ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

BIOLOGICAL OPINION

Agency: National Marine Fisheries Service

Activity: NMFS' approval of the Tilefish Fishery Management Plan
GARFO-2001-00003

Conducted by: National Marine Fisheries Service
Northeast Regional Office

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Approved by: [signature]

This constitutes the National Marine Fisheries Service's (NMFS) biological opinion on the effects of NMFS's approval and implementation of the Tilefish Fishery Management Plan on threatened and endangered species in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). NMFS's Office of Sustainable Fisheries requested NMFS's Office of Protected Resources to initiate formal consultation by letter on March 29, 1999. Following receipt of additional information, formal consultation was initiated on August 25, 1999.

This biological opinion (Opinion) is based on information provided in the August 25, 1999, Draft Environmental Impact Statement (DEIS) for the Tilefish Fishery Management Plan, telephone conversations with NMFS' Office of Sustainable Fisheries, and other sources of information. A complete administrative record of this consultation is on file at the NMFS Northeast Regional Office.

Consultation History

The National Marine Fisheries Service (NMFS) has determined that the stock of golden tilefish (*Lopholatilus chamaeleonticeps*), hereafter referred to as "tilefish", is overexploited and that the implementation of a fishery management plan (FMP) is necessary to eliminate overfishing and rebuild the stock to an optimum yield level. The Mid-Atlantic Fishery Management Council (MAFMC) developed an FMP, and has submitted it to the NMFS for approval. NMFS intends to publish a proposed rule for implementation of this plan under the Magnuson-Stevens Act (MSA).

The tilefish fishery is currently unregulated. Although listed species have not been reported to have been taken by the tilefish fishery, based on a review of the draft FMP for tilefish and records of listed species encounters with gear similar to those used in the tilefish fishery (especially bottom longline gear and sea turtles), NMFS' Office of Sustainable Fisheries determined that approval and implementation of the FMP was likely to adversely affect !isted species or critical habitat. Following this determination, NMFS' Office of Sustainable Fisheries (the action agency equivalent) forwarded a letter to NMFS' Office of Protected Resources (the consulting agency equivalent) requesting formal intra-service section 7 consultation on March 29, 1999.

I. Description of the Proposed Action

The proposed action is NMFS' Office of Sustainable Fisheries' approval and implementation of a federally-permitted commercial fishery targeting tilefish outside of state waters and within the Exclusive Economic Zone (EEZ). A comprehensive discussion of the current fishery and background for the proposed action, including a more detailed description of the proposed measures, can be found in the FMP and DEIS. A summary of the characteristics of the fishery relevant to the analysis of its potential effects on threatened and endangered species is presented below.

a. Description of the Current Fishery for Tilefish

The current fishery for tilefish is primarily located in the mid-Atlantic. From 1985-1994, an average of 89.7% of the total commercial tilefish landings came from the mid-Atlantic region, and 9.3% from the New England region. During the past decade, the mid-Atlantic states of New York and New Jersey have had the greatest landings of tilefish, nearly 68% and 22% respectively, amongst states from Maine through Virginia. Rhode Island followed with 8% of tilefish landings, and Maine accounted for 1% of tilefish landings from Maine through Virginia. No other state during the past decade averaged more than 1% of tilefish landings.

The tilefish fishery within the action area is overwhelmingly a federal fishery. Between 1985 and 1994 at least 99% of all commercial tilefish landings for the states from Maine through Virginia were caught in the EEZ. Only in 1988 and 1993 were more than 1000 pounds of tilefish recorded as being landed in state controlled waters. However, considering the unique habitat requirements of tilefish, it is likely that these are misreported landings.

Tilefish habitat is typically found in the canyons along the continental shelf. The current fishing effort for tilefish appears to be focused on particular canyons. Nearly three-quarters of the most recent landings were caught in statistical area 537 which includes Atlantis, Alvin and Block Canyons. Statistical area 616, which includes Hudson Canyon, had the second highest landings while statistical area 526, which includes Veatch Canyon, rated third. In contrast, less than 5% of the total landings were caught in statistical areas 525,533, 534, and 636 which also include canyons.

A minority of the vessels that participate in the tilefish fishery account for the majority of the landings. Weigh-out data suggests that there were 215 vessels in the tilefish fishery in 1998. However, 12 of these accounted for over 80% of the landings. In addition, only 50 vessels appear to have had sufficient landings from 1988-1998 to qualify for the new tilefish limited access permits. Tilefish vessels are usually of steel construction and range in length from 50 to 100 feet. Although the number of vessels targeting tilefish has decreased since the peak in the

1980s, the approximate dozen vessels currently in the fishery have more than adequate capacity to harvest the maximum economic yield level.

The tilefish fishery talces place year round but is most intense from October through June when the market value and catch rates are the highest. Seasonally the highest landings of tilefish occur in January through June with a peak of 3.01 million pounds in March during the past decade. New York, New Jersey, and Rhode Island (states with the three highest landings) show a similar trend in landings throughout the year. Effort (as demonstrated by commercial landings) increased substantially through the 1990s. Commercial landings had a net increase of 260% from 1989 to 1998.

The primary gear type in the tilefish fishery is bottom longline. Nearly ninety-three percent of the tilefish landings during the past decade have been made with bottom longline gear while bottom trawls accounted for approximately seven percent. Some tilefish have also been taken in sink gillnet gear and pot gear. However, the numbers taken in either of these gear types are minimal and likely reflect incidental catch of tilefish. Longline landings for the two states with the greatest landings were 98.2% of New York's total landings and 99.3% of New Jersey's total landings, during the past decade. Rhode Island and Connecticut were the only states whose primary gear for tilefish was otter trawl with 69.8% and 70.7% of their landings, respectively, by that gear during the past decade. In the past, the bottom longline fishery for tilefish has used rope or monofilament for the longline. The current fishery uses steel cable. It is believed that the use of cable will reduce the risk of entanglements for marine mammals and sea turtles. However, it may also cause an increased risk in wounding and/or scarring events if marine mammals swim hard into buoy lines.

The tilefish fishery has never been an observed fishery, and no reliable data exists concerning incidental take of listed species in the fishery. Anecdotal information suggests that loggerhead and leatherback sea turtles have been taken by hook in the tilefish bottom longline fishery (MAFMC, 2000). Likewise, no reliable data exists co ceming any incidental take of listed marine mammals in the tilefish fishery, although take may have occurred in the past. An observer program comparable to that in place for other regulated fisheries (e.g., Northeast multispecies, monkfish, and spiny dogfish, amongst others) is proposed for this action. The NMFS observer program records data on protected species (e.g., marine mammals and sea turtles) incidentally taken in fishery interactions. Although greater coverage is often sought, typically less than 1% observer coverage in any one fishery is achieved. This is primarily due to limited financial resources to fund the observer program. To minimize protected species interactions, the proposed FMP encourages fishers to move to a new location if they have an interaction with an ESA-listed species.

Although tilefish were once taken in the recreational fishery, this no longer appears to be the case. In 1997 (the most recent Marine Recreational Fishing Statistical Surveys data) there were only three intercepted trips (randomly conducted interviews) which stated that tilefish was the primary species being targeted. This suggests that there is not a substantial directed recreational fishery for tilefish. There is currently no foreign fishing for tilefish within the EEZ. Foreign fishery landings were reduced to zero by the mid-1980s.

B. Proposed Tilefish Fishery Management Plan

The proposed Tilefish FMP contains the following measures that either directly or indirectly affect the fishery:

Effort Control and Reduction Measures:

- a IO-year stock rebuilding schedule with an annual commercial quota, and measures to reduce the quota on an annual basis if overages occur in the preceding year
- a limit on new entrants to the fishery
- a commercial quota divided into a two-tiered full time, part-time and incidental categories
- a trip limit for the incidental category designed to achieve a "target" quota expected to have some reductions in fishing mortality

The proposed stock recovery schedule for the tilefish fishery specifies mandatory reductions in tilefish fishing mortality which are expected to result in reductions in fishing effort directed at tilefish in the defined management unit. Fishing mortality is expected to be reduced by limiting the total allowable landings (TAL) to 1.995 million pounds for ten consecutive years. The TAL is intended to remain the same over the I0-year rebuilding schedule. However, the TAL could change from year to year if: (I) necessary to correct for an overage in the previous year, or (2) warranted by new data from an assessment of the stock that changes the biological parameters.

Supporting Administrative Measures:

The FMP for tilefish identifies several administrative measures that will be used to support the proposed fishery. These measures include:

- permits that will be required for commercial vessels, operators, and dealers
- a fishing year that begins January I and ends December 31
- a requirement for operators of commercial vessels to possess an operator's license
- logbook reporting for commercial vessels, and dealer reports from dealers purchasing tilefish
- a framework adjustment process
- a requirement for a benchmark stock assessment every 3 years
- a trip limit of 300 pounds for vessels with incidental permits
- a requirement to take observers upon request by NMFS

Action Area

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. For the purposes of this consultation, the Action Area is defined by the management unit of this FMP.

Tilefish are found along the entire U.S. Atlantic coast and the Gulf of Mexico. However, this FMP is concerned only with the tilefish inhabiting the area north of the Virginia/North Carolina border which have been identified as a biologically discrete stock (Katz *et al.,* 1983). Tilefish south of this border are managed by the South Atlantic Fishery Management Council under the Snapper-Grouper FMP.

Tilefish have some unique habitat characteristics, and are found in a warm water band (47-65° F) at 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.

II. Status of the species/critical habitat

NMFS has determined that the action being considered in the Opinion is not expected to affect shortnose sturgeon *(Acipenser brevirostrum)* which is listed as an endangered species under the Endangered Species Act of 1973. Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They can be found in large rivers along the western Atlantic coast from St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range *(i.e.,* south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 1998b). Since operation of die tilefish fishery does not occur in or near large rivers, it is highly unlikely that the action being considered in this Opinion will affect shortnose sturgeon.

a. Status of affected species

NMFS has determined that the action being considered in the Opinion may affect the following species and/or their critical habitat(s) provided protection under the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.;* ESA):

Cetaceans	
Right whale *(Eubalaena glacialis)*	Endangered
Humpback whale *(Megaptera novaeangliae)*	Endangered
Fin whale *(Balaenoptera physalus)*	Endangered
Blue whale *(Balaenoptera musculus)*	Endangered
Sei whale *(Balaenoptera borealis)*	Endangered
Sperm whale *(Physeter catodon)*	Endangered
Sea Turtles	
Loggerhead sea turtle *(Caretta caretta)*	Threatened
Leatherback sea turtle *(Dermochelys coriacea)*	Endangered
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered
Green sea turtle *(Chelonia mydas* [1])	Endangered
Critical Habitat Designations	
Right whale	Cape Cod Bay and Great South Channel portions of northern right whale critical habitat

This section will focus on the status of the various species within the action area, summarizing the information necessary to establish the environmental baseline to assess the effects of the proposed action. Of the species expected to be present in the action area, none have been known to become entangled in the bottom longline or bottom trawl gears employed in the tilefish fishery, although encounters with this gear type in other fisheries have occurred. For example, sea sampling data from the bottom longline fishery for sharks in the southeastern U.S. recorded 31 takes of loggerhead sea turtles out of 408 observed trips, and sperm whales interact with bottom long line gear used in the Alaskan sablefish fishery. Additional background information on the range-wide status of these species and a description of the critical habitat can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995, USFWS 1997, Marine Turtle Expert Working Group- TEWG, 1998 and in prep.), recovery plans for the humpback whale (NMFS 1991a), right whale (1991 b), loggerhead sea turtle (NMFS and USFWS 1991) and leatherback sea turtle (NMFS and USFWS 1992) and the 1999 Marine Mammal Stock Assessment Report (SAR) (Waring *et al.,* 1999).

Right Whale

Right whales have occurred historically in all the world's oceans from temperate to subarctic latitudes. NMFS recognizes three major populations of right whales: North Pacific, North Atlantic, and Southern Hemisphere. NMFS further recognizes two extant subpopulations in the North Atlantic: eastern and western. A third subpopulation may have existed in the central Atlantic (migrating from east of Greenland to the Azores or Bermuda), but this stock appears to be extinct (Perry *et al.,* 1999). Because of our limited understanding of the genetic structure of the entire species, the most conservative approach to this species would treat these right whale subpopulations as distinct populations whose survival and recovery is critical to the survival and recovery of the species. Further, any action that appreciably reduced the likelihood that one or more of these subpopulations would survive and recover in the wild would appreciably reduce the species' likelihood of survival and recovery in the wild. Consequently, this Opinion will focus on the western north Atlantic population of right whales, which occurs in the action area.

The scarcity of right whales is the result of an 800-year history of whaling that continued into the 1960s (Klumov 1962). Of all of the large whales, the northern right whale has the highest risk of extinction in the near future. Recent data indicate that there are fewer than 300 individuals in the North Atlantic and a small, unknown number of individuals in the North Pacific. The southern right whale, in contrast, has shown signs of slow recovery over the past 20 years. Illegal takes by Soviet whaling fleets operating in the North Pacific and Southern Hemisphere are now known to have continued until as recently as 1980 (Zemsky *et al.,* 1995). Northern right whales have been protected for more than 50 years from the pressures of whaling, yet most stocks show no evidence of recovery.

Right whales appear to prefer shallow coastal waters, but their distribution is also strongly correlated to the distribution of their prey (zooplankton). In both northern and southern hemispheres, right whales have been observed in the lower latitudes and more coastal waters during winter, where calving takes place, and then tend to migrate to higher latitudes during the summer. In summer and fall in both hemispheres, the .distribution of right whales appears linked to the distribution of their principal zooplankton prey (Winn *et al.,* 1986). The western north Atlantic stock of right whales generally occurs in Northwest Atlantic waters west of the Gulf Stream and are most commonly associated with cooler waters (5:21 °C). They are not found in the Caribbean and have been recorded only rarely in the Gulf of Mexico.

NMFS designated right whale critical habitat on June 3, 1994 (59 FR 28793). These waters, which lie within the action area, include the waters of Cape Cod Bay and the Great South Channel off the coast of Massachusetts, and off the coasts of southern Georgia and northern Florida, where the species is concentrated at different times of the year. Whales are most abundant in Cape Cod Bay between February and April (Hamilton and Mayo 1990; Schevill *et al.,* 1986; Watkins and Schevill 1982), in the Great South Channel in May and June {Kenney *et al.* 1986, Payne *et al.,* 1990), and off Georgia/Florida from mid-November through March {Slay *et al.,* 1996). Right whales also frequent the Bay of Fundy, Browns and Baccaro Banks (in Canadian waters), Stellwagen Bank and Jeffrey's Ledge in the spring and summer months, and use mid-Atlantic waters as a migratory pathway between the winter calving grounds and their spring and summer nursery/feeding areas in the Gulf of Maine. During the winter of 1999/2000, appreciable numbers of right whales were recorded in the Charleston, SC area. Because survey efforts in the mid-Atlantic have been limited, it is unknown whether this is typical or whether it represents a northern expansion of the normal winter range, perhaps due to unseasonably warm waters. However, historical sighting data uncorrected for effort do show a concentration of sightings in this area. In addition, recent satellite tracking efforts have identified individual animals embarking on far-ranging foraging episodes not previously known (Knowlton, pers. comm.).

