentangle a smalltooth sawfish without harming the animal. Entangled animals frequently have to be cut free, causing extensive damage to nets. The entangled smalltooth sawfish can also endanger fishers if brought on board a vessel. For these reasons, many historical records of smalltooth sawfish catches note they were either killed or released after their saws had been removed (e.g., Henshall 1895, Evermann and Bean 1897, Bigelow and Schroeder 1953).

Effects on smalltooth sawfish from incidental capture in gillnets today likely depend on fishers' handling practices. For example: (1) The amount of gear and time fishers are willing to sacrifice to carefully remove an animal; (2) whether or not the animal is restrained while being handled to avoid damage to the rostrum and rostral teeth; (3) the length of time an animal is out of the water while being disentangled; and (4) the amount of gear left on the animal when released, are all likely to impact the overall severity of the event. An observer record of the release of a smalltooth sawfish with no visible injuries, after it had been incidentally caught in the Atlantic shark drift gillnet fishery, suggests that smalltooth sawfish can be removed safely with careful handling (NMFS 2003d).

5.5.2 Factors Affecting the Likelihood of Entanglement

Spatial Overlap of Fishing Effort and Sea Turtle Abundance

The same factors that affect the likelihood of sea turtle entanglement in gillnet gear (see Section 5.2.2) also affect smalltooth sawfish entanglement potential. The most critical of those factors is the spatial overlap between where smalltooth sawfish occur and fishing effort. The likelihood of smalltooth sawfish entanglement increases as the amount of gear in waters where smalltooth sawfish are present increases. The likelihood of interactions also increases as smalltooth sawfish abundance in those areas increases. The more abundant smalltooth sawfish are in a given fishing area, the greater the probability a smalltooth sawfish will interact with that gear. The amount of effort occurring in those areas of overlap is also a determining factor in the frequency of smalltooth sawfish entanglement. The characteristics of fishing operations (i.e. fishing technique, soak times, mesh size, etc.) also have impact on the frequency and severity of entanglement events.

Mesh Size

Smalltooth sawfish can become entangled in any sized mesh, but large mesh is likely particularly problematic. As noted above, smalltooth sawfish may become entangled when

their saw penetrates the netting and they try to escape. Larger mesh may allow for easier penetration into the gillnetting, thus increasing entanglement potential.

Fishing Technique/Soak Times

The size (i.e., length and width) and profile or shape of gillnets in the water column affect the likelihood of smalltooth sawfish entanglement in gillnets. Gillnets spanning the entire water column (i.e., surface to bottom) are much more likely to catch smalltooth sawfish than low profile gillnets spanning only a narrow portion of the water column. The use of tie downs, which create a “pocket” or “bag” effect in gillnets, are also believed to increase the potential for entanglement.

Since smalltooth sawfish are considered a benthic species, they are more likely to encounter sink gillnets or gillnets set on or near the bottom. Prior to the observed capture of a smalltooth sawfish in the Atlantic shark gillnet fishery, some people speculated that because these gillnets are set above the sea floor they may not catch smalltooth sawfish. However, smalltooth sawfish do feed on small schooling fish and could occur higher in the water column when engaged in this feeding behavior.

The amount of time gillnet gear is left in the water is another important consideration. The longer amount of time gillnets are left in the water, the greater the likelihood of a smalltooth sawfish encountering the gear and becoming entangled.

5.6 Extent of Effects of CMPR Gillnets on Smalltooth Sawfish

As with sea turtles, we must conduct a jeopardy analysis in section 7.0 for smalltooth sawfish. To conduct this analysis, we must estimate the number of smalltooth sawfish that are likely to be taken as a result of the proposed action. This section focuses on quantifying the impacts on individual animals from the proposed action. This analysis first estimates the smalltooth sawfish take in the CMPR gillnet fisheries over the last several years. We then evaluate how the proposed action would alter those take estimates.

5.6.1 Available Data Sources

The data available for estimating smalltooth sawfish interaction rates with CMPR gillnet gear come from several sources. We evaluated SEFSC logbook data, the Atlantic shark fishery observer program data, and smalltooth sawfish encounter database records. Additional anecdotal information on the incidental captures of a smalltooth sawfish was also reviewed.

Logbook Data (CFLP and SDDP Data)

As discussed in Section 2.6, all permitted commercial and charter/headboat CMPR fishers are required to report their catch and effort data via the CFLP. Approximately 20 percent of commercial CMPR permit holders are also required to submit discard data via the SDDP. Selections for the SDDP are made in July of each year, and the selected fishers (vessels) are required to complete and to submit discard forms, along with their CFLP logbook forms, for each trip they make during August through July of the following year. Participants in this

program have never reported an incidental capture of a smalltooth sawfish in CMPR gillnet gear.