Right whales in the Gulf of Maine feed on zooplankton, primarily copepods, by skimming at or below the w ter surface with open mouths (see NMFS 1991b, Kenney *et al.,* 1986, Murison and Gaskin 1989, Mayo and Marx 1990).

There has been significant discussion regarding attempts to determine the current status and trend of this very small population and to make valid recommendations on recovery requirements. As reported in the 1997 Biological Opinion on Highly Migratory Species, Knowlton *et al.* (1994) concluded, based on data from I987 through 1992, that the western North Atlantic right whale population was growing at a net annual rate of 2.5% (CV= 0.12). This rate was also used in NMFS' marine mammal Stock Assessment Reports, e.g., Blaylock *et al.,* 1995, Waring *et al.,* 1997. Since then, the data used in Knowlton *et al.* (1994) have been re-evaluated, and new attempts to model the trends of the western North Atlantic right whale population have been published (e.g., Kraus 1997; Caswell *et al.,* 1999) and additional works are in progress (Caswell *et al.,* in prep; Wade and Clapham, in prep).

Recognizing the precarious status of the right whale, the continued threats present in its coastal habitat throughout its range, and the uncertainty surrounding attempts to characterize population trends, the International Whaling Commission (IWC) held a special meeting of its Scientific Committee from March 19-25, 1998, in Cape Town, South Africa, to conduct a comprehensive assessment of right whales worldwide. The workshop's participants reviewed available information on the northern right whale, including Knowlton *et al.* (1994), Kraus (1997), and Caswell *et al.* (1999). After considering this information, the workshop attendees concluded that it is unclear whether the western North Atlantic population of the right whale is "declining, stationary or increasing, and [that] the best estimate of current population size is only 300 animals." Maintaining a conservative stance due to these uncertainties, participants concluded that the growth rate of this population "is both low and substantially less than that of the southern right whale populations" (IWC, 1999).

The IWC Workshop participants expressed "considerable concern" in general for the status of the western North Atlantic population Based on recent (1993-1995) observations of near-failure of calf production, the significantly high mortality rate, and an observed increase in the calving interval, it was suggested that the slow but steady recovery rate published in Knowlton *et al.* (1994) may not be continuing. Workshop participants urgent!y recommended increased efforts to determine the trajectory of this right whale population, and NMFS' Northeast Fisheries Science Center has initiated several efforts to implement that recommendation.

Caswell *et al.* (1999), using data on reproduction and survival through 1996, determined that the western North Atlantic right whale population was declining at a rate of 2.4% per year. One model they used suggested that the mortality rate of the right whale population has increased five-fold in less than one generation According to Caswell *et al.* (1999), if the mortality rate as of 1996 does not decrease and the population performance does not improve, extinction could occur within 100 years and would be certain within 400 years, with a mean time to extinction of 191 years. In the three calving seasons following Caswell *et al.*'s (1999) analysis, only IO calves are known to have been born into the population. However, at least 16 calves (one of which subsequently died of unknown causes) have been born this (2000/2001) calving season, providing new hope that perhaps at least the decline may be slowing.

It should be noted that no information is currently available on the response of the right whale population to recent (1997-1999) efforts to mitigate the effects of entanglement and ship strikes. Therefore, it is not possible to determine whether the trend through 1996, as reported in Caswell *et al.* (1999), is continuing. Furthermore, results reported in Caswell *et al.* (1999) suggest that it is not possible to determine that anthropogenic mortalities alone are responsible for the decline in right whale survival. However, they conclude that reduction of anthropogenic mortalities would significantly improve the species' survival probability. Given the uncertainty regarding effects of natural phenomena such as demographic and environmental stochasticity, which can influence the northern right whale population – and assuming that the right whale population, is in fact, declining – it is impossible to determine whether the western North Atlantic right whale population has reached the point where it would continue to decline even if all human-induced mortalities ceased.

At the 1998 IWC workshop, an inter-sessional Steering Group was established to review Caswell *et al.* (1999) and several other ongoing assessment efforts to identify the best and most current available scientific information on population status and trends. The [WC Scientific Committee met in May 1999 and discussed the Steering Group's report Committee members noted that there were several potential negative tiiases in Caswell *et al.* (1999) but agreed that the results of the study should be considered in management actions.

For the purposes of this Biological Opinion – and until the new status and trend information has been thoroughly reviewed for assimilation into NMFS management programs – NMFS will continue to adopt the risk averse assumption that the northern right whale population is declining.

General human impacts and entanglement

The major known sources of anthropogenic mortality and injury of right whales include entanglement in commercial fishing gear and ship strikes. Right whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

Based on photographs of catalogued animals from 1959 and 1989, Kraus (1990) estimated that 57% of right whales exhibited scars from entanglement and 7% from ship strikes (propeller injuries). This work was updated by Hamilton *et al.* (1998) using data from 1935 through 1995. The new study estimated that 61.6% of right whales exhibit injuries caused by entanglement, and 6.4 % exhibit signs of injury from vessel strikes. In addition, several animals have apparently been entangled on more than one occasion Some right whales that have been entangled were subsequently involved in ship strikes. These scarring percentages are primarily based on sightings of free-swimming animals that initially survive the impact which resulted in the scar. Because some animals may drown or be killed immediately, the actual number of interactions may be slightly higher. Following is a summary of recent documented cases of human interaction

Many of the reports of mortality cannot be attributed to a particular source. The following deaths or injuries were reported between 1996 and 1999 (these numbers should be viewed as absolute minimum numbers; the total number of deaths and injuries cannot be estimated):

1996: one right whale was killed by a ship strike, a second right whale was killed by a ship after having been entangled in 1995. In addition to these mortalities, there were two confirmed reports of right whales becoming entangled in fishing gear.

1997: another right whale was killed by a ship strike in the Bay of Fundy, and there were eight confirmed reports of whale entanglements. Six of the entanglements were reported in Canadian waters and two in U.S. waters; it should be noted that we only know where two of the eight entanglements occurred (one in U.S. and one in Canadian waters), and one of the reports may represent a resighting of an earlier entanglement.

1998: .two adult female right whales were discovered in a weir off Grand Manan Island in the Bay of Fundy on July 12, 1998, and were released two days later; no residual injuries of concern were reported. On July 24, 1998, the Disentanglement Team removed line from around the tail stock of a right whale which was originally seen entangled in the Bay of Fundy on August 26, 1997. This same whale, apparently debilitated from the earlier entanglement, became entangled in lobster pot gear twice in one week in Cape Cod Bay in September 1998. The gear from the latter two entanglements was completely removed, but line from the 1997 entanglementremained in the animals mouth. On August 15, 1998, a right whale was observed entangled in the Gulf of St. Lawrence; the animal apparently freed itself of most of the gear, but some gear may remain.

1999: two right whale mortalities were documented, including an adult female found floating near Truro, Massachusetts, that was towed to the beach for necropsy. Based on the necropsy, scientists concluded that the whale died from complications resulting from injuries caused by a ship strike. In the fall, a second adult female died of complications caused by entanglement.

Four new right whale entanglements were confirmed in 1999. There were several attempts to disentangle two of the whales. A whale sighted in the Bay of Fundy in June was nearly completely disentangled; a small piece of line remains in the mouth.

2000: there has been one right whale mortality to date. A whale identified as #2701 was found floating dead 10 miles southeast of Block Island, RI on 1/19/00. Although entangling gear (line) was seen around the tail stock,.cause of death is uncertain. NMFS was unable to retrieve the carcass for examination due to extreme winter stonns.

Several right whale entanglements have been reported in 2000 as well, but disentanglement personnel have met with little success in relocating/disentangling these animals so it is unclear how many animals are involved.

2001: A right whale calf is known to have died in late-January, though the reasons for its demise are unclear, as stranding personnel were unable to recover the carcass.

The available information makes it reasonable to conclude that the current death rate far exceeds . the birth rate in the western North Atlantic right whale population. The nearly complete reproductive failure in this population from 1993 to 1995 and again in 1998 and 1999 suggests that this pattern has continued for almost a decade, though the 2000/2001 season appears the most promising in the past *5* years, in terms of new calves born. As on January 3, 200 l, the calf count stood at 16 (less one mortality, but compared to only one calf in January 2000). Because no population can sustain a high death rate and low birth rate for long without becoming extinct, this combination places the North Atlantic right whale population at high risk of extinction. Coupled with an increasing calving interval, the relatively large number of adult, female right whales that are killed, and these human-related deaths, the right whale's probability of extinction in the next 100 years is very high.

About half of the northern right whale's known geographic range is within the action area for this consultation. In the action area as a whole, right whales are present throughout most months of the year, but are most abundant between February and June, with concentrations observed in the critical habitat areas. The action area. includes the Cape Cod Bay and the Great South Channel critical habitat areas which were designated by NMFS on June 3, 1994 (59 FR 28793). Whales are most abundant in Cape Cod Bay between February and April (Hamilton and Mayo 1990; Schevill *et al.,* 1986; Watkins and Schevill 1982) and in the Great South Channel in May and June (Kenney *et al.,* 1986, Payne *et al.,* 1990). Mid-Atlantic waters are used as a migratory pathway from the spring and summer feeding/nursery areas in the Gulf of Maine to the winter calving grounds off the coast of Florida. There is, however, much about right whale movements and habitat that is not known or understood. Approximately 85% of the population is unaccounted for during the winter (Waring *et al.,* 1999). Telemetry technology, used to track whales, has shown lengthy and somewhat distant excursions into deep water off of the continental shelf (Mate *et al.,* 1997) as well as northern movements as far as Newfoundland. the Labrador Basin and southeast of Greenland (Knowlton *et al.,* 1992).

Humpback Whale
Humpback whales calve and mate in the Caribbean and migrate to feeding areas in the northwestern Atlantic during the summer months. Six separate feeding areas are utilized in northern waters after their return (Waring *et al.,* 1999). They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by targeting fish schools and filtering large amounts of water for the associated prey. Humpback whales have also been observed feeding on krill (Wynne and Schwartz, 1999).

Humpback whales use the mid-Atlantic as a migratory pathway, but it rriay also be an important feeding area for juveniles. Since 1989, observations ofjuvenile humpbacks in the mid-Atlantic have been increasing during the winter months, peaking January through March (Swingle *et al.,* 1993). Biologists theorize that non-reproductive animals may be establishing a winter feeding range in the mid-Atlantic since they are not participating in reproductive behavior in the Caribbean.

New information has become available on the status and trends of the humpback whale population in the North Atlantic. Although current and maximum.net productivity rates are unknown at this time, the population is apparently increasing. It has not yet been determined whether this increase is uniform across all six feeding stocks (Waring *et al.,* 1999). The rate of increase has been estimated at 9.0 % (CV=0.25) by Katona and Beard (1990), while a 6.5 % rate was reported for the Gulf of Maine by Barlow and Clapham (1997) using data through 1991. The rate reported by Barlow and Clapham (1997) may roughly approximate the rate of increase for the portion of the population within the action area. The best estimate of abundance for the North Atlantic humpback whale population is 10,600 animals (CV=0.067; Smith *et al.,* 1999) while the minimum population estimate used for NMFS management purposes is 10,019 animals (CV=0.067, Waring *et al.,* 1999).

Swingle *et al.* (1993) identified a shift in distribution ofjuvenile humpback whales in the nearshore waters of Virginia, primarily in winter months. Those whales using this mid-Atlantic area that have been identified were found to be residents of the Gulf of Maine feeding group, suggesting a shift in distribution that may be related to winter prey availability. Studies conducted by the Virginia Marine Science Museum indicate that these whales are feeding on, among other things, bay anchovies and menhaden. Researchers theorize that juvenile humpback whales, which are unconstrained by breeding requirements that result in the migration of adults to relatively barren Caribbean waters, may be establishing a winter foraging area in the mid-Atlantic (Mayo pers. comm.). In concert with the increase in mid-Atlantic whale sightings, strandings of humpback whales have increased between New Jersey and Florida since 1985. Strandings were most frequent during September through April in North Carolina and Virginia waters, and were composed primarily ofjuvenile humpback whales of no more than 11 meters in length (Wiley *et al.,* 1995). Six of 18 humpbacks (33%) for which the cause of mortality was determined were killed by vessel strikes. Sixty percent of those mortalities that were closely investigated showed signs of entanglement or vessel collision (Wiley *et al.,* 1993).

General human impacts and entanglement
The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that at least 48% --- and possibly as many as 78% --- of animals in the Gulf of Maine exhibit scarring caused by entanglement. Several whales have apparently been entangled on more than one occasion. These estimates are based on sightings of free-swimming animals that initially survive the encounter. Because some whales may drown immediately, the actual number of interactions may be slightly higher.

Many of the reports of mortality cannot be attributed to a particular impact source. The following injury/mortality events are those reported from 1996 to the present for which impact source was determined. These numbers should be viewed as absolute minimum numbers. The total number of mortalities and injuries cannot be estimated but it is believed to be higher since it is unlikely that all carcasses will be observed. In 1996, three humpback whales were killed in collisions with vessels and at least five were seriously injured by entanglement. Three confirmed humpback whale entanglements were reported in 1997. For 1998, 14 confirmed humpback whale entanglements resulting in injury (n=13) or mortality (n=1) were reported. One of the animals with entanglement injuries stranded dead, but the role of the entanglement in the animals death has not been determined. One injury from a vessel interaction was reported in 1998; the whale was seen several times after the injury, and exhibited some healing. A total of eight whales were observed entangled in 1999. One animal was completely disentangled, and a second was partially disentangled. There was also one known humpback whale mortality in 1999 that appears to be attributable to entanglement in fishing gear. Although no gear was present on the carcass, line marks were clearly visible on the dorsal and ventral surfaces of the tail stock. There were also line marks leading from the right side of the jaw to the ventral grooves, and to the insertion point of the right flipper.

Preliminary data for 2000 indicate that of 30 humpback whales reported to the stranding network, there were 16 possible human interactions (fifteen fishery+ one ship) and 13 for which no signs of entanglement or injury were sighted or reported. Of the 15 possible recorded cases of fishery interactions, fourteen were alive, of which one was successfully disentangled and another was seen at a later date apparently free of gear. These data have not yet been fully analyzed to determine causes of mortality (in cases which resulted in death). The type of fishery involved in these entanglements has been identified for only one of the animals thus far; a juvenile humpback whale was entangled in sink gillnet gear used to target sea trout.

Up to February 12, 2001, of four humpback whale mortalities reported to the stranding network there were two human interactions one fishery interaction which was released alive with no gear attached and one ship strike which resulted in a mortality. The third animal was a floater which was not recovered and the fourth had no signs of entanglement or injury sighted or reported.

Humpback whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries. Further information on these factors is provided in the Environmental Baseline.

Fin Whale

The fin whale is ubiquitous in the North Atlantic and occurs from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic pack ice (NMFS 1998a). The overall pattern of fin whale movement is complex, consisting of a less obvious north-south pattern of migration than that of right and humpback whales. Based on acoustic recordings from hydrophone arrays, however, Clark (1995) reported a general southward flow pattern of fin whales in the fall from the Labrador/Newfoundland region, south past Bermuda, and into the West Indies. The overall distribution may be based on prey availability, and fin whales are found throughout the action area for this consultation in most months of the year. This species preys opportunistically on both invertebrates and fish (Watkins *et al.,* 1984). As with humpback whales, they feed by filtering large volumes of water for the associated prey. Fin whales are larger and faster than humpback and right whales, and are less concentrated in nearshore environments. Insufficient data are available to determine status and trends of the Western North Atlantic stock of the fin whale population (Waring *et al.,* 1999). Hain *et al.* (1992) estimated that about 5,000 fin whales inhabit the northeastern United States continental shelf waters. Shipboard surveys of the northern Gulf of Maine and lower Bay of Fundy provided an estimate of 2,200 (CV=0.24) fin whales, from which the current minimum population estimate of 1,803 animals was derived (Waring *et al.,* 1999).

General human impacts and entanglement

The major known sources of anthropogenic mortality and injury of fin whales include entanglement in commercial fishing gear and ship strikes. However, many of the reports of mortality cannot be attributed to a particular source. The following injury/mortality events are those reported from 1996 to the present for which source was determined. These numbers should be viewed as absolute minimwn nwnbers; the total nwnber of mortalities and injuries cannot be estimated but is believed to be higher since it is unlikely that all carcasses will be observed. Mortalities that occur further offshore are less likely to be observed.

One mortality due to a ship strike was recorded in 1996. One entanglement report was also received in 1996. Five confirmed reports of entangled fin whales were received by NMFS in 1997. One ship strike mortality and one entanglement mortality were reported in 1998. A total of three fin whales were observed entangled in 1999. One of these was successfully disentangled. Preliminary data for 2000 indicate two finback whale mortalities, one of which was an apparent shipstrike (data have not yet been formally reviewed to determine the cause of death and whether observed injuries were pre- or post-mortem, but the animal had broken ribs and vertebral processes). No signs of entanglement or injury were sighted or reported for the second animal. Thus far in 2001 (through February 12), two dead finback whales were reported, both of which were possibly involved in ship strikes (one had a broken jaw and the other displayed bruising and broken bones).

Fin whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries. Further information on these factors is provided in the Environmental Baseline.

Sei Whale

The sei whale population in the western North Atlantic is assumed to consist of two stocks, a Nova Scotian Shelf stock and a Labrador Sea stock. Within the action area, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer, primarily in deeper waters. Individuals may range as far south as North Carolina. There are occasional influxes of this species further into Gulf of Maine waters, presumably in conjunction with years of high copepod abundance inshore. Sei whales are occasionally seen feeding in association with right whales in the southern Gulf of Maine and in the Bay of Fundy. Although sei whales may prey upon small schooling fish and squid in the action area, available information suggests that calanoid copepods and euphasiids are the primary prey of this species. There are insufficient data to determine trends of the sei whale population. Because there are no abundance estimates within the last 1Oyears, a minimum population estimate cannot be determined for NMFS management purposes (Waring *et al.,* 1999). Abundance surveys are problematic as this species is difficult to distinguish from the fin whale.

General human impacts and entanglement

Few instances of injury or mortality of sei whales due to human impacts have been recorded in U.S. waters. Entanglement is not known to impact this species in the U.S. Atlantic, possibly because sei whales typically inhabit waters further offshore than most commercial fishing operations or perhaps entanglements do occur but are less likely to be observed. A small number of ship strikes of this species have been recorded. The most recent documented incident occurred in 1994 when a carcass was brought in on the bow of a container ship in Charlestown, Massachusetts. Other impacts noted above for other baleen whales may also occur. Due to the. deep-water distribution of this species, interactions that do occur are less likely to be observed or reported than those involving right, humpback, and fin whales that often frequent areas within the continental shelf.

Blue Whale

Compared to the other species of large whales, relatively little is known about this species. Blue whale range in the North Atlantic extends from the subtropics to Baffin Bay and the Greenland Sea (Yochem and Leatherwood, 1985). Large euphasiid crustaceans *(Thysanoessa inermis* and *Meganyctiphanes norvegica)* make up the bulk of the blue whale's diet. Fish and copepods may also be consumed but are not likely to be significant components of the diet (NMFS 1998c).

There are insufficient data to determine the status and trends of the blue whale population in the western North Atlantic (Waring *et al.,* 1999). The Recovery Plan for the blue whale (NMFS 1998c) summarizes what is known about blue whale abundance in the western North Atlantic and concludes that the population probably numbers in the low hundreds. More than 320 individuals were photo-identified in the Gulf of St. Lawrence between 1979-1995, while '352 individuals were catalogued from eastern Canada and New England through Autumn 1997

(Sears *et al.,* 1990; and Sears, pers. comm., reported in NMFS 1998c).

General human impacts and entanglement
The major known sources of anthropogenic mortal_ity and injury of blue whales also involve entanglement and ship strikes. Other impacts noted above may also occur. No recent entanglements of blue whales have been reported from the U.S. Atlantic. In 1987, concurrent with an unusual influx of blue whales into_ the Gulf of Maine, one report was received from a whale watch boat that spotted a blue whale in the southern Gulf of Maine entangled in gear described as probable lobster pot gear. In March 1998, a juvenile male blue whale was carried into Rhode Island waters on the bow of a tanker. Cause of death was determined to be due to a ship strike, although not necessarily caused by the tanker on which it was observed, and the strike may have occurred outside the U.S. EEZ (Waring *et al.,* 1999).

Sperm Whale
Sperm whales were hunted in America from the 17th century through the early 1900's. The International Whaling Commission estimates that nearly a quarter-million sperm whales were killed worldwide in whaling activities between 1800 and 1900 (IWC 1971). With the advent of modern whaling the larger rorqual whales were targeted. However, as their numbers decreased, greater attention was paid to smaller rorquals and sperm whales. From 1910 to 1982 there were nearly 700,000 sperm whales killed worldwide from whaling activities (Clarke 1954; Committee for Whaling Statistics 1959 -1983). In recent years the catch of sperm whales has been drastically reduced as a result of the imposition of catch quotas. NMFS believes there are insufficient data to determine population trends for this species (Blaylock *et al.,* 1995).

There are estimated to be approximately two million sperm whales worldwide with a population of 130,000 or more thought to occur in the North Atlantic (IWC 1983). In the western North Atlantic they range from Greenland to the Gulf of Mexico and the Caribbean. The sperm whales that occur in the eastern U.S. EEZ are believed to represent only a portion of the total stock (Blaylock *et al.,* 1995). Sperm whales generally occur in waters greater than 180 meters in depth. While they may be encountered almost anywhere on the high seas, their distribution shows a preference for continental margins, sea mounts, and areas of upwelling, where food is abundant (Leatherwood and Reeves 1983). Waring *et al.* (1993) suggest sperm whale distribution is closely correlated with the Gulf Stream edge. Like swordfish, which feed on similar prey, sperm whales migrate to higher latitudes during summer months when they are concentrated east and northeast of Cape Hatteras. Bull sperm whales migrate much farther poleward than the cows, calves, and young males. Because most of the breeding herds are confined almost exclusively to warmer waters many of the larger mature males return in the winter to the lower latitudes to breed

The best estimate of abundance for sperm whales in the western North Atlantic is 2,698 (CV=0.67) (Waring *et al.,* 1999). For purposes of determining the Potential Biofogical Removal PBR) under the Marine Mammal Protection Act (MMPA), a minimum population estimate of 1,617 was used for the western North Atlantic sperm whale. Using this minimum estimate, PBR for the western North Atlantic sperm whale was calculated to be 3.2 animals (Waring *et al.,* 1999).

The sperm whale occurs throughout the U8. EEZ on the continental shelf edge, over the continental slope, and into the mid-ocean regions. NMFS currently uses the IWC stock structure guidance which recognizes one stock for the entire North Atlantic (Waring *et al.,* 1999). Sperm whales are distributed in a distinct seasonal cycle, concentrated east-northeast of Cape Hatteras in winter and shifting northward in spring when whales are found throughout the Mid-Atlantic Bight. Distribution extends further northward to areas north of Georges Bank and the Northeast Channel region in swnmer and then south of New England in fall, back to the mid-Atlantic Bight (Waring *et al.,* 1999).

Sperm whales feed primarily on mediwn to large-sized mesopelagic squids such as *Architeuthis* and *Moroteuthis.* Sperm whales, especially mature males in higher latitude waters, also take significant quantities oflarge demersal and mesopelagic sharks, skates, and bony fishes (Clarke 1962, 1980). Spenn whale populations are organized into two types of groupings: breeding schools and bachelor schools. Older males are often solitary (Best 1979). Breeding schools consist of females of all ages and juvenile males. The mature females ovulate April through August in the Northern Hemisphere. During this season one or more large mature bulls temporarily join each breeding school. Bachelor schools consist of maturing males who leave the breeding school and aggregate in loose groups of about 40 animals. As the males grow older they separate from the bachelor schools and remain solitary most of the year (Best 1979). Sperm whales have a low reproductive rate. Vital information for animals of the northwest Atlantic include: (a) mean age at sexual maturity is 19 years for males and 9 years for females, (b) mean age at physical maturity is 45 years for males and 30 years for females, (c) the calving interval is 4-6 years, (d) lactation is 24 months, and (e) the gestation period is 14.5-16.5 months (Waring *et al.,* 1999).

General human impacts and entanglement

Few instances of injury or mortality of sperm whales due to hwnan impacts have been recorded in U.S. waters. Like sei whales, sperm whales typically inhabit waters further offshore than most commercial fishing operations. Docwnented takes primarily involve offshore fisheries such as the offshore lobster pot fishery and pelagic driftnet and pelagic longline fisheries. The NMFS Sea Sampling program recorded three entanglements (in 1989, 1990, and 1995) of sperm whales in the swordfish drift gillnet fishery prior to permanent closure of the fishery in January 1999. All three animals were injured, fo\lfid alive, and released. However, at least one was still carrying gear. Opportunistic reports of sperm whale entanglements for the years 1993-1997 include three records involving offshore lobster pot gear, heavy monofilament line, and fine mesh gillnet from an unknown source. Sperm whales may also interact opportunistically with fishing gear. Observers aboard Alaska sablefish and Pacific halibut longline vessels have documented sperm whales feeding on longline caught fish in the Gulf of Alaska (Perry *et al.,* 1999). Behavior similar to that observed in the Alaskan longline fishery has also been documented during longline operations off South America where sperm whales have become entangled in longline gear, have been observed feeding on fish caught in the gear, and have been reported following longline vessels for days (Perry *et al.,* 1999).

Because of their generally more offshore distribution and their benthic feeding habits, sperm whales are less subject to entanglement than are right or humpback whales. Sperm whales have been taken in the pelagic driftnet fishery for swordfish, and could likewise be taken in the shark gillnet fishery on occasions when they may occur more nearshore, although this likely does not occur often.

Sperm whales are also struck by ships. In May 1994 a ship struck sperm whale was observed· south of Nova Scotia (Waring *et al.,* 1999). A sperm whale was seriously injured as a result of a ship strike in May 2000 in the western Atlantic. Due to the offshore distribution of this species, interactions that do occur are less likely to be reported than those involving right, humpback, and fin whales that more often occur in nearshore areas. Other impacts noted above for baleen whales may also occur.

Due to their offshore distribution, sperm whales tend to strand less often than, for example, right whales and humpbacks. Preliminary data for 2000 indicate that often sperm whales reported to the stranding network (nine dead and one injured) there was one possible fishery interaction, one ship strike (wounded with bleeding gash on side) and eight animals for which no signs of entanglement or injury were sighted or reported. No sperm whales have stranded or been reported to the stranding networ to date in 2001.

Loggerhead Sea Turtle
The loggerhead sea turtle was listed as threatened under the ESA on July 28, 1978. Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans and are the most abundant species of sea turtle occurring in U.S. waters. Loggerhead sea turtles concentrate their nesting in the north and south temperate zones and subtropics, but generally avoid nesting in tropical areas of Central America, northern South America, and the Old World (NRC 1990). The largest known nesting aggregation ofloggerhead sea turtles occurs on Masirah and Kuria Muria Islands in Oman (Ross and Barwani, 1982). In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the gulf coast of Florida. The best scientific and commercial data available on the genetics of loggerhead sea turtles suggests there are four major subpopulations of loggerhead sea turtles in the northwest Atlantic: (1) a northern nesting subpopulation that occurs from North Carolina to northeast Florida, about 29° N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida panhandle nesting subpopulation; occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); and (4) a Yucatan nesting subpopulation, occurring on the eastern Yucatan Peninsula, Mexico (Marquez 1990)(approximately 1,000 nests in 1998)(TEWG 2000). This biological opinion will focus on the. northwest Atlantic subpopulations of loggerhead sea turtles, which occur in the action area.

Although NMFS has not formally listed these subpopulations of loggerhead sea turtles separately under the ESA, sea turtles are generally grouped by their nesting locations. Based on the most recent reviews of the best scientific and commercial data on the population genetics of loggerhead sea turtles and analyses of their population trends (TEWG, 1998; TEWG 2000), NMFS believes these loggerhead turtle nesting aggregations are distinct subpopulations whose survival and recovery is critical to the survival and recovery of the species. Further, any action that appreciably reduced the likelihood that one or more of these nesting aggregations would survive and recover would appreciably reduce the species' likelihood of survival and recovery in the wild. Consequently, this biological opinion will focus on the four nesting aggregations of loggerhead sea turtles identified in the preceding paragraph (which occur in the action area) and treat them as subpopulations for the purposes of this analysis. Natal homing to the nesting beach provides the genetic barrier between these subpopulations, preventing recoloni:2:ation from turtles from other nesting beaches. The importance of maintaining these subpopulations in the wild is shown by the many examples of extirpated nesting assemblages in the world. In addition, recent fine-scale analysis of mtDNA work from Florida rookeries indicate that population separations begin to appear between nesting beaches separated by more than 50-100 km of coastline that does not host nesting (Francisco *et al.* 2000) and tagging studies are consistent with this result (Richardson 1982, Ehrhart 1979, LeBuff 1990, CMTTP: in NMFS SEFSC 2001). Nest site relocations greater than I00 km occur, but generally are rare (Ehrhart 1979; LeBuff 1974, 1990; CMTTP; Bjomdal *et al.* 1983: *in* NMFS SEFSC 2001).

The loggerhead sea turtles in the action area are likely to represent differing proportions of the four western Atlantic subpopulations. Although the northern nesting subpopulation produces about 9% of the loggerhead nests, they comprise more of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia: between 25 and 59 percent of the loggerhead sea turtles in this area are from the northern subpopulation (NMFS SEFSC 2001; Bass *et al.,* 1998; Norrgard, 1995; Rankin-Baransky, 1997; Sears 1994, Sears *et al.,* 1995). In the Carolinas, the northern subpopulation is estimated to make up from 25% to 28% of the loggerheads (NMFS SEFSC 2001; Bass *et al.* 1998, 1999). About ten percent of the loggerhead sea turtles in foraging areas off the Atlantic coast of central Florida are from the northern subpopulation (Witzell *et al.,* in prep). In the Gulf of Mexico, most of the loggerhead sea turtles in foraging areas will be from the South Florida subpopulation, although the northern subpopulation may represent about 10% of the loggerhead sea turtles in the Gulf (Bass pers. comm). In the Mediterranean Sea, about 45 - 47 percent of the pelagic loggerheads are from the South Florida subpopulation and about two percent are from the northern subpopulation, while only about 51% originated from Mediterranean nesting beaches (Laurent *et al.,* 1998). In the vicinity of the Azores and Madiera Archipelagoes, about 19% of the pelagic loggerheads are from the northern subpopulation, about 71% are from the South Florida subpopulation, and about 11% are from the Yucatan subpopulation (Bolten *et al.,* 1998).