HMS Atlantic Shark Fishery Observer Data

The HMS Atlantic shark fishery consists of a bottom longline and drift gillnet sector. Since 1993, an observer program has been underway to estimate catch and bycatch in the directed shark gillnet fisheries along the southeastern U.S. Atlantic coast. In 1999, a revised Fishery Management Plan for Highly Migratory Species (HMS-FMP) established a 100 percent observer coverage requirement for this fishery at all times to improve estimates of catch, effort, bycatch, and bycatch mortality (Carlson and Lee 2000). To date, this program has only documented one take of a smalltooth sawfish by Atlantic shark gillnet gear (NMFS 2003b).

Smalltooth Sawfish Encounter Databases

As discussed in Section 3.2.6, smalltooth sawfish encounter databases are maintained by biologists Gregg Poulakis (Florida Fish and Wildlife Commission, Fish and Wildlife Research Institute) and Jason Seitz (Florida Museum of Natural History), as well as MML. As of July 2006, neither of these encounter databases have documentation of any additional smalltooth sawfish incidental captures in commercial gillnet gear out of a total of 1760 documented encounters.

Anecdotal Observations

In the late 1970s or early 1980s, an incidentally captured smalltooth sawfish was documented in the run-around king mackerel fishery. Mark Godcharles, with the Florida Department of Natural Resources at that time (now with NMFS SERO), observed the smalltooth sawfish entangled in a gillnet still loaded with mackerel at Ming's Seafood dock on Stock Island, Florida just east of Key West.

A review of the logbook data and recent observer data did not reveal any records of incidental take in the CMPR fishery. There are also no reports of incidental takes of smalltooth sawfish attributed to the CMPR fishery in the smalltooth sawfish encounter databases. In a few instances, smalltooth sawfish caught on hook-and-line have shown signs of previous entanglements with gillnet gear. Close evaluation of these reports suggest the pompano gillnet fishery is the most likely source of these entanglements, based on mesh size (C. Simpfendorfer, pers. comm.).

The information available suggests incidental takes have either not occurred recently in the CMPR fishery, or have been too rare to be detected by current monitoring programs. However, the documented take of a smalltooth sawfish in the late 1970s or early 1980s, in conjunction with the more recent take by the Atlantic shark gillnet fishery, suggests takes do occasionally occur.

5.6.2 Estimating Smalltooth Sawfish Takes in CMPR Gillnets

Atlantic King Mackerel Fishery

We believe the Atlantic king mackerel component of the CMPR fishery will not adversely affect smalltooth sawfish. The distribution of Atlantic king mackerel fishing effort does not overlap geographically with the current range of smalltooth sawfish. Vessels targeting king mackerel in the Atlantic are only allowed to use gillnets north of Cape Lookout, North Carolina (34°37.3'N). Smalltooth sawfish do not occur this far north.

Atlantic and Gulf of Mexico Spanish and Gulf of Mexico King Mackerel Fisheries

We believe the Atlantic and Gulf of Mexico Spanish mackerel fisheries, as well as the Gulf of Mexico king mackerel fishery, may adversely affect smalltooth sawfish. The primary area for gillnetting Spanish mackerel in the Atlantic occurs off Florida from Fort Pierce to Cape Canaveral; an area where smalltooth sawfish are known to infrequently occur. In the Gulf of Mexico, Spanish mackerel are occasionally targeted in the areas adjacent to the smalltooth sawfish's core range and the potential for interaction exists. The potential for interaction with smalltooth sawfish also exists in the Gulf of Mexico king mackerel fishery. This fishery only operates off of Collier and Monroe County, Florida, but smalltooth sawfish are known to occur frequently in these areas.

All of these fisheries are primarily run-around gillnet fisheries. Run-around fishing methods reduce the potential for smalltooth sawfish entanglement because of the limited amount of time the gear is in the water. Run-around gillnet sets are typically only one to two hours in duration. By contrast, drift gillnet sets can range from six to ten hours. However, the morphology of the smalltooth sawfish make them especially vulnerable to entanglement in gillnet gear. We believe that while these fishing practices reduce the potential for interaction, they do not eliminate them.

With only one documented smalltooth take in the CMPR fishery in the past and one recently documented smalltooth take in the Atlantic HMS shark drift gillnet fishery, we believe that take in the CMPR fishery would be very rare in the future. Still, since Florida banned gillnets in 1995, smalltooth sawfish are believed to have increased in the action area. As smalltooth sawfish populations increase in the action area, the CMPR gillnet fishery might experience more frequent captures in the future. Based our review of this information, and the potential for more interactions to occur in the future, we estimate two smalltooth sawfish will be captured over the next three years as a result of the use of gillnets in the Gulf of Mexico king mackerel fishery.

Smalltooth Sawfish Mortality Estimate

As discussed in Section 5.3.2, the recently observed smalltooth sawfish entangled in the Atlantic shark drift gillnet fishery was cut from the net and released alive. The smalltooth sawfish had no visible injuries and was not expected to have experienced post-release mortality. Based on this information, we believe any smalltooth sawfish take in the CMPR fishery would also be non-lethal, experiencing only short-term effects from the capture.