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. Turtles in this life history stage are called "pelagic immatures" and are best known from the eastern Atlantic near the Azores and Madeira and have been reported from the Mediterranean as well as the eastern Caribbean (Bjorndal *et al.,* in press). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm SCL they recruit to coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico.

Benthic immatures have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico (R. Marquez-M., pers. comm.). Large benthic immature loggerheads (70-91 cm) represent a larger proportion of the strandings and in-water captures (Schroeder *et al.,* 1998) along the south and western coasts of Florida as compared with the rest of the coast, but it is not known whether the larger animals actually are more abundant in these areas or just more abundant within the area relative to the smaller turtles. Benthic immature loggerheads foraging in northeastern U.S. waters are known to migrate southward in the fall as water temperatures cool (Epperly *et al.,* 1995; Keinath, 1993; Morreale and Standora, 1999; Shoop and Kenney, 1992), and migrate northward in spring. Given an estimated age at maturity of 21-35 years (Frazer and Ehrhart, 1985; Frazer and Limpus, 1998), the benthic immature stage must be at least 10-25 years long. NMFS SEFSC 2001 analyses conclude that juvenile stages have the highest elasticity and maintaining or decreasing current sources of mortality in those stages will have the greatest impact on maintaining or increasing population growth rates.

Although loggerhead sea turtles are most vulnerable to pelagic longlines during their pelagic, immature life history stage, there is some evidence that benthic immatures may also be captured, injured, or killed by pelagic fisheries. Recent studies have suggested that not all loggerhead sea turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic immatures, followed by permanent settlement into benthic environments. Some may not totally circumnavigate the North Atlantic. In addition, some of these turtles may either remain in the pelagic habitat in the North Atlantic longer than hypothesized or they may move back and forth between pelagic and coastal habitats (Witzell in prep.). Any loggerhead sea turtles that follow this developmental model would be adversely affected by shark gill nets and shark bottom longlines set in coastal waters, in addition to pelagic longlines.

Adult loggerhead sea turtles have been reported throughout the range ofthis species in the U.S. and throughout the Caribbean Sea. As discussed in .the beginning of this section, they nest primarily from North Carolina southward to Florida with additional nesting assemblages in the Florida Panhandle and on the Yucatan Peninsula. Non-nesting, adult female loggerheads are reported throughout the U.S. and Caribbean Sea; however, little is known about the distribution of adult males who are season lly abundant near nesting beaches during the nesting season. Aerial surveys suggest that loggerheads (benthic immatures and adults) in U.S. waters are distributed in the following proportions: 54% in the southeast U.S. Atlantic, 29% in the northeast U.S. Atlantic, 12% in the eastern Gulf of Mexico, and 5% in the western Gulf of Mexico (TEWG 1998).

Based on the data available, it is not possible to estimate the size of the loggerhead sea turtle population in the U.S. or its territorial waters. There is, however, general agreement that the number of nesting females provides a .useful index of the species' population size and stability at this life stage. Nesting data collected on index nesting beaches in the U.S. from 1989-1998 represent the best dataset available to index the population size of loggerhead sea turtles. However, an important caveat for population trends analysis based on nesting beach data is that this may reflect trends in adult nesting females, but it may not reflect overall population growth rates. Given this, between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,016-89,034 annually, representing, on average, an adult female population of 44,780 [(nests/4.1) * 2.5]. On average, 90.7% of the nests were from the South

Florida subpopulation, 8.5% were from the northern subpopulation, and 0.8% were from the Florida Panhandle subpopulation. There Is limited nesting throughout the Gulf of Mexico. west of Florida, but it is not known to what subpopulation they belong. Based on the above, there are only an estimated 3,800 nesting females in the northern loggerhead subpopulation. The status of this population, based on number of loggerhead nests, has been classified as stable or declining (TEWG 2000). Another consideration adding to the vulnerability of the northern subpopulation is that NMFS scientists estimate, using genetics data from Texas, South Carolina, and North Carolina in combination with juvenile sex ratios from those states, that the northern subpopulation produces 65% males, while the Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001, Part I).

From a global perspective, the southeastern U.S. nesting aggregation is critical to the survival of this species: it is second in size only to the nesting aggregations in the Arabian Sea off Oman and represents about 35 and 40 percent of the nests of this species. The status of the Oman nesting beaches has not been evaluated recently, but they are located in a part of the world that is vulnerable to extremely disruptive events (e.g. political upheavals, wars, and catastrophic oil spills), the resulting risk facing this nesting aggregation and these nesting beaches is cause for considerable concern (Meylan *et al.,* 1995).

Like other sea turtles, the movements of loggerheads are influenced by water temperature. Since they are limited by water temperatures, sea turtles do not usually appear on the summer foraging grounds until June, but are found in Virginia as early as April. The large majority leave the Gulf of Maine by mid-September but may remain in these areas until as late as November and December. Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (Wynne and Schwartz, 1999). Under certain conditions they may also scavenge fish, particularly if they are easy to catch (e.g., caught in nets) (NMFS and USFWS, 1991).

General Human-related Impacts

Loggerhead sea turtles face a number of threats in the marine environment, including oil and gas exploration, development, and transportation; marine pollution; trawl, purse seine, hook and line, gill net, pound net, longline, and trap fisheries; underwater explosions; dredging, offshore artificial lighting; power plant entrapment; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; and poaching. On their nesting beaches in the U.S., loggerhead sea turtles are threatened with beach erosion, armoring, and nourishment; artificial lighting; beach cleaning; increased hwnan presence; recreational beach equipment; exotic dune and beach vegetation; predation by exotic species such as fire ants, raccoons *(Procyon lotor),* armadillos *(Dasypus novemcinctus),* opossums *(Didelphus virginiana);* and poaching.

Large numbers of loggerhead sea turtles from the four subpopulations that occur in the action area are captured, injured, or killed in a wide variety of fisheries. Virtually all of the pelagic immature loggerheads taken in the Portuguese longline fleet in the vicinity of the Azores and Madiera are from western North Atlantic nesting subpopulations (Bolten *et al.,* 1994, 1998) and about half of those taken in both the eastern and western basins of the Mediterranean Sea are from the western North Atlantic subpopulations (Bowen *et al.,* 1993; Laurent *et al.,* 1998). Aguilar *et al.* (1995) es;imated that the Spanish swordfish longline fleet, which is only one of the many fleets operating in the region, alone captures more than 20,000 juvenile loggerheads annually (killing as many as 10,700). Estimated bycatch of marine turtles by the U.S. Atlantic tuna and swordfish longline fisheries, based on observer data, was significantly greater than reported in logbooks through 1997 (Johnson *et al.,* 1999; Witzell 1999), but was comparable by 1998 (Yeung, 1999). Observer records indicate that an estimated 6,544 loggerheads were captured by the U.S. fleet between 1992-1998, of which an estimated 43 were dead (Yeung *et al.,* in prep.). For 1998, an estimated 510 loggerheads (225-1250) were captured and, based on serious injury criteria developed for marine mammals (which may be inappropriate for sea turtles), all were presumed dead or were expected to die subsequent to being captured. Logbooks and observer records indicated that loggerheads readily ingest hooks (Witzell 1999). Aguilar *et al.* (1995) reported that hooks were removed from only 171 of 1,098 loggerheads captured in the Spanish longline fishery, describing that removal was possible only when the hook was found in the mouth, the tongue or, in a few cases, externally (flippers, *etc.);* the presumption is that all others had ingested the hook.

NMFS closed part of Pamlico Sound to the setting of gill nets 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, 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. A large proportion of these loggerheads was assumed to be from the northern subpopulation. NMFS will continue to implement such proactive measures as necessary. In 2000, following renewed large strandings of sea turtles in Pamlico Sound, North Carolina closed this fishery after exceeding the incidental take anticipated in a recently issued incidental take permit from NMFS.

Loggerhead sea turtles also face numerous threats from natural causes. For example, there is a significant overlap between hurricane seasons in the Caribbean Sea and northwest Atlantic Ocean (June to November) and loggerhead sea turtle nesting season (March to November); hurricanes can have potentially disastrous effects on the survival of eggs in sea turtle nests. In 1992, Hurricane Andrew affected turtle nests over a 90-mile length of coastal Florida; all of the eggs were destroyed by storm surges on beaches that were closest to the eye of this hurricane (Milton *et al.,* 1992). On Fisher Island near Miami, Florida, 69 % of the eggs did not hatch after Hurricane Andrew, probably because they were drowned by the storm surge. Nests from the northern subpopulation were destroyed by hurricanes which made landfall in North Carolina in the mid to late 1990's. Sand accretion and rainfall that result from these storms can appreciably reduce hatchling success. These natural phenomena probably have significant, adverse effects on the size of specific year classes; particularly given the increasing frequency and intensity of hurricanes in the Caribbean Sea and northwest Atlantic Ocean.

Status and Trend of Loggerhead Sea Turtles

The most recent work updating what is known regarding status and trends of loggerhead sea turtles is contained in NMFS SEFSC 2001. The recovery plan for this species (NMFS and

USFWS 1991) state that southeastern U.S. loggerheads can be considered for delisting if, over a period of 25 years, adult female populations in Florida are increasing and there is a return to pre-listing annual nest nwnbers totaling 12,800 for North Carolina, South Carolina, and Georgia combined. This equates to approximately 3,100 nesting females per year at 4.1 nests per female per season. NMFS SEFSC 2001 concludes that "nesting trends indicate that the numbers of females associated with the South Florida subpopulation are increasing. Likewise, nesting trend analyses indicate potentially increasing nest numbers in the northern subpopulation (TEWG 2000)." However, NMFS SEFSC 2001 also cautions that "given the uncertainties in survival rates (of the different life stages, particularly the pelagic immature stage), and the stochastic nature of populations, population trajectories should not be used now to quantitatively assess when the northern subpopulation may achieve 3,100 nesting females."

Several published reports have presented the problems facing long-lived species that delay sexual maturity in a world replete with threats from a modem, human population (Congdon *et al.,* 1993, Congdon and Dunham, 1994, Crouse *et al.,* 1987, Crowder *et al.,* 1994, Crouse 1999). In general, these reports concluded that animals that delay sexual maturity and reproduction must have high, annual survival as juveniles through adults to ensure that enough juveniles survive to reproductive maturity and then reproduce enough times to maintain stable population sizes. This general rule applies to sea turtles, particularly loggerhead sea turtles, because the rule originated in studies *o(* sea turtles (Crouse *et al.,* 1987, Crowder *et al.,* 1994, Crouse 1999). Heppell *et al.* (in prep.) specifically showed that the growth of the loggerhead sea turtle population was particularly sensitive to changes in the annual survival of both juvenile and adult sea turtles and that the adverse effects of the pelagic longline fishery on loggerheads from the pelagic immature phase appeared critical to the survival and recovery of the species. Crouse (1999) concluded that relatively small changes in annual survival rates of both juvenile and adult loggerhead sea turtles will adversely affect large segments of the total loggerhead sea turtle population.

The four major subpopulations of loggerhead sea turtles in the northwest Atlantic - northern, south Florida, Florida panhandle, and Yucatan - are all subject to fluctuations in the number of young produced annually because of natural phenomena like hurricanes as well as hwnan-related activities. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merrit Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection and probably cause fluctuations in sea turtle nesting success. Volusia County, Florida, for example, allows motor vehicles to drive on sea turtle nesting beaches (the County has filed suit against the USFWS to retain this right) and sea turtle nesting in Indian River, Martin, West Palm, and Broward counties of Florida can be affected by beach armoring, beach renourishment, beach cleaning, artificial lighting, predation, and poaching.

As discussed previously, the survival of juvenile loggerhead sea turtles is threatened by a completely different set of threats from human activity once they migrate to the ocean. Pelagic immature loggerhead sea turtles from these four subpopulations circumnavigate the North Atlantic over several years (Carr 1987, Bjomdal 1994). During that period, they are exposed to a series of long-line fisheries that include an Azorean long-line fleet, a Spanish long-line fleet, and various fleets in the Mediterranean Sea (Aguilar *et al.,* 1995, Bolten *et al.,* 1994, Crouse 1999). Based on their proportional distribution, the capture of immature loggerhead sea turtles in long-line fleets in the Azores and Madiera Archipelagoes and the Mediterranean Sea will have a significant, adverse effect on the annual survival rates of juvenile loggerhead sea turtles from the western Atlantic subpopulations, with a disproportionately large effect on the northern subpopulation that may be significant at the population level.

In waters off coastal U.S., the survival of juvenile loggerhead sea turtles is threatened by a suite of fisheries in Federal and State waters. Loggerhead turtles are captured, injured, or killed in shrimp fisheries off the Atlantic coast; along the southeastern Atlantic coast, loggerhead turtle populations are declining where shrimp fishing is intense off the nesting beaches (NRC 1990). Conversely these nesting populations do not appear to be declining where nearshore shrimping effort is low or absent. The management of shrimp harvest in the Gulf of Mexico demonstrates the correlation between shrimp trawling and impacts to sea turtles. Waters out to 200nm are closed to shrimp fishing off of Texas each year for approximately a three month period (mid-May through mid-July) to allow shrimp to migrate out of estuarine waters; sea turtle strandings decline dramatically during this period (NMFS, STSSN unpublished data). Loggerhead sea turtles are captured in fixed pound-net gear in the Long Island Sound, in pound-net gear and trawls in summer flounder and other finfish fisheries in the mid-Atlantic and Chesapeake Bay, in gill net fisheries in the mid-Atlantic and elsewhere, in fisheries for monkfish and for spiny dogfish, and in northeast sink gillnet fisheries (see further discussion in the *Environmental Baseline* of this Opinion). Witzell (1999) compiled data on capture rates of loggerhead and leatherback turtles in U.S. longline fisheries in the Caribbean and northwest Atlantic; the cumulative takes of these fisheries approach those of the U.S. shrimp fishing fleet (Crouse 1999, NRC 1990)

Leatherback turtle

The Recovery Plan for leatherback turtles *(Dermochelys coriacea)* contains a description of the natural history and taxonomy of this species (FWS and NMFS, 1992). Leatherbacks are widely distributed throughout the oceans of the world and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour, 1972). They are predominantly distributed pelagically, feeding primarily on jellyfish such as *Stomolophus, Chryaora,* and *Aurelia* (Rebel 1974). Leatherbacks are deep divers, with recorded dives to depths in excess of 1000 m (Eckert *et al.,* 1998), but they may come into shallow waters if there is an abundance of jellyfish nearshore. Leary (1957) reported a large group of up to 100 leatherbacks just offshore of Port Aransas, Texas associated with a dense aggregation of *Stomolophus.* They also occur annually in places such as Cape Cod and Narragansett bays during certain times of the year, particularly the fall.

The leatherback is the largest living sea turtle and it ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS 1995). Leatherback turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas) and are often found in association with jellyfish. TDR data recorded by Eckert *et al.* (1998) indicate that leatherbacks are night feeders. Of the turtle species common to the action area, leatherback turtles seem to be the most susceptible to entanglement in lobster gear and, along with loggerheads, to longline gear. This susceptibility may be the result of attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, and perhaps to the lightsticks used to attract target species in the pelagic longline fishery.

Although leatherbacks are a long lived species(> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported as about13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996) and 19 years as a likely maximum (NMFS SEFSC 2001). They nest frequently (up to 7 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).