5.7 Effect of CMPR Management and Regulations; Anticipated Future Take Levels

We believe management of the CMPR fishery has directly benefited sea turtles and smalltooth sawfish. Regulations restricting gear in the fishery have had the most benefit. Regulations restricting gear have affected the way the fishery is prosecuted. Since the last consultation on this fishery, there has been a substantial gear shift from gillnet gear to trolled hook-and line. In 1989, 51 vessels used gillnets to target king mackerel and 314 vessels used gillnets to target Spanish mackerel. Today, 42 vessels are permitted to fish for king mackerel and less than 30 fish for Spanish mackerel in the South Atlantic (GMFMC et al. 2004). This shift in gear effort has likely greatly reduced the fishery's potential impact on sea turtles and smalltooth sawfish. Although stranding records do not show a decrease in takes over the past ten years, this may be masked by improvement in stranding coverage over the years.

There are no proposed changes to existing management of the CMPR fishery that would alter future levels of take. The current regulations have been in place for some time, thus the same levels estimated in the past are expected to continue into the future.

5.8 Summary

Based on our review in this section, gillnet gears used in the CMPR fisheries of the Atlantic and Gulf of Mexico have adversely affected sea turtles and smalltooth sawfish in the past via entanglement and, in the case of sea turtles, via forced submergence. Commercial and recreational hook-and-line gear and commercial cast net gear have not likely adversely affected sea turtles or smalltooth sawfish. We anticipate the continued authorization of the Atlantic/Gulf of Mexico CMPR fishery, as currently managed, will not change this conclusion or alter the take patterns documented in the past. Table 5.5 summarizes the anticipated take we expect on a three-year basis in the future.

Table 5.8 Summary of Anticipated 3-Year Take and Mortality Estimates

Species	Amount of Take	Total
Green	Total Take	14
	Lethal Take	14
Hawksbill*	Total Take	2
	Lethal Take	2
Kemp's ridley*	Total Take	4
	Lethal Take	4
Leatherback*	Total Take	2
	Lethal Take	2
Loggerhead	Total Take	33
	Lethal Take	33
Smalltooth sawfish	Total Take	2
	Lethal Take	0

*These species take numbers are in combination with one another and represent the maximum number of each that may be taken over a three-year period.

6.0 Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions, not involving federal activities, reasonably certain to occur within the action area considered in this opinion (i.e., Gulf of Mexico, South Atlantic, and Mid-Atlantic EEZ). Future 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.

Cumulative effects may affect sea turtle species, the smalltooth sawfish, and their habitats in the action area. The actions and their effects described as occurring within the action area in the Environmental Baseline are expected to continue in the future. We are not aware of any proposed or anticipated changes to these actions that would substantially change the impacts that each threat has on the sea turtles and smalltooth sawfish covered by this opinion. Therefore, we expect the effects of these actions on sea turtle species and smalltooth sawfish will continue at similar levels into the foreseeable future.

7.0 Jeopardy Analysis

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 any ESA-listed sea turtles or smalltooth sawfish known to interact with the CMPR fishery. In Section 5.0, we have outlined how interactions with the CMPR fishery can affect sea turtles and smalltooth sawfish. That section also evaluated the extent of those effects in terms of triennial estimates of the numbers of sea turtles and smalltooth sawfish captured and killed. Now we must assess each species' response to this impact, in terms of overall population effects from the estimated take. This assessment requires us to determine whether the effects of the proposed action, when added to the status of the species (Section 3.0), the environmental baseline (Section 4.0), and the cumulative effects (Section 6.0), will jeopardize the continued existence of any ESA-listed sea turtles or smalltooth sawfish known to interact with the CMPR fishery.

“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 making this conclusion for each species, 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 explore whether it will cause an appreciable reduction in the likelihood of both the survival and the recovery of the species.

7.1 Green Sea Turtles

The proposed action is expected to result in the taking of up to 14 green sea turtles every three years. Based on our knowledge of green sea turtles in the action area, we expect these takes would consist of both benthic immature and adult males and female individuals. Of these takes, all are expected to be lethal.

The loss of 14 green sea turtles over any given 3-year period would result in a reduction in the number of green sea turtles for that time period. These lethal takes could also result in a potential reduction in future reproduction, assuming at least some of these individuals would be females and would have survived other threats and reproduced in the future. Sub-lethal effects on adult females may also reduce reproduction by hindering foraging success, as sufficient energy reserves are probably necessary for producing multiple clutches of eggs in a breeding year. Reductions in the distribution of green sea turtles would not occur as these randomly occurring takes would have no significant effect on the overall position, arrangement, or frequency of green sea turtles occurrences in the action area. The CMPR fishery has been operating for decades, with no perceived changes in the distribution of green sea turtles to date.

The reductions in numbers and reproduction of green sea turtles attributed to the CMPR fishery would not appreciably reduce the green sea turtle's likelihood of survival and recovery. Whether the reductions in numbers and reproduction of green sea turtles attributed to the CMPR fishery would appreciably reduce the green sea turtle's 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 from this relatively small number of deaths. Although caution is warranted about optimistically interpreting the future of green sea turtle populations based on this nesting trend data given the late sexual maturity of the species, as discussed in Section 3.0 (Status of the Species), available green sea turtle nesting trend data from major nesting beaches in Florida, Yucatán, and Tortuguero indicate green sea turtle populations are increasing. The proportional change in overall survival of benthic immature and adult green sea turtles from the loss of 14 individuals on a future triennial basis would therefore likely be undetectable. The death of 14 individuals and their future reproduction value is likely to be exceeded by the number of younger green sea turtles recruiting into the adult or subadult population (i.e., increased survivability of benthic adults from the new TED rule) and their future potential reproductive value.

7.2 Hawksbill Sea Turtles

The proposed action is expected to result in the taking of two hawksbills every three years. Based on our knowledge of hawksbills in the action area, we expect these takes would be both benthic immature and adult individuals. Both takes are expected to be lethal.

The loss of two hawksbills over any given 3-year period would result in a reduction in the number of hawksbills for that time period. These lethal takes could also result in a potential reduction in future reproduction assuming at least some of the individuals taken would be females and would have survived other threats and reproduced in the future. Reductions in the distribution of hawksbills would not occur as these randomly occurring takes would have no significant effect on the overall position, arrangement, or frequency of hawksbills occurrences in the action area. The proposed action has been ongoing for decades, with no perceived changes in the distribution of hawksbill sea turtles to date.

The reductions in numbers and reproduction of green sea turtles attributed to the CMPR fishery would not appreciably reduce the hawksbill sea turtle's likelihood of survival and recovery. Whether the reductions in numbers and reproduction attributed to the CMPR fishery would appreciably reduce the hawksbill's 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 from this relatively small number of deaths. As noted in Section 3.0 (Status of the Species), hawksbill populations appear to be increasing or stable at the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out (Meylan 1999a). Although today's nesting population is only a fraction of what it was, nesting activity in recent years by hawksbill has increased on well-protected beaches in Mexico, Barbados, and Puerto Rico (Caribbean Conservation Corporation 2005). Increasing protections for live coral habitat in the Atlantic, Gulf of Mexico, and Caribbean over the last decade that have limited fishing activity in live coral habitat may also increase hawksbill survival rates in the marine environment. Benefits may also be gained by hawksbills from the larger-sized TED requirements implemented. The proportional change in overall survival rates of benthic immature and adult hawksbills from the loss of two individuals every three years would be insignificant. The death of these individual and their future reproductive value is likely to be exceeded by the number of younger hawksbills recruiting into the adult or subadult population and their future potential reproductive value.

7.3 Kemp's Ridley Sea Turtles

The proposed action is expected to result in the taking of no more than four Kemp's ridleys every three years. Based on our knowledge of Kemp's ridleys in the action area, we expect these takes would be both benthic immature and adult individuals. All of these takes are expected to be lethal.

The loss of four Kemp's ridley over any given 3-year period would result in a reduction in the number of Kemp's ridleys for that time period. Kemp's ridleys nest primarily at Rancho Nuevo, a stretch of beach in Mexico, Tamaulipas State, outside of the proposed action area, so the chance of that individual being an inter-nesting adult female and causing an immediate reduction in reproduction is unlikely. However, the lethal takes could still result in a potential reduction in future reproduction if those individual were females and would have survived other threats and reproduced in the future. Reductions in the distribution of Kemp's ridleys would not occur as these four takes would have no bearing on the overall position, arrangement, or frequency of Kemp's ridleys occurrences in the action area.

The reductions in numbers and reproduction of Kemp's ridleys sea turtles attributed to the CMPR fishery would not appreciably reduce the sea turtle's likelihood of survival and recovery. Whether the reductions in numbers and reproduction attributed to the CMPR fishery would appreciably reduce the Kemp's ridley's 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 from this relatively small number of deaths. The required use of TEDs in shrimp trawls in the U.S. under the sea turtle conservation regulations has had dramatic effects on the

recovery of Kemp's ridleys. Their population, which had declined to critical levels in the 1980s, increased rapidly in the 1990s (TEWG 2000). Nesting beach survey data indicates the population is increasing (TEWG 2000). Over 1,000 nesting females were documented on one single day during 2002 (J. Peña, pers. comm. 2005). In 2006, over 12,000 nests were documented in Mexico (J. Peña, pers. comm. 2006). The proportional change in overall survival of Kemp's ridleys from the loss of four individuals would be insignificant. The number of younger sea turtles recruiting into the adult or subadult population and their future potential reproductive value would quickly exceed the death of four individuals and its future reproductive value.