Compared to the current knowledge regarding loggerhead populations, the genetic distinctness of leatherback populations is less clear. However, genetic analyses of leatherbacks to date indicate that within the Atlantic basin significant genetic differences occur between St. Croix, the U.S. Virgin Islands and mainland Caribbean populations (Florida, Costa Rica, Suriname and French Guiana), and between Trinidad and the same mainland populations (Dutton *et al.,* 1999), leading to the conclusion that there are at least 3 separate subpopulations of leatherbacks in the Atlantic. Much of the genetic diversity is contained in the relatively small insular subpopulations. To date, no studies have been published on pelagic or benthic foraging leatherbacks in the Atlantic and thus is it not known what populations are being impacted by the pelagic longline fishery. Although populations or subpopulations of leatherback sea turtles have not been formally recognized, based on the most recent reviews of the analysis of population trends of leatherback sea turtles, and due to our limited understanding of the genetic structure of the entire species, the most conservative approach would be to treat leatherback nesting populations as distinct populations whose survival and recovery is critical to the survival and recovery of the species. This Opinion therefore considers the status of the various nesting populations, as well as the Atlantic and worldwide populations. Any action that appreciably reduced the likelihood for one or more of these nesting populations or the basin wide population to survive and recover in the wild, would appreciably reduce the species' likelihood of survival and recovery in the wild.

Status and Trends of Leatherback Sea Turtles

Estimated to number approximately 115,000 adult females globally in 1980 (Pritchard 1982) and only 34,500 by 1995 (Spotila *et al.* 1996), leatherback populations nave been decimated worldwide, not only by fishery related mortality but, at least historically, primarily due to intense exploitation of the eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert 1996). Eckert (1996) and Spotila *et al.* (1996) record that adult mortality ,has also increased significantly, particularly as a result of driftnet and longline fisheries. The Pacific population is in a critical state of decline, now estimated to number less than 3,000 total adult and subadult animals (Spotila in press). The status of the Atlantic population is less clear. In 1996, it was reported to be stable, at best (Spotila 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females. According to Spotila (pers.comm.), the Western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic *(i.e.* off Africa, numbering~ 4,700) have remained consistent with numbers reported by Spotila *et al.* in 1996. Spotila (in press) indicates that between 1989 and 1995, marked leatherback returns to the nesting beach at St. Croix averaged only 48.5%, but that the overall nesting population grew. This is in contrast to a Pacific nesting beach at Playa Grande, Costa Rica, where only 11.9% of turtles tagged in 1993-94 and 19.0% of turtles tagged in 1994-95 returned to nest over the next five years. Characterizations of this population suggest that is has a very low likelihood of survival and recovery in the wild under current conditions.

Nest counts are currently the only reliable indicator of population status available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NMFS and USFWS 1995). The status of the leatherback population in the Atlantic is difficult to assess since major nesting beaches occur over broad areas within tropical waters outside the United States. The nesting population within U.S. jurisdiction is presumed to be stable. Numbers at some nesting beaches are increasing (e.g. St. Croix, Florida, Puerto Rico; P. Dutton, pers. comm.), although some nesting beaches in the U.S. Virgin Islands have been extirpated including nesting assemblages in other areas of the Caribbean such as St. John and St. Thomas. The nesting beach at Sandy Point, St. Croix, which has witnessed an increase in the population, has been subject to intensive conservation management efforts since 1981. However, it is not known whether the observed increase is due to improved adult survival or recruitment of new nesters since flipper tag loss is so high in this species. Better data collection methods implemented since the late 1980's may soon help to answer these questions. Based on an expected inter-nesting interval of one to five years, Dutton *et al.* (in press) estimate a 19 - 49% mortality rate for re-migrating females at Sandy Point. Researchers are currently unable to explain the underlying mechanisms which somehow are resulting simultaneously in such high mortality levels to nesting age females, and yet exponential growth in the nesting population.

In the western Atlantic, the primary nesting beaches occur in French Guiana, Suriname, and Costa Rica. The nesting population of leatherback sea turtles in the Suriname-French Guiana trans-boundary region has been declining since 1992 (Chevalier and Girondot, 1998). The current status of nesting populations in French Guiana and Suriname is difficult to interpret because these beaches are so dynamic geologically. Chevalier (pers. comm.) in a talk at the recent Annual Sea Turtle Symposium on March 2, 2000, entitled "Driftnet Fishing in the Marconi Estuary: the Major Reason for the Leatherback Turtle's Decline in the Guianas," stated that since·the middle 1970's leatherback nesting has declined (1987-1992 mean = 40,950 nests and 1993-1998 mean = 18,100 nests). He states that there is very little shifting in nesting from French Guiana and Suriname to other Caribbean sites (there has only been I tag recapture elsewhere).

The nesting population of leatherback sea turtles in Suriname is also decreasing. Chevalier claims that there is no human-induced mortality on the beach in French Guiana, and natural mortality of adults should be low. There has been very ·low hatchling success on beaches used for the last 25 years. Chevalier believes that threats to the population include fishing (longlines, drift nets, and trawling), pollution (plastic bags and chemicals), and boat propellers. Around 90% of the nests are laid within 25 km from the Marconi estuary. Strandings in 1997, 1998, and 1999 in the estuary were 70, 60, and 100, which Chevalier considers underestimates. He questioned the fishermen and actually observed a one km (gill) net with seven dead leatherbacks. This observation, coupled with the strandings, led him to conclude that there were large numbers captured incidentally in large mesh nets. There are protected areas nearshore in French Guiana; offshore, driftnets are set. There are no such protected areas off Suriname, and fishing occurs at the beach. Offshore nets soak overnight in Suriname; many boats fish overnight. According to Chevalier, the French Guiana government is starting up a working group to deal with accidental capture and to enforce the legislation. They will work towards the management of the fishery activity and collaborate with Suriname. They plan to study the accidental capture by the fishermen, satellite track turtles, and study strandings. The main problem appears to be the close proximity of the driftnet fishery to the nesting areas.

Swinkels (pers. comm.) also gave a presentation at the symposium on March 3, 2000 entitled "The Leatherback on the Move? Promising News from Suriname." Swinkels stated that from 1995• 1999 there was a large increase in leatherback nesting in Suriname. There is a nature reserve in two parts: one in Suriname and one in adjacent French Guiana. There were increasing trends observed on three beaches but poaching was 80 percent. Samsambo is a very dynamic beach, which has been newly created (by natural events) and now is a nesting beach. In 1995 very few nests were poached because at the time there wasn't much beach or nesting. Swinkels indicated that since that time, however, poaching has been increasing. In 1999, there were >4000 nests of which about 50% were poached. The beach has naturally been renourished over this period leading to increased nesting and increased poaching of new nests. Swinkels' null hypothesis was that there had been a shift in nesting activity (from other nesting areas). His alternate hypothesis was that the new nesting represented new recruitment to the population.

The status of leatherbacks in the Pacific appears more dire than the Atlantic. The East Pacific leatherback population was estimated to be over 91,000 adults in 1980 (Spotila 1996). Declines in nest abundance have been reported from primary nesting beaches. At Mexiquillo, Michoacan, Mexico, Sarti *et al.* (1996) reported an ayerage annual decline in nesting of about 23% between 1984 and 1996. The total number of females nesting on the Pacific coast of Mexico during the 1995-1996 season was estimated at fewer than 1,000. Less than 700 females are estimated for Central America (Spotila 2000). In the western Pacific, the decline is equally severe. Current nestings at Terengganu, Malaysia represent one percent of the levels recorded in the 1950's (Chan and Liew 1996).

Globally, leatherback populations have been decimated worldwide. The population was estimated to number approximately 115,000 adult females in 1980 (Pritchard 1982) and only 34,500 by 1995 (Spotila *et al.,* 1996). The decline can be attributed to many factors including fisheries as well as intense exploitation of the eggs (Ross, 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert, 1996). Eckert (1996) and Spotila *et al.* (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries. The Pacific population appears to be in a critical state of decline, now estimated to number less than 3,000 total adult and subadult animals (Spotila 2000). The status of the Atlantic population is less clear. In 1996, it was reported to be stable, at best (Spotila 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females. According to Spotila (pers.comm.), the Western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (*i.e.* off Africa, numbering~ 4,700) have remained consistent with numbers reported by Spotila *et al.* in 1996. Between 1989 and 1995, marked leatherback returns to the nesting beach at St. Croix averaged only 48.5%, but the overall nesting population grew (McDonald, *et. al,* 1993). This is in contrast to a Pacific nesting beach at Playa Grande, Costa Rica, where only 11.9% of turtles tagged in 1993-94 and 19.0% of turtles tagged in 1994-95 returned to nest over the next five years. Characterizations of this population suggest that is has a very low likelihood of survival and recovery in the wild under current conditions.

Spotila (2000) states that a conservative estimate of annual leatherback fishery-related mortality (from longlines, trawls and gillnets) in the Pacific during the 1990's is 1,500 animals. He estimates that this represented about a 23% mortality rate (or 33% if most mortality was focused on the East Pacific population). Spotila (2000) asserts that most of the mortality associated with the Playa Grande nesting site was fishery related. As noted above, leatherbacks normally live at least 30 years, usually maturing at about 12-13 years. Such long-lived species can not withstand such high rates of anthropogenic mortality.

Spotila *et al.* (1996) describe a hypothetical life table model based on estimated ages of sexual maturity at both ends of the species' natural range (5 and 15 years). The model concluded that leatherbacks maturing in 5 years would exhibit much greater population fluctuations in response to external factors than would turtles that mature in 15 years. Furthermore, the simulations indicated that leatherbacks could maintain a stable population only if both juvenile and adult survivorship remained high, and that if other life history stages (*i.e.* egg, hatchling, and juvenile) remained static, "stable leatherback populations could not withstand an increase in adult mortality above natural background levels without decreasing...Even the Atlantic populations are being exploited at a rate that cannot be sustained." Model simulations indicated that an increase in adult mortality of more than 1% above background levels in a stable population was unsustainable. Spotila *et al.* (1996) recommended not only reducing mortalities resulting from fishery interactions, but also advocated protection of eggs during the incubation period and of hatchlings during their first day, and indicated that such practices could potentially double the chance for survival and help counteract population effects resulting from adult mortality. They conclude "the Atlantic population is the most robust, but it is being exploited at a rate that cannot be sustained and if this rate of mortality continues, these populations will also decline. Leatherbacks are on the road to extinction."

Zug and Parham (1996) point out that the combination of the loss of long-lived adults in fishery related mortality, and the lack of recruitment stemming from elimination of annual influxes of hatchlings because of intense egg harvesting has caused the sharp decline in leatherback populations. The authors state that "the relatively short maturation time of leatherbacks offers some hope for their survival if we can greatly reduce the harvest of their eggs and the accidental and intentional capture and killing of large juveniles and adults."

The conflicting information regarding the status of Atlantic leatherbacks makes it difficult to conclude whether or not the population is currently in decline. Numbers at some nesting sites are up, while at others it is down. Data collected in southeast Florida clearly indicate increasing numbers of nests for the past twenty years (13% increase), though it should be noted that there was also an increase in the survey area in Florida over time (NMFS SEFSC 2001). At one site (St. Croix), population growth has been documented despite large apparent mortality of nesting females; for data from 1979 on from St. Croix the trend in numbers of nests is increasing at 8.1 % per year (*r*= 0.130, S.E. = 0.014, NMFS SEFSC 2001). Where data are available, population numbers are down in the Western Atlantic, but stable in the Caribbean and Eastern Atlantic. It does appear, however, that the Western Atlantic portion of the population is being subjected to mortality beyond sustainable levels, resulting in a continued decline in numbers of nesting females.

In the absence of any other population models, the population cannot withstand more than a 1% human-related mortality level which translates to 150 nesting females (Spotila *et al.* 1996; Spotila pers. comm.). As noted above, there are many human-related sources of mortality to leatherbacks; a tally of all leatherback takes anticipated annually under current biological opinions completed for NMFS June 30, 2000, biological opinion on the pelagic longline fishery projected a potential for up to 801 leatherback takes (although this sum includes many takes expected to be nonlethal). In 1999 there were 19 animals observed taken dead, or by hook or ingestion, in the pelagic longline fishery. Scientific extrapolation of these data has not yet been completed so an accurate estimation of how many animals this represents across the entire fishery is currently unavailable. However, the observed sets represent approximately 3% of total effort for 1999; therefore a direct scaling to total effort would estimate that approximately 633 leatherbacks may have been taken dead or seriously injured by the fishery. A direct scaling to 100% effort is inappropriate, as take rates vary widely across different geographical areas of the fishery (as well as seasonally and inter-annually), but it may at least provide an idea of the potential order of magnitude of dead or seriously injured animals associated with this fishery. Perhaps a better way of looking at the data is to apply the 29% mortality estimate provided by Aguilar (1995) to the average annual estimated take of 715 animals (Yeung *et al.,* in prep.), which indicates that an average of 207 animals annually either die or are seriously injured by pelagic longlines in the U.S. fleet.

NMFS has recently reinitiated consultation on the Highly Migratory Species FMP which includes the pelagic longline fishery and is reanalyzing and reviewing measures to reduce the take of sea turtles. NMFS has also recently completed a review of criteria used to estimate mortality of turtles hooked by pelagic longline gear (including the Aguilar study) and established a range of mortality assumptions for entangled {0% mortality), lightly-hooked (27% mortality), and hook ingested turtles (42% mortality) (NMFS 2001). Preliminary results from this reanalysis suggest that total takes of sea turtles by the pelagic longline fishery in 1999 are 991 loggerheads (95% CI = 510 - 2,089) and 1,015 leatherbacks (95% CI = 410 - 2,746). Of the 7,891 loggerhead and 6,363 leatherback turtles estimated to have been captured from 1992-1999, 66 loggerhead and 88 leatherbacks were estimated to have been released dead (NMFS SEFSC 2001, Part III). Analysis of these data using the newly developed serious injury criteria (NMFS 2001) is not yet complete.

Based on the information outlined above, pelagic longline fisheries alone may be killing leatherback sea turtles at levels equal to or greater than the 1% maximum sustainable level of total human-related mortality supported by the work of Spotila *et al.* (1996). When other pressures on leatherback sea turtle populations, including the number of leatherbacks that are injured or killed in other fisheries and other federal activities *(e.g.* military activities, oil and gas development, *etc.),* the continued harvest of eggs and adult turtles for meat in some Caribbean and Latin nations, the effects of ocean pollution, natural disturbances such as hurricanes (which may wipe out nesting beaches), the total number of turtles that die in any given year reduces the leatherback turtles reproduction, numbers, or distribution in a way that would be expected to appreciably reduce their likelihood of survival and recovery in the wild.

General human impacts and entanglement
Two to three leatherbacks are reported entangled in the buoy lines of lobster pot gear every year. Prescott (1988) reviewed stranding data for Cape Cod Bay and concluded that for those turtles where cause of death could be determined (the minority), entanglement is the leading cause of death followed by capture by dragger, cold stunning, or collision with boats. Entanglement in pot gear set for other species of shellfish and finfish in the action area have also been documented.