7.4 Leatherback Sea Turtles

The proposed action is expected to result in the death of two leatherbacks every three years. Based on our knowledge of leatherbacks in the action area, we expect these takes would be both immature and adult individuals. All of these takes are expected to be lethal.

The lethal removal of up to two leatherback sea turtles over any given 3-year period would result in a reduction in the number of leatherbacks for that time period. These lethal takes could also result in a potential reduction in future reproduction, assuming at least a portion of the individuals killed would be females and would have survived other threats and reproduced in the future. Reductions in leatherback distribution would not occur because these randomly intermittent takes would have no significant effect on the overall position, arrangement, or frequency of leatherback occurrences in the action area. The proposed action has been ongoing for decades, with no perceived changes in the distribution of leatherback sea turtles to date.

The best available stock assessment for evaluating Atlantic leatherback populations is NMFS SEFSC (2001). That assessment is somewhat confounded by the near absence of data or high uncertainty for estimates of juvenile and adult survival and mortality, age and growth; and also, by the intermittence of nesting data from the major leatherback nesting beaches on the north coast of South America. Nevertheless, a very strong signal of declining nesting was detected for the nesting aggregation of Suriname and French Guiana, the largest remaining leatherback nesting aggregation in the world. Nesting there had been declining at about 15 percent per year since 1987 through the 1990s. From the period 1979-1986, however, the number of nests had been increasing at about 15 percent annually. As explained in Section 3, there is a great degree of uncertainty and inconsistency regarding the leatherback sea turtle population status and trends. The uncertain trends in nesting at U.S. beaches versus South American beaches complicate our evaluation. Additionally, because of a lack of sufficient data, the population modeling scenarios performed for loggerhead sea turtles are not possible at this point for leatherback sea turtles. Therefore, we use Spotila et al. (1996) as the latest, most complete estimation of leatherback populations throughout the Atlantic basin (from all nesting beaches in the Americas, the Caribbean, and West Africa) (approximately 27,600 nesting females with an estimated range of 20,082-35,133).

As stated earlier, the CMPR fishery is expected to kill two individuals every three years. The size ratio of leatherbacks captured in the CMPR fishery is unknown. However, the HMS

pelagic longline observer program data, which records leatherback size information based on the observer's best estimate of the turtle's carapace length, to the nearest foot, suggest that one of the leatherbacks caught in the CMPR fishery may be mature breeders, and the other a sub-adult animals. Information on the sex ratios of the leatherbacks caught in the CMPR fishery is not available. Following the assumption used in leatherback population model published in Spotila et al. (1996), we assume the population sex ratio is 50 percent. Using a 50 percent sex-ratio and a 50 percent adult to juvenile ratio, therefore, we estimated that up to one breeding-age (adult) female and one subadult female may be killed every three years.

The reductions in numbers and reproduction of leatherback sea turtles attributed to the CMPR fishery would not appreciably reduce the species' likelihood of survival and recovery. Whether the reductions in numbers and reproduction attributed to the CMPR fishery would appreciably reduce the leatherback sea turtle's 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 from this relatively small number of deaths. The United States has taken action to reduce the number and severity of leatherback interactions with the two leading known causes of leatherback fishing mortality - the U.S. Atlantic longline fisheries, and the Southeast shrimp trawl fishery. The proportional change in overall survival of leatherbacks from the loss of a total of two leatherbacks every three years, with no more than one adult female and one subadult female, would be insignificant. With an estimate of twenty- to thirty-five thousand nesting females, we believe that the effects of these losses will not result in detectable change in leatherback populations. The death of these individuals every three years and their future reproductive value is likely to be exceeded by the number of younger sea turtles recruiting into the adult or subadult population and their future potential reproductive value.

7.5 Loggerhead Sea Turtles

The proposed action is expected to result in take of up to 33 loggerheads every three years, all of which are expected to be lethal. Based on our knowledge of loggerhead sea turtles in the action area, we expect these takes would be either benthic immature or adult individuals.

As discussed in Section 3 (Status of the Species), five northwestern Atlantic loggerhead subpopulations have been identified (NMFS SEFSC 2001), with the South Florida nesting and the northern nesting subpopulations being the most abundant. Based on Bowen et al. (2004), approximately 90.2 percent of loggerheads in the action area are from the South Florida subpopulation, 5.8 percent are from the northern nesting subpopulation, 2.5 percent are from the Yucatán, Mexico subpopulation, 0.8 percent are from the northwest Florida (Panhandle subpopulation), and 0.3 percent are from the Dry Tortugas.

The lethal removal of 33 loggerheads over a given 3-year period would result in a reduction in the number of loggerheads for that time period. The lethal takes could also result in a potential reduction in future reproduction, assuming at least a portion of the individuals killed were females and would have survived other threats and reproduced in the future.

Reductions in loggerhead distribution are not expected because these randomly occurring takes would have no significant effect on the overall position, arrangement, or frequency of

loggerhead occurrences in the action area. The proposed action has been ongoing for decades, with no perceived changes in the distribution of loggerhead sea turtles to date.

Loggerhead sea turtles are the most abundant sea turtles in the action area. It is yet to be determined how the recent dynamics in the nesting situation of the South Florida subpopulation translates to the status of the current population, and whether it is reflective of a population decline or a failure of mature females to nest. Also, although nesting trends can provide an important indicator of subpopulation status, they cannot be viewed in isolation. Loggerheads mature at a late age (20-30 years); therefore current nesting trends reflect natural and anthropogenic effects on female loggerheads that occurred over the last two decades. Using nesting trend data to make conclusions about the status of the entire subpopulation, therefore, requires making certain assumptions. These assumptions are that the current impacts to mature females are experienced to the same degree amongst all age classes regardless of sex, and/or that the impacts leading to the current abundance of nesting females are affecting the current immature females to the same extent.

The 1995 ban of gillnets in Florida state waters, and subsequent similar actions by South Carolina and Georgia, have had significant impact on the gillnet component of the Spanish mackerel CMPR fishery. In the Gulf of Mexico, the average Spanish mackerel gillnet landings during each fishing season from 2001/02 thru 2003/04 were 41 percent lower than the average gillnet landings during the fishing seasons from 1987/88 thru 1994/95 (GMFMC et al. 2004). Cast nets have become increasingly popular since the 1995 Florida net ban.¹⁵ Prior to 2001, cast nets accounted for no more than 12 percent of the total Spanish mackerel landings in the South Atlantic (GMFMC et al. 2004). Since 2001, cast nets have replaced gillnets as the predominant gear type used to target Spanish mackerel in South Atlantic. In 2003, cast nets accounted for 59 percent of all Spanish mackerel landings from this region, while gillnets only represented 25 percent (14% "other" gillnet gear, 11% run-around gear) (GMFMC et al. 2004).

Similar changes have also occurred in the gillnet component of the king mackerel CMPR fishery. The number of vessels permitted to fish for king mackerel in the Gulf of Mexico decreased from 100 in 1998 to 27 in 2004 (GMFMC et al. 2004). Similarly, from the 1960s to the 1990s, gillnets were the predominant gear type used to target king mackerel in the South Atlantic. More recently, handline gear has become the dominate gear type for targeting king mackerel in this region. In 2003, only 2 percent of the king mackerel landed in South Atlantic were taken with gillnet gear (GMFMC et al. 2004). Most of the gillnet fishing that still occurs in the South Atlantic region occurs in state waters. From 1999–2003 (inclusive), 90 percent of gillnet fishing trips targeting king mackerel in the South Atlantic occurred within North Carolina state waters (GMFMC et al. 2004). Participation in the CMPR fishing has also declined. In November 2004, the Councils overseeing the management of CMPR species in the Gulf of Mexico and South Atlantic moved to make a moratorium on new commercial king mackerel permits permanent. Since the first full fishing season under this program (1998/1999) the number of active commercial permits for king mackerel and king and Spanish mackerel in combination, had decreased from 2,172 in 1998

¹⁵ Cast nets with a stretched length (the distance from the horn to the lead line) of less than 14 feet are still allowed in Florida state waters (FWCC 2006).

to 1,683 by August 2004 (GMFMC et al. 2004). The number of vessels reporting landings of king mackerel also decreased from 1,078 in 1999 to 951 in 2003 (SEFSC Logbook data in GMFMC et al. 2004).

Actions have been taken to reduce anthropogenic impacts to loggerhead sea turtles from various sources, particularly since the early 1990s. These include lighting ordinances, predator control, and nest relocations to help increase hatchling survival, as well as measures to reduce the mortality of pelagic immatures, benthic immatures, and sexually mature age classes in various fisheries and other marine activities. Recent actions have taken significant steps towards reducing the environmental baseline and improving the status of all loggerhead subpopulations. For example, the TED regulation (published on February 21, 2003 [68 FR 8456]) represents a significant improvement in the baseline affecting loggerhead sea turtles. Shrimp trawling is considered to be the largest source of anthropogenic mortality on loggerheads.

The reductions in numbers and reproduction of loggerhead sea turtles attributed to the CMPR fishery would not appreciably reduce the sea turtle's likelihood of survival and recovery. Whether the reductions in numbers and reproduction attributed to the CMPR fishery would appreciably reduce the loggerhead's 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 from this relatively small number of deaths. Given the late maturity of loggerheads, the benefits of many of the actions noted above, in terms of positive effect on nesting trends, will not be apparent for many years to come. Even if the South Florida subpopulation nesting decline trend data proves to be indicative of a true population decline (See Section 3.2.5.2), the proportional change in overall survival of loggerheads attributed to the proposed action from the loss of 33 individuals every three years and their future reproductive value would be insignificant. These relatively few losses are still likely to be exceeded by the number of younger sea turtles recruiting into the adult or subadult population and their future potential reproductive value and not be detected.