Leatherback interactions with the southeast shrimp fishery are also common. Turtle Excluder Devices (TEDs), typically used in the southeast shrimp fishery to minimize sea turtle/fishery interactions, are less effective for the large-sized leatherbacks. The NMFS has used several measures to protect leatherback sea turtles from lethal interactions with the shrimp fishery. These include establishment of a Leatherback Conservation Zone (60 FR 25260). NMFS established the zone to restrict, when necessary, shrimp trawl activities from off the coast of Cape Canaveral, Florida to the Virginia/North Carolina Border. It allows the NMFS to quickly close the area or portions of the area to the shrimp fleet on a short-term basis when high concentrations of normally pelagic leatherbacks are recorded in more coastal waters where the shrimp fleet operates. Other emergency measures may also be used to minimize the interactions between leatherbacks and the shrimp fishery. For example, in November 1999 parts of Florida experienced an unusually high number of leatherback strandings. In response, the NMFS required shrimp vessels operating in a specified area to use TEDs with a larger opening for a 30-day period beginning December 8, 1999 (64 FR 69416) so that leatherback sea turtles could escape if caught in the gear.

There is no data on the take of leatherback sea turtles in the tilefish bottom longline fishery although anecdotal reports indicate that some turtles have been caught. An observer program for the bottom longline fishery predominantly targeting sharks in the southeastern U.S. did report the incidental take of two leatherback turtles during the observer period from 1994 to 1996. Both turtles were released alive.

Kemp's Ridley Sea Turtle
Of the seven extant species of sea turtles of the world, the Kemp's ridley has declined to the lowest population level. The Recovery Plan for the Kemp's Ridley Sea Turtle *(Lepidochelys kempi)* (USFWS and NMFS 1992) contains a description of the natural history, taxonomy, and distribution of the Kemp's ridley turtle. Kemp's ridleys nest in daytime aggregations known as arribadas, primarily at Rancho Nuevo, a stretch of beach in Mexico. Most of the population of

adult females nest in this single locality (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 early 1970's, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s. Recent observations of increased nesting suggest that the decline in the ridley population has stopped and there is cautious optimism that the population is now increasing.

Research being conducted by Texas A&M University has resulted in the intentional live-capture of hundreds of Kemp's ridleys at Sabine Pass and the entrance to Galveston Bay. Between 1989 and 1993, 50 of the Kemp's ridleys captured were tracked (using satellite and radio telemetry) by biologists with the NMFS Galveston Laboratory. The tracking study was designed to characterize sea turtle habitat and to identify small and large scale migration patterns. Preliminary analysis of the data colle:cted during these studies suggests that subadult 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, NMFS Galveston Laboratory; pers. comm.).

After unprecedented numbers of Kemp's ridley carcasses were reported from Texas and Louisiana beaches during periods of high levels of shrimping effort, NMFS established a team of population biologists, sea turtle scientists, and managers, known as the Turtle Expert Working Group (TEWG) to conduct a status assessment of sea turtle populations. Analyses. conducted by the group have indicated that the Kemp's ridley population is in the early stages of recovery; however, strandings in some years have increased at rates higher than the rate of increase in the Kemp's population (TEWG 1998). While many of the stranded turtles observed in recent years in Texas and Louisiana are believed to have been incidentally taken in the shrimp fishery, other sources of mortality exist in these waters. These stranding events illustrate the vulnerability of Kemp's ridley and loggerhead turtles to the impacts of human activities in nearshore Gulf of Mexico waters.

The TEWG (1998) developed a population model. to evaluate trends in the Kemp's ridley population through the application of empirical data and life history parameter estimates chosen by the TEWG. Model results identified three trends in benthic immature Kemp's ridleys. Benthic immatures are those turtles that are not yet reproductively mature but have recruited to feed in the nearshore benthic environment where they are available to nearshore mortality sources that often result in strandings. Benthic immature ridleys are estimated to be 2-9 years of age and 20-60 cm in length. Increased production of hatchlings from the nesting beach beginning in 1966 resulted in an increase in benthic ridleys that leveled off in the late 1970s. A second period of increase followed by leveling occurred between 1978 and 1989 as hatchling production was further enhanced by the cooperative program between the U.S. Fish and Wildlife Service (FWS) and Mexico's Instituto Nacional de Pesca to increase the nest protection and relocation program in 1978. A third period of steady increase, which has not leveled off to date, has occurred since 1990 and appears to be due to the greatly increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990 due, in part, to the introduction of turtle excluder devices (TEDs). Adult ridley numbers have now grown from a low of approximately 1,050 adults producing 702 nests in 1985, to greater than 3,000 adults producing 1,940 nests in 1995 and about 3,400 nests in 1999.

The TEWG (1998) was unable to estimate the total population size and current mortality rates for the Kemp's ridley population. However, the TEWG listed a number of preliminazy conclusions. The TEWG indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Over the period 1987 to 1995, the rate of increase in the annual number of nests accelerated in a trend that would continue with enhanced hatchling production and the use of TEDs. Nesting data indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and a low of 702 nests in 1985. This trajectory of adult abundance tracks with trends in nest abundance from an estimate of 9,600 in 1966 to 1,050 in 1985. The TEWG estimated that in 1995 there were 3,000 adult rid.leys. The increased recruitment of new adults is illustrated in the proportion of neophyte, or first time nesters, which has increased from 6% to 28%_from 1981 to 1989 and from 23% to 41 % from 1990 to 1994. The population model in the TEWG projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan of 10,000 nesters by the year 2020 if the assumptions of age to sexual maturity and age specific survivorship rates plugged into their model are correct. It determined that the data reviewed suggested that adult Kemp's ridley turtles were restricted somewhat to the Gulf of Mexico in shallow near shore waters, and benthic immature turtles of 20-60 cm straight line carapace length are found in nearshore coastal waters including estuaries of the Gulf of Mexico and the Atlantic.

The TEWG (1998) identified an average Kemp's ridley population growth rate of 13% per year between 1991 and 1995. Total nest numbers have continued to increase. However, the 1996 and. 1997 nest numbers reflected a slower rate of growth, while the increase in the 1998 nesting level has been much higher and decreased in 1999. The population growth rate does not appear as steady as originally forecasted by the TEWG, but annual fluctuations, due in part to irregular internesting periods, are normal for other sea turtle populations. Also, as populations increase and expand, nesting activity would be expected to be more variable.

The area surveyed for ridley nests in Mexico was expanded in 1990 due to destruction of the primary nesting beach by Hurricane Gilbert. The TEWG (1998) surned that the increased nesting observed particularly since 1990 was a true increase, rather than the ·result of expanded beach coverage. Because systematic surveys of the adjacent beaches were not conducted prior to 1990, there is no way to determine what proportion of the nesting increase documented since that time is due to the increased survey effort rather than an expanding ridley nesting range. As noted by TEWG, trends in Kemp's ridley nesting even on the Rancho Nuevo beaches alone suggest that recovery of this population has begun but continued caution is necessary to ensure recovery and to meet the goals identified in the Kemp's Ridley Recovery Plan.

Juvenile Kemp's ridleys use northeasiem and mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Post-pelagic ridleys feed primarily on crabs, consuming a variety of species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and

Cancer sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal, 1997). Juvenile ridleys migrate south as water temperatures cool in fall, and are predominantly found in shallow coastal embayments along the Gulf Coast during fall and winter months.

Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 centimeters in carapace length, and weighing less than 20 kilograms (Terwilliger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June, and migrating to more southerly waters from September to November (Keinath *et al.,* 1987; Musick and Limpus, 1997). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick, 1985; Bellmund *et al.,* 1987; Keinath *et al.,* 1987; Musick and Limpus, 1997). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (Musick and Limpus, 1997).

General human impacts and entanglement
Anthropogenic impacts to the Kemp's ridley population are similar to those discussed above. Sea sampling coverage in the northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries have recorded takes of Kemp's ridley turtles. As with loggerheads, a large number of Kemp's ridleys are taken in the southeast shrimp fishery each year. Kemp's ridleys were also affected by the apparent large-mesh gillnet interaction that occurred in spring off of North Carolina. A total of five carcasses were recovered from the same North Carolina beaches where 277 loggerhead carcasses were found. This is expected to be a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction since it is unlikely that all carcasses washed ashore.

Green Sea Turtle
Green turtles are distributed circumglobally. In the western Atlantic they range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean, but are considered rare north of Cape Hatteras (Wynne and Schwartz, 1999). Several major nesting assemblages have been identified and studied in the western Atlantic (Peters 1954; Carr and Ogren, 1960; Carr *et al.,* 1978). Most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart 1979).

There is evidence that green turtle nesting has been on the increase during the past decade. Recently, green turtle nesting occurred on Bald Head Island, North Carolina just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Certain Florida nesting beaches wh re most green turtle nesting activity occurs have been designated index beaches. Index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the six years of regular monitoring since establishment of the index beaches in 1989. Recent population estimates for the western Atlantic area are not available.

While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida, the northwestern coast of the Yucatan Peninsula, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. Pelagic juveniles are assumed to be omnivorous, but with a strong tendency toward camivory during early life stages. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to a chiefly herbivorous diet (Bjorndal 1997). Post-pelagic green turtles feed primarily on sea grasses and benthic algae but also consume jellyfish, salps, and sponges. In the western Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds, and south throughout the tropics (Musick and Limpus, 1997). Like loggerheads and Kemp's ridleys, green sea turtles that use northern waters during the summer must return to southern waters in autumn, or face the risk of cold stunning.

General human impacts and entanglement
Anthropogenic impacts to the green sea turtle population are similar to those discussed above for other sea turtles species. Sea sampling coverage in the pelagic driftnet, pelagic longline, scallop dredge, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. In addition, the NMFS/Northeast Fisheries S.cience Center (NEFSC) is conducting a review of bycatch levels and patterns in all fisheries in the western Atlantic for which observer data is available. Bycatch estimates will be made for all fisheries for which sample sizes are sufficiently large to permit reasonable statistical analysis. This will be compiled into an assessment report. Until that analysis is completed, the only information on the magnitude of take available for fisheries in the action area is unextrapolated numbers of observed takes from the sea sampling data. Preliminary sea sampling data summary (1994-1998) shows the following total take of green turtles: one (anchored gillnet), two (pelagic driftnet), and two (pelagic longline). Stranding reports indicate that between 200-300 green turtles strand annually from a variety of causes (Sea Turtle Stranding and Salvage Network, unpublished data). As with the other species, fishery mortality accounts for a large proportion of annual human-caused mortality outside the nesting beaches, while other activities like dredging, pollution, and habitat destruction account for an unknown level of other mortality.

Right Whale Critical Habitat
The nearshore waters of northeast Florida and southern Georgia were formally designated as critical habitat for right whales on June 3, 1994 (59 FR, 28793). These waters were first identified as a likely calving and nursery area for right whales in 1984. Since that time, Kraus *et al.* (1993) have documented the occurrence of 74% of all the known mature females from the North Atlantic population in this area. While sightings off Georgia and Florida include primarily adult females and calves, juveniles and adult males have also been observed.

Scientists suspect that all habitats used by the northern right whale are not known at the present time. Genetics work performed by Schaeff *et al.,* (1993) suggested the existence of at least one unknown nursery area. Within the known distribution of the species, however, the following five areas have been identified as critical to the continued existence of the species: (I) coastal

Florida and Georgia; (2) the Great South Channel, which lies east of Cape Cod; (3) Cape Cod and Massachusetts Bays; (4) the Bay of Fundy; and (5) Browns and Baccaro Banks off southern Nova Scotia. The first three areas occur in U.S. waters and have been designated by NMFS as critical habitat (59 FR 28793). Whales are most abundant in Cape Cod Bay between February and April (Hamilton and Mayo, 1990; Schevill *et al.,* 1986; Watkins and Schevill, 1982), in the Great South Channel in May and June (Kenney *et al.,* 1986, Payne *et al.,* 1990), and off Georgia/Florida from mid-November through March (Slay *et al.,* 1996). Right whales also frequent the Bay of Fundy, Browns and Baccaro Banks (in Canadian waters), Stellwagen Bank and Jeffrey's Ledge in spring and summer months and use mid-Atlantic waters as a migratory pathway between winter calving grounds and their spring and summer nursery/feeding areas in the Gulf of Maine. A recent review and comparison of sighting data suggests that Jeffrey's Ledge may also be regularly used by right whales in late Fall; October through December (Weinrich *et al.,* 2000). Satellite tracking efforts have also identified individual animals embarking on far-ranging excursions (Knowlton *et al.,* 1992 and Mate *et al.,* 1997).

The availability of dense concentrations of zooplankton blooms in Cape Cod Bay in late winter and the Great South Channel in spring is described as the key factor for right whale utilization of these areas. Kraus and Kenney (1991) provide an overview of data regarding right whale use of these areas. Important habitat components in Cape Cod Bay include seasonal availability of dense zooplankton patches and protection from weather afforded by land masses surrounding the bay. The spring current regime and bottom topography of the Great South Channel result in nutrient rich upwelling conditions. These conditions support the dense piankton and zooplankton blooms utilized by right whales. The combination of highly oxygenated water and dense zooplankton concentrations are optimal conditions for the small schooling fishes (sand lance, herring and mackerel) that prey upon some of the same zooplankton as right whales. Therefore, the abundance of these fishes, in turn, may affect and be affected by the distribution of several piscivorous marine mammal species such as humpback, fin, minke, and pilot whales, Atlantic whitesided dolphins, and harbor porpoise (CeTAP 1982).

Overfishing has severely reduced the stocks of several groundfish species such as cod, haddock, and yellowtail flounder. Recovery of commercially targeted finfish stocks from their current overfished condition may reduce the biomass of small schooling fish that feed directly on zooplankton resources throughout the region. It is unknown whether zooplankton densities that occur seasonally in Cape Cod Bay or the Great South Channel could be expected to increase significantly. However, increased predation by groundfish on small schooling fish in certain areas and at specific critical periods may allow the necessary high zooplankton densities to be maintained in these areas for longer periods, or accumulate in other areas at levels acceptable to right whales.

The critical habitat identified in the Southeast U.S. is used primarily as a calving and nursing area. Although entanglements have been recorded in this area, the primary concern is a high volume of shipping traffic. In the 1993-1994 season, NMFS, the U.S. Coast Guard (USCG), U.S. Navy (USN), and U.S Army Corps of Engineers (ACOE) began a program to monitor and alert ship operators to the presence of right whales in and adjacent to the southeast critical habitat area in order to reduce the potential for ship-whale collisions. A number of collaborative efforts have resulted in coverage of not only the coastal, high-use area where whales frequently occur in and around major shipping lanes, but also areas to the north, south, and east where whales and shipping traffic are less densely concentrated.

In 1997, NMFS, the USCG, and the Commonwealth of Massachusetts began a similar program of monitoring the presence of right whales in and adjacent to the Cape Cod Bay and Great South Channel habitats for the purpose of reducing the potential for ship-whale collisions. Sightings in other parts of the Northeast have also been investigated. One such investigation during the first year of the program revealed the presence of approximately 23 whales in one day off Rhode Island in an area of heavy shipping traffic. This monitoring program ---- initially called the Early Warning System (EWS) but renamed the Sighting Advisory System (SAS)---- is described in more detail in the Environmental Baseline section. Important information has been collected as a result of the SAS which may enable NMFS to identify additional critical habitat areas within Northeast waters as well as to refine the time and area boundaries of the known existing critical habitat areas and peak usage periods. The Environmental Baseline section also summarizes recent efforts in addressing the international component of the ship strike problem in the vicinity of right whale critical habitat.

III. Environmental Baseline

Environmental baselines for biological opinions include the past and present impacts of all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR 402.02). The environmental baseline for this Opinion includes the effects of several activities that may 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 generally fall into the following three categories: vessel operations, fisheries, and recovery activities associated with reducing those impacts. Other environmental impacts include effects of dredging, disposal, ocean dumping, and sonic activity.

Status of the Species within the Action Area
The listed species occurring in the action area are all highly migratory, and the scope of the action area includes all pelagic areas within which these species may be found within the U.S. EEZ. Therefore, the range-wide status of the species given in Section II above most appropriately reflects the species' status within the action area.

A. Federal actions that have undergone formal or early section 7 consultation. NMFS has undertaken several ESA section 7 consultations to address the effects of vessel operations and gear associated with federally-permitted fisheries on threatened and endangered species in the action area. Each of those consultations sought to develop ways of reducing the probability of adverse impacts of the action on large whales and sea turtles. Similarly, recovery actions NMFS has undertaken under both the MMPA and the ESA are addressing the problem of take of whales in the fishing and shipping industries. Incidental take levels anticipated under the incidental take statements associated with these existing biological opinions are summarized in Table I. below, followed by a brief discussion of each action consulted on. The following summary of anticipated incidental take of sea turtles includes only those federal actions that have undergone formal section 7 consultation.

Table 1. Summary of annual incidental take levels anticipated under the incidental take statements associated with NMFS' existing biological opinions in the US Atlantic and Gulf of Mexico.

Federal Action	Annual Anticipated Incidental Take Level (lethal)'				
	Loggerhead	**Leatherback**	**Green**	**Kemp's**	**Hawksbill**
Coast Guard Vessel Operation	I{I)[2]	1(1)[2]	1{I)[2]	I(I)l	I(I)[2]
Navy SE Ops Area[3]	91(91)	17(17)[2]	16(16)[2]	16(16)[2]	4(4)[2]
Navy-NE Ops Area	IO(IO)	0	I(I)[2]	I(I)[2]	0
Shipshock - SeawoWWinston Churchill'	276(58)[2]	276(58)[2]	276(58)[2]	276(58)[2]	276(58)[2]
COE Dredging-NE Atlantic	27(27)	1(1)	6(6)[2]	5(5)[2]	0
COE Dredging - S. Atlantic	35(35)	0	7(7)	7(7)	2(2)
NE Multispecies Sink Gillnet Fishery	10(10)	4(4)	4(4)	2(2)	0
ASMFC Lobster Plan	10 (10)	4(4)	0	0	0
Bluefish	6(3)	0	0	6(6)	0
Herring	6(3)	I(I)	I(I)	1(1)	0
Mackerel, Squid, Butterfish	6(3)	I(I)	2(2)	2(2)	0
Monkfish Fishery[7]	6(3)	1(1)	1(1)	1(1)	0
Dogfish Fishery	6(3)	1(1)	1(1)	1(1)	0
Sargassum	30(30)'	1(1)l	I(I)[2]	I(I)[2]	1{I)l
Summer Flounder, Scup & Black Sea Bass	15(15)	3(3)[2]	3(3)[2]	3(3)[2]	3(3)[2]
Shrimp Fishery	3450(3450)[9]	650(650)[9]	3450(3450)[9]	3450(3450)[9]	3450(3450)[9]
Weakfish	20(20)	0	0	2(2)	0
HMS• Pelagic Longline Fishery[10]	468(7)	358(6)	46(2)	23(1)	46(2)
HMS • Shark gillnet Fishery[11]	20(20)	2(2)	2(2)	2(2)	2(2)
HMS - Bottom Longline Fishery[11]	12(12)	2(2)	2(2)	2(2)	2(2)
NRC - St. Lucie, FL[12]	unlimited(2)	unlimited(I)	unlimited(3)	unlimited(I)	unlimited(I)
NRC - Brunswick, NC	50 (6)[2]	50[2]	50 (3)[2]	50 (2)[2]	50[2]
NRC - Crvstal River, FL	*55* (1)[2]	*55* {1)[2]	***55*** (1)[2]	*55* (1)[2]	*55* (1)[2]
Total (see note 13)	**4,660 (3,860)**	**1,440** (767)	**3,945 (**	**3,933 (3,592)**	3,907 (3,541)

[1] Anticipated Take level represents 'observed' unless otherwise noted. Number in parenthesis represents lethal take and is a subset of the total anticipated take; numbers less than whole are rounded up.

[2] The anticipated take level may represent any combination of species and thus is tallied under each column (note: in most cases, it is expected that takes of turtle species other than loggerheads will be minimal.

[3] Includes Navy Operations along the Atlantic Coasts and Gulf of Mexico, Mine warfare center, Eglin AFB, Moody AFB

[4] Total **estimated** take includes acoustic harassment

[5] Up to 8 turtles total, of which, no more than 5 may be leatherbacks, greens, Kemp's or hawksbill. in combination.

[6] Total anticipated take is 3 turtles of any combination over a 30-year period

[7] Not to exceed 25 turtles, in totaL

[8] Anticipated take for post-hatchlings for total period June 21 , 1999 through January 2001

[9] Represents **estimated** take, however the Incidental take statement cites observed take (5 loggerheads, 2 leatherbacks, or 3 Kemp's ridleys or greens or hawksbills in any combination) as a representative of the estimated take. The estimated take represents any combination of species other than the leatherback.

[10] Represents **estimated** total take and **observed** lethal take in parentheses

[11] Represents **estimated** total and lethal take

[12] Take levels for non-lethal were not identified because entrainment is a function of turtle abundance & environmental conditions; lethal take is also expressed as 1.5% of the total number entrained in the plant, whichever is greater

[13] Represents a minimum number of turtles taken annually because the majority of the take is observed take and is not an estimate of true numbers that are taken. The numbers for each species are not additive because the total anticipated take, in many cases, represents a combination of species.

(1) Vessel-related Operations and Exercises

Potential adverse effects from federal vessel operations in the action area of this consultation include operations of the U.S. Navy (USN) and the USCG, which maintain the largest federal vessel fleets, the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and the Anny Corps of Engineers (ACOE). NMFS has conducted formal consultations with the USCG, the USN (described below) and is currently in early phases of consultation with other federal agencies on their vessel operations (e.g., NOAA research vessels). In addition to operation of ACOE vessels, NMFS has consulted with the ACOE to provide recommended permit restrictions for operations of contract or private vessels around whales. Through the section 7 process, where applicable, NMFS has and will continue to establish conservation measures for all these agency vessel operations to avoid adverse effects to listed species. At the present time, however, they represent potential for some level of interaction. The Opinions for the USCG (September 15, 1995, July 22, 1996, and June 8, 1998) and the USN (May 15, 1997) provide further detail on the scope of vessel operations for these agencies and conservation measures being implemented as standard operating procedures.

Since the USN consultation only covered operations out ofMayport, Florida, potential still remains for USN vessels to adversely affect large whales 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 whales. However, the in-water activities of these agencies are limited in scope, as they operate a small number of vessels or are engaged in research/operational activities that are unlikely to contribute a large amount of risk. Through the consultation process, conservation recommendations will be provided to further reduce the potential for adverse impacts.

(2) Additional military activities, incJuding vessel operations and ordnance detonation, also affect listed species of whales and 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). The USN will also conduct ship-shock testing for the new SEAWOLF submarine off the Atlantic coast of Florida, using 5 submerged detonations of 10,000 lb explosive charges. This testing is estimated to injure or kill 50 loggerheads, 6 leatherbacks, and 4 hawksbills, greens, or Kemp's ridleys, in combination (NMFS, 1996). Operation of the USCG's boats and cutters in the U.S. Atlantic is estimated to take no more than one individual turtle-of any species-per year (NMFS, 1995). Formal consultation on USCG or USN activities in the Gulf of Mexico has not been conducted.

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 bor 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, 7 greens, 7 Kemp's ridleys, and 2 hawksbills (NMFS, 1997b). Along the north and west coasts of the Gulf of Mexico, channel maintenance dredging using a hopper dredge may injure or kill 30 loggerhead, 8 green, 14 Kemp's ridley, and 2 hawksbill sea turtles annually (NMFS, 1997c). Additional incidental take statements for dredging of Charlotte Harbor and Tampa Bay, FL anticipate this project may incidentally take, by injury or mortality, 2 loggerheads or 1 Kemp's ridley or 1 green or I hawksbill sea turtle for Charlotte Harbor and 8 sea turtles, including no more than 5 documented Kemp's ridley, hawksbill, leatherback, or green turtles, in any ·combination, for Tampa Bay.

US Anny Corps of Engineers (COE) and Minerals Management Service (MMS) (the latter is non-military) rig removal activities also adversely affect sea turtles. For the COE activities, an incidental take (by injury or mortality) of one documented Kemp's ridley, green, hawksbill, leatherback, or loggerhead turtle is anticipated under a rig removal consultation for the New Orleans District (NMFS 1998d). MMS activities are anticipated to result in annual incidental take (by injury or mortality) of 25 sea turtles, including no more than five Kemp's ridley, green, hawksbill, or leatherback turtles and no more than ten loggerhead turtles, due to MMS' OCS oil and gas exploration, development, production, and abandonment activities.

(3) Federal Fishery Operations
The most reliable method for monitoring fishery interactions is the sea sampling program, which provides random sampling of commercial fishing activities. However, due to the size, power, and mobility of whales, sea sampling is only effective for sea turtles and sturgeon. Although takes of whales are occasionally observed by the sea sampling program, levels of interaction between whales and fishing vessels and their gear is derived from data collected opportunistically. However, it is often difficult to assign gear found on stranded or free-swimming animals to a specific fishery. In 1999, gear was recovered from 13. of the 24 confirmed whale entanglements, and could be traced back to a particular fishery in only six

cases. Other gear identified as gillnet or trawl gear could not be assigned to a particularly gillnet or trawl fishery. Determining the location where an entanglement occurred is even more difficult. For example, the point of occurrence is only known for two of the eight right whale entanglement events (one in U.S. and one in Canadian waters) that occurred in 1997. Consequently, the total level of interaction between fisheries and whales is unknown. However, there is sufficient information to identify several commercial fisheries that use gear that is known to take listed species. Efforts to reduce the adverse affects of commercial fisheries are addressed through both the MMPA take reduction planning process and the ESA section 7 process. Federally regulated gillnet, longline, trawl, seine, dredge, and pot fisheries have all been documented as interacting with either whales or sea turtles or both. Other gear types are known to impact whales as well.

Formal ESA section 7 consultation has been conducted on the following fisheries which may adversely affect threatened and endangered species: American Lobster, Northeast Multispecies, Monk.fish, Atlantic Pelagic Swordfish/funa/Shark, Summer Flounder/Scup/Black Sea Bass, Atlantic Mackerel/Squid/Atlantic Butterfish, Atlantic Bluefish, and Spiny Dogfish fisheries. These consultations are summarized below. More detailed information can be found in the respective Opinions.

The *Northeast Multispecies sink gillnetfishery* is one of the fisheries in the action .area known to entangle whales and sea turtles. This fishery has historically occurred along the northern portion of the action area from the periphery of the Gulf of Maine to Rhode Island in water to 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 declined from 399 to 341 permit holders in 1993 and has declined further since extensive groundfish conservation measures have been implemented. Based on 1999 data, NMFS estimated that there were 271 participants in the northeast multispecies sink gillnet fishery as defined under the MMPA. The fishery operates throughout the year with peaks in spring and from October through February. Data indicate that gear used in this fishery has seriously injured or killed northern right whales, humpback whales, fin whales, and loggerhead and Ieatherback sea turtles. Formal consultation on this fishery was last conducted in 1996, at which time NMFS concluded that the operation of the fishery was likely to jeopardize the continued existence of the northern right whale. Reasonable and Prudent Alternatives (RPA) issued with the 1996 Opinion were implemented by NMFS through the New England Fishery Management Council process. The fishery was examined again in the context of subsequent informal consultations on the Atlantic Large Whale Take Reduction Plan (ALWTRP), which concluded that the fishery as modified by the ALWTRP may adversely affect but is not likely to jeopardize the continued existence of listed species. As a result of entanglement events in 1999, including one mortality of a right whale, the NMFS is currently revising the ALWTRP with changes or additional measures necessary to meet the plan objectives. The NMFS has reinitiated the ESA section 7 consultation on the multispecies fishery to determine whether the revised ALWTRP will be an acceptable reasonable and prudent alternative to remove the likelihood of jeopardy to right whales caused by this fishery. Further information on the ALWTRP follows.

The *monkjishfishery* uses several gear types that may entangle protected species, and takes of shortnose sturgeon and sea turtles have been recorded from monkfish trips. The monkfish gillnet sector is included in either the northeast sink gillnet or mid-Atlantic coastal gillnet fisheries and is therefore regulated by the ALWTRP and Harbor Porpoise Take Reduction Plan (HPTRP). NMFS completed a formal consultation on the Monkfish FMP on December 21, 1998, which concluded that the fishery, with modification under the take reduction plans, is not likely to jeopardize listed species or adversely modify ,critical habitat. However, as a result of entanglement events in 1999, including one mortality of a right whale, the NMFS is currently revising the ALWTRP with changes or additional measures necessary to meet the plan objectives. The NMFS has reinitiated the ESA section 7 consultation on the monkfish fishery to determine whether the revised ALWTRP will be an acceptable reasonable and prudent alternative to remove the likelihood of jeopardy to right whales.

The NMFS will also consider the take of loggerhead sea turtles in excess of the ITS during reinitiation of the section 7 consultation for the monkfish fishery. In April and early May 2000, the carcasses of 281 sea turtles, mostly loggerheads, washed ashore on North Carolina beaches. The monkfish fishery was operating offshore at the time that the turtles were present in the area. Fishing gear retrieved from four loggerhead carcasses was confirmed to be gillnet gear with 10-12 inch mesh; gear tltat is consistent with gillnets for monkfish. The ITS issued with the December 21, 1998, Opinion for the monkfish FMP only allowed for the observed lethal take of three loggerheads. Therefore, the NMFS will also consider this new information during reinitiation of the section 7 consultation for the monkfish fishery.

Components of the Highly Migratory Species (HMS) *Atlantic pelagic fishery for swordfish/tuna/shark* in the EEZ have occurred within the action area for this consultation. Use of pelagic longline, pelagic driftnet, bottom longline, hand line (including bait nets), and/or purse seine gear in this fishery has resulted in the take of sea turtles and whales. The northeast swordfish driftnet portion of the fishery was prohibited during an emergency closure that began in December 1996, extended through May 31, 1997, and was subsequently extended for another six months. An extensive environmental assessment (NMFS 1999b) was prepared to evaluate this fishery from both a fisheries and a protected species perspective. The northeast swordfish driftnet segment was reopened on August 1, 1998, but a final rule to prohibit the use of driftnet gear in the swordfish fishery was published on January 27, 1999 (64 FR 4055). A final rule implementing a new comprehensive FMP for the whole pelagic fishery, which incorporates the driftnet closure, was published on May 28, 1999 (64 FR 29090).