7.6 Smalltooth Sawfish

The proposed action is expected to result in the taking of two adult smalltooth sawfish, but no mortality is anticipated. Our best available information indicates the short-term non-lethal effects anticipated on smalltooth sawfish are not expected to affect the reproduction, numbers, or distribution. The abundance of adults relative to juvenile smalltooth sawfish, including very small individuals, encountered in shallow waters outside of the proposed action area suggests the population remains reproductively active and viable. Based on this information, the CMPR fishery would not affect the reproduction, numbers, or distribution of wild populations of smalltooth sawfish. Therefore, the proposed action will not reduce the smalltooth sawfish population's likelihood of surviving and recovering in the wild.

8.0 Conclusion

We have analyzed the best available data, the current status of the species, environmental baseline, effects of the proposed action, and cumulative effects to determine whether the proposed action is likely to jeopardize the continued existence of any sea turtle species or smalltooth sawfish.

Green, Hawksbill, Kemp's Ridley, Leatherback, and Loggerhead Sea Turtles

Our sea turtle analyses focused on the impacts and population response of sea turtles in the Atlantic basin. However, the impact of the effects of the proposed action on the Atlantic populations must be directly linked to the global populations of the species, and the final jeopardy analysis is for the global populations as listed in the ESA. Because the proposed action will not reduce the likelihood of survival and recovery of any Atlantic populations of sea turtles, it is our opinion that the continued operation of the Gulf of Mexico and South Atlantic CMPR fishery is also not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles.

Smalltooth Sawfish

Our smalltooth sawfish analyses focused on the impacts and population response of the U.S. DPS of smalltooth sawfish. Based on our analysis, it is our opinion that the continued operation of the CMPR fishery 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 RPAs and terms and conditions of the ITS.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the MMPA. Given that no incidental take of listed marine mammals is expected or has been authorized under section 101(a)(5) of the MMPA, no statement on incidental take of endangered whales is provided and no take is authorized. Nevertheless, F/SER2 must immediately notify (within 24 hours, if communication is possible) NMFS, Office of Protected Resources should a take of a listed marine mammal occur.

9.1 Anticipated Amount or Extent of Incidental Take

NMFS anticipates the following incidental takes may occur annually as a result of the continued operation of the CMPR fishery.

Table 5.5 Summary of Anticipated 3-Year Take and Mortality Estimates

Species	Amount of Take	Total
Green	Total Take	14
	Lethal Take	14
Hawksbill*	Total Take	2
	Lethal Take	2
Kemp's ridley*	Total Take	4
	Lethal Take	4
Leatherback*	Total Take	2
	Lethal Take	2
Loggerhead	Total Take	33
	Lethal Take	33
Smalltooth sawfish	Total Take	2
	Lethal Take	0

*These species take numbers are in combination with one another and represent the maximum number of each that may be taken over a three-year period.

9.2 Effect of the Take

NMFS has determined the level of anticipated take specified in section 9.1 is not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles or smalltooth sawfish.

9.3 Reasonable and Prudent Measures (RPMs)

Section 7(b)(4) of the ESA requires NMFS to issue to any agency action found to comply with section 7(a)(2) of the ESA and whose proposed action may incidentally take individuals of listed species a statement specifying the impact of any incidental taking. It also states that RPMs necessary and appropriate 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 sea turtles and 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/SER3 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 sea turtles and sawfish during CMPR fishing.

1. NMFS must ensure that any caught sea turtle or smalltooth sawfish is handled in such a way as to minimize stress to the animal and increase its survival rate.
2. NMFS must ensure that monitoring and reporting of any sea turtles or smalltooth sawfish encountered: (1) Detects any adverse effects resulting from the CMPR 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 individual 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 terms and conditions implement RPM No. 1.

1. NMFS must distribute information to permit holders specifying handling and/or resuscitation requirements fishers must undertake for any sea turtles or smalltooth sawfish taken.

The following terms and conditions implement RPM No. 2.

2. NMFS must maintain its current SDDP and improve future sea turtle data potentially reported under the SDDP by distributing educational outreach materials regarding the specific information to be reported and sea turtle identification to CMPR gillnet vessels selected to participate in this program prior to each reporting period.
3. NMFS must continue to observe the gillnet component of the CMPR gillnet indirectly via the Atlantic Shark observer program in the CMPR commercial gillnet sector. Observers must record information as specified on the SEFSC sea turtle life history form for any sea turtle captured. For any smalltooth sawfish captured, observers must record the date, time, location (lat./long.), water depth, estimated total length, estimated length of saw, tag ID(s) if present, gear, target species, tackle (hook brand, type, size, etc.), where hooked and/or entangled, and bait type. Photographs must be taken whenever feasible to confirm species identity and release condition. If feasible, observers should also tag any sea turtles or smalltooth sawfish caught and collect tissue samples from sea turtles for genetic analysis. This opinion serves as the

permitting authority for such tagging and tissue samples (without the need for an additional section 10 permit). NMFS must ensure that any observers employed are equipped with the tools, supplies, training, and instructions to collect and store tissue samples. Samples collected must be analyzed to determine the genetic identity of individual sea turtles caught in the fishery.

4. SERO must collaborate with SEFSC to monitor stranding data for records showing signs of being attributed to the CMPR fishery.
5. SERO must work with the U.S. Coast Guard and to ensure at-sea enforcement of regulations during the run-around king mackerel fishery in the Gulf of Mexico.
6. SERO must collaborate with the SEFSC to ensure the following information is reported to F/SER3 annually based on available information:
 - a. detailed information on any take reported;
 - b. total reported gillnet effort (yards fished x soak time [days]) by fishers selected for the SDDP;
 - c. total reported gillnet effort data from the CPL;
 - d. observer coverage level obtained in the commercial CMPR gillnet fishery;
 - e. detailed information on any observed takes;
 - f. total observed effort;
 - g. observed CPUEs for species observed taken; and
 - h. total take estimates for each species taken in the fishery.

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.

1. NMFS should conduct or fund smalltooth sawfish research on the demographic, behavioral, spatial, and temporal patterns of smalltooth sawfish in the GOM and Atlantic to improve understanding of the co-occurrence between the CMPR fishery and smalltooth sawfish.
2. NMFS should conduct or fund surveys or other alternative methods for determining smalltooth sawfish abundance in areas where CMPR fishing is concentrated.
3. NMFS should support in-water abundance estimates of sea turtles to achieve more accurate status assessments for these species and better assess the impacts of incidental take in fisheries.
4. NMFS should expand the SDDP's requirement that 20 percent of commercial permit holders record and submit trip discard data to NMFS to 100 percent coverage.

11.0 Reinitiation of Consultation

This concludes formal consultation on the CMPR fishery. 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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**Appendix A Analysis and Maps of Sea Turtle Strandings and Incidental Captures
off Florida 1994 through 2004**

**Table 1 Sea Turtle Stranding Analysis for the Records off Florida (Source: SEFSC
STSSN Database, May 13, 2005)**

Florida Sea Turtle Strandings Data Used in Take Analysis									
ID	Year	Month	Species	Life Stage	Match Time	Match Area	Mesh Size ¹	Take Probability	Notes
GS1	1994	March	Green	N/A	No	Yes	4 3/4" Str.	Possible	Matches time; mesh size is 1 1/2" larger than minimum
GS2	1994	July	Green	N/A	No	Yes	5 1/4" Str.	Possible	Matches area, gear close to Atl. King.
GS6	1994	June	Hawksbill	Juvenile	No	No	N/A	Unlikely	Does not match time or area
GS7	1994	June	Green	N/A	No	No	3 5/8" Str.	Possible	Gear matches closely
GS8	1994	April	Loggerhead	N/A	No	No	N/A	Unlikely	Does not match time or area
GS13	1996	July	Green	N/A	No	No	N/A	Unlikely	Does not match time or area
GS14	1996	August	Green	N/A	Yes	Yes	N/A	Likely	Matches both time and area
GS15	1996	September	Loggerhead	Adult	Yes	Yes	2 1/4" Bar	Likely	Matches both time and area; gear could also match
GS16	1996	October	Loggerhead	N/A	Yes	Yes	N/A	Likely	Matches both time and area
GS21	1996	August	Loggerhead	Adult	No	Yes	N/A	Possible	Matches area
GS23	1997	May	Green	N/A	Yes	No	N/A	Possible	Matches Time
GS26	1998	November	Hawksbill	Sub-Adult	No	Yes	N/A	Possible	Matches area
GS33	1999	February	Green	N/A	Yes	No	N/A	Possible	Matches Time
GS34	2000	August	Green	N/A	Yes	No	N/A	Possible	Matches Time
GS35	2000	July	Green	N/A	No	Yes	4" Bar	Possible	Matches area of the fishery
GS52	2003	September	Green	N/A	No	No	24" Str.	Unlikely	Does not match time or area; gear well above minimum size
N/A	1997	February	Unknown	N/A	No	No	N/A	Unlikely	Does not match time or area
N/A	1999	August	Loggerhead	N/A	No	Yes	4" Mesh	Possible	Matches area of the fishery, gear could also match

¹ Str. = Stretched mesh, Bar = bar mesh, Mesh = mesh without designation as stretched or bar, Illegal = gillnet thought to be illegal
N/A = Not Available

Figure 1 Location of Offshore Sea Turtle Strandings and Incidental Captures off Florida