The most recent consultation on the FMP for the Atlantic pelagic fishery for swordfish/tuna/shark was completed on June 30, 2000. NMFS concluded that operation of the pelagic longline fishery jeopardized the continued existence of threatened loggerhead and endangered leatherback sea turtles, and to avoid the likelihood of jeopardizing the continued existence of loggerhead and leatherback sea turtles, fishery management measures must reduce the number of loggerhead sea turtles and leatherback sea turtles that are incidentally captured, injured, or killed by gear associated with HMS fisheries in the United States by at least 75% from current levels. The Opinion prescribed two reasonable and prudent alternatives to meet this goal and avoid the likelihood of jeopardizing these listed sea turtles. However, since completion of the June 30, 2000, Opinion, NMFS has determined that further analyses of observer data and additional population modeling of loggerhead sea turtles are needed to more precisely assess the impact of the pelagic longline fishery on sea turtles. Consequently, NMFS has reinitiated consultation on the FMP for the Atlantic pelagic fishery for swordfish/tuna/shark. NMFS anticipates completing the consultation and issuing a new Opinion in early 2001. Until then, NMFS is implementing emergency measures to reduce sea turtle bycatch and bycatch mortality in the pelagic longline fishery. These short-term measures, are: (1) emergency regulations to implement a time and area closure until April 6, 2001, for the pelagic longline fishing within the Northeast Distant Statistical Sampling (NED) Area, and (2) a requirement that all pelagic longline vessels that have been issued a Federal HMS fishing permit and that fish in the Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea, carry on board dipnets and line clippers meeting NMFS design and performance standards effective October IO, 2000.

The *Summer Flounder, Scup and Black Sea Bass fisheries* are known to interact with sea turtles. Based on occurrence of gillnet entanglements in other fisheries, the gillnet portion of this fishery could entangle endangered whales, particularly humpback whales. The pot gear and staked trap sectors could also entangle whales and sea turtles. 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 TEDs in nets in the area of greatest bycatch off the North Carolina coast. NMFS is considering a more geographically inclusive regulation to require TEDs in trawl fisheries that overlap with sea turtle distribution to reduce the impact from this fishery. Developmental work is also ongoing for a TED that will work in the flynets used in the weakfish fisheries. Portions of the summer flounder, scup and black sea bass gillnet sector are subject to the ALWTRP and HPTRP since they contribute to the northeast sink gillnet sector (an MMPA Category I fishery) and mid-Atlantic coastal gillnet fishery (an MMPA Category II fishery). Formal consultation on the summer flounder, scup and black sea bass fishery concluded that the operation of the fishery may adversely affect but is not likely to jeopardize the continued existence of listed species. Expected annual incidental take for this fishery includes 15 threatened loggerhead sea turtles and no more than three cumulatively of endangered Kemp's ridleys, hawksbill, leatherback or green sea turtles.

On April 28, 1999, NMFS completed a formal consultation on the *Atlantic Mackerel/Squid/Atlantic Butterfish fishery*. This fishery is known to take sea turtles and may occasionally interact with whales and shortnose sturgeon. Several types of gillnet gear may be used in the mackerel/squid/butterfish fishery. Gillnet sectors of this fishery are subject to the requirements of the ALWTRP and.the HPTRP as appropriate. Other gear types that may be used in this fishery include pelagic longline/hook-and-line/handline, pot/trap, dredge, poundnet, and bandit gear. Entanglements or entrapments of whales, sea turtles, and sturgeon have been recorded in one or more of these gear types. An ITS has been issued for the taking of sea turtles and shortnose sturgeon in this fishery. The ITS allows for the annual take of six loggerhead sea turtles of which no more than three can be lethal takes, two lethal or non-lethal takes of green sea turtles, two lethal or non-lethal takes of Kemp's ridley sea turtles, one lethal or non-lethal take of leatherback sea turtles, and three takes (of which no more than one can be lethal) of shortnose sturgeon. No takes of marine mammals are authorized.

Formal consultation on the *Atlantic Bluefish* fishery was completed on July 2, 1999. NMFS concluded that operation of the fishery under the FMP, as amended, is not likely to jeopardize the continued existence of listed species and not likely to adversely modify critical habitat. Gillnets are the primary gear used to commercially land bluefish. Whales can become entangled in the buoy lines of the gillnets or in the net panels. The ALWTRP and HPTRP both include measures to reduce the risk of entanglement to marine mammals from gillnet gear. The bluefish fishery is subject to these measures. The bluefish fishery may pose a risk to protected marine mammals, but is most likely to interact with sea turtles (primarily Kemp's ridley and loggerheads) and shortnose sturgeon given the time and locations where the fishery occurs. A small nwnber of takes of sea turtles and shortnose sturgeon were authorized in the ITS issued with the July 2, 1999, Opinion as follows: six takes (no more than three lethal) ofloggerhead sea turtles; six lethal or non-lethal takes of Kemp's ridley sea turtles; and one shortnose sturgeon.

Formal consultation on the *Spiny dogfish* fishery was completed on August 13, 1999. NMFS concluded that the operation of the fishery under the FMP may adversely affect but is not likely to jeopardize the continued existence of listed species and not likely to adversely modify critical habitat. The dogfish fishery is most likely to interact with sea turtles (all species) given the time and locations where the fishery occurs. The FMP for dogfish calls for a 30% reduction in quota allocation levels for the first year of the plan and a 90% reduction beginning with year two. Although there have been delays in implementing the plan, quota allocations are expected to be substantially reduced over the 4 ½ year rebuilding schedule which should result in a substantial decrease in effort directed at spiny dogfish. For the last four years of the rebuilding period, dogfish landings are likely to be limited to incidental catch in other fisheries. The reduction in effort should be of benefit to protected species by reducing the number of gear interactions that occur.

Large-mesh gillnetting for dogfish off of North Carolina has been implicated as a possible source of mortality leading to the large nwnber of sea turtle carcasses that washed ashore on the Outer Banks in April and May, 2000. However, there is very limited observer coverage for this fishery, making it difficult to determine the role that this fishery might have played in the mortality event. The ITS issued with the August 13, I999, Opinion allows for the take of six loggerhead sea turtles (of which no more than three can be lethal takes), one lethal or non-lethal take of green sea turtles, one lethal or non-lethal take of Kemp's ridley sea turtles, and one lethal or non-lethal take of leatherback sea turtles.

Gillnet gear is one of the primary gear types most likely to interact with whales. Whales can become entangled in the buoy lines of the gillnets or in the net panels. The 1997 Opinion on the ALWTRP (which considered the impacts of the dogfish gillnet fishery) concluded that th implementation of the ALWTRP as a reasonable and prudent alternative to the unmodified operation of the gillnet fisheries removed the threat ofjeopardy to the northern right whales and provided sufficient protection for other endangered whale species. As described above, several entanglements of right whales and other protected whales did, however, occur in 1999 despite the measures of the ALWTRP. The NMFS and the ALWTRT are in the process ofrevising the ALWTRP to reduce the likelihood of serious injury or mortality to levels as defined in the MMPA. The NMFS has reinitiated the ESA section 7 consultation on the spiny dogfish FMP to determine whether the revised ALWTRP will be an acceptable reasonable and prudent alternative to remove the likelihood of jeopardy to right whales.

Fishing vessel effects: Other than entanglement in fishing gear, effects of fishing vessels on listed species may involve disturbance or injury/mortality due to collisions or entanglement in anchor lines. Listed species or critical habitat may also be affected by fuel oil spills resulting from fishing vessel accidents. No collisions between commercial fishing vessels and listed species or adverse effects resulting from disturbance have been documented. However, the commercial fishing fleet represents a significant portion of marine vessel activity. For example, more than 280 fishing vessels fish on Stellwagen Bank in the Gulf of Maine. Therefore, the potential for collisions exists. Due to differences in vessel speed, collisions during fishing activities are less likely than collisions during transit to and from fishing grounds. Because most fishing vessels are smaller than large commercial tankers and container ships, collisions with protected species are less likely to result in mortality. Although entanglement in fishing vessel anchor lines has been documented historically, no information is available on the prevalence of such events. Fuel oil spills could affect animals directly or indirectly through the food chain. Fuel spills involving fishing vessels are common events. However, these spills typically involve small amounts of material that are unlikely to adversely affect listed species. Larger oil spills may result from accidents, although these events would be rare and involve small areas. No direct adverse effects on listed species or critical habitat resulting from fishing vessel fuel spills have been documented. Given the current lack of information on prevalence or impacts of interactions, there is no reason to assume that the level of interaction represented by any of the various fishing activities (i.e., collisions, oil spills) discussed in this section would be detrimental to the recovery of listed species.

(4) MMPA and ESA Permits

Regulations developed under the MMPA and the ESA allow for the taking of ESA-listed marine mammals and sea turtles for the purposes of scientific research. In addition, the ESA also allows for the taking of listed species by states through cooperative agreements developed per section 6 of the ESA. Prior to issuance of these authorizations for taking, the proposal must be reviewed for compliance with section 7 of the ESA.

Regulations restrict the level of take that may occur as a result of scientific research or from a section 6 agreement. In general, lethal take is prohibited. However, there is a growing concern that repeated harassment as a result of research activities could be detrimental to the species; for example, if it were to disrupt breeding, feeding or nursing. Such effects would be particularly relevant for very small populations such as the North Atlantic right whales. As of October 2000 there were eight active permits issued jointly under the MMPA and ESA for scientific research involving right whales. Activities covered by the permits include collection of tissue samples, tag attachment, photo-id, and other activities requiring close approach (minimum of 20 feet) (Simona Perry Roberts, 2000). While there is no information as yet to show that research on the species is having detrimental cumulative effects, a comprehensive permit review is being conducted to help ensure that such effects do not occur as a result of research activities.

Sea turtles are also the focus of research activities authorized by permit or through a section 6 agreement under the ESA. There are approximately 15 active scientific research permits directed toward sea turtles that may be found in the action area of this Opinion. Authorized activities range from photographing, weighing and tagging sea turtles incidentally taken in fisheries to blood sampling, tissue sampling (biopsy) and performing laparoscopy on intentionally captured turtles. The number of authorized takes varies widely depending on the research and species involved but may involve the taking of hundreds of turtles annually. Before any 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, these must also be reviewed for compliance with section 7(a)(2) to ensure that the action (issuance of the permit) does not result in jeopardy to the species. However, despite these safeguards, there is growing concern that research activities may result in cumulative effects that negatively affect sea turtle populations or subpopulations. Closer monitoring of all activities involving sea turtles may help to provide insight on the effects of research activities on sea turtles. One tool for achieving this goal is the National Section 7 Database maintained by the NMFS. The purpose of the database is to record each activity for which a section 7 consultation has been conducted thus providing a comprehensive record of federal actions affecting sea turtles.

B. State or private actions

(]) Statefishery operations

State fisheries are known to interact with protected species. For example, in 1998, three entanglements of humpback whales in state-water fisheries were documented. Sea turtles have frequently been found, unharmed, within the pounds of several state pound-net fisheries. Data from the marine mammal and sea turtle stranding networks are also useful for identifying interactions of protected species with state fisheries. However, documenting the exact number of state fishery interactions with protected species is difficult. Interactions may not always be reported, and stranding data is often insufficient for identifying the exact cause or location of the interaction. For example, recovered carcasses may be too decomposed for a thorough analysis, entangled whales may swim away from the site of the entanglement, and sea turtles that drown as a result of an interaction leave no visible clue as to the type of gear encountered. For these reasons the extent of take of ESA-protected species in fisheries that operate strictly in state waters cannot be fully determined. The NMFS is actively participating in a cooperative effort with the Atlantic States Marine Fisheries Commission (ASMFC) and member states to standardize and/or implement programs to collect information on level of effort and bycatch of protected species in state fisheries. When this information becomes available, it can be used to refine take reduction plan measures in state waters.

The *American lobster potfishery* is the largest fixed gear fishery in the action area. This fishery is known to take endangered whales and sea turtles. An ITS has been issued for sea turtles takes in this fishery. The ITS allows for take of up to ten loggerhead or four leatherback sea turtles. Formal consultation on the fishery under the MSA reached a jeopardy conclusion for the northern right whale with the Opinion issued December 13, 1996. As a result of the Reasonable and Prudent Alternative (RPA) included with the 1996 Opinion, an emergency regulation under the MMPA (Emergency Interim Final Rule, 62 FR 16108) was published that implemented restrictions on the use of lobster pot gear in the federal portion of the Cape Cod Bay right whale critical habitat and in the Great South Channel right whale critical habitat during periods of expected peak right whale abundance. NMFS reinitiated formal consultation on the federally regulated lobster fishery in 1998 to consider: (1) potential effects of the transfer of management authority from the MSA to the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA), (2) the implementation of new lobster management actions under the ACFCMA, and (3) recent takes of endangered whales in the fishery. The ACFCMA plan includes measures to limit the number of lobster traps that can be deployed during the first two years of the plan, and further trap reduction measures may be chosen as default effort reduction measures during subsequent plan years. Although there is no way of quantifying the anticipated benefit from reductions in gear, it is generally assumed that there will be fewer protected species-gear interactions if there is less gear in the water.

The interaction between the lobster trap fishery and endangered whales is addressed in the ALWTRP. Formal consultation on the American lobster fishery previously resulted in a finding of jeopardy for right whales. The ALWTRP was accepted as an RPA to remove the likelihood of jeopardy. However, as a result of entanglement events in 1999, including one mortality of a right whale, the NMFS is currently revising the ALWTRP with changes or additional measures necessary to meet the plan objectives. The NMFS has reinitiated the ESA section 7 consultation on the lobster fishery to determine whether the revised ALWTRP will be an acceptable reasonable and prudent alternative to remove the likelihood of jeopardy to right whales caused by the lobster fishery.

In December 1997, the ASMFC adopted *Amendment 3 to the American Lobster Interstate Fishery Management Plan.* Amendment 3 includes recommended measures in Federal waters as well as in state waters. In January 2000, federal legal authority for managing lobster fishing was transferred from the MSA to the ACFCMA. The purpose of the change is to reduce lobster fishing effort by 2005 to reverse the overfished status of the resource, and to make Federal American lobster management measures compatible with the ASMFC's management of American lobster in state waters.

Amendment 3 contained the outline of a long-term plan with annual targets during the rebuilding period and initial effort reduction measures for some areas. These effort reduction measures included trap caps and trap limits. Several states implemented trap caps in 1998. In addition, all Federal lobster permit holders are subject to trap limits throughout the lobster management areas as of May 1, 2000; the start of the American lobster 2000 fishing year. These trap limits are expected to have an added benefit of generating some risk reduction for protected species.

Early in 1997, the *Commonwealth of Massachusetts* implemented restrictions on lobster pot gear in the state water portion of the Cape Cod Bay critical habitat during the January 1 - May 15 period to reduce the impact of the fishery on northern right whales. The regulations were revised prior to the 1998 season. State regulations impact state permit holders who also hold federal permits, although effects would be similar to those resulting from federal regulations during the January 1- May 15 period. The Massachusetts Division of Marine Fisheries has also recently taken action to reduce the amount of abandoned lobster gear in Cape Cod Bay. Working with conservation and fisheries industry groups, participants worked together to remove abandoned fishing gear from Cape Cod Bay over the course of several weeks in spring 2000. It is hoped this pilot effort will lead to an annual clean up of the bay. Most abandoned gear in the bay is lobstering-related buoys, ropes and pots which pose a risk to right whales and other protected species (Associated Press, 2000). In a further move to aid right whales and other protected species, the Commonwealth of Massachusetts has implemented Winter/Spring gillriet restrictions in state waters comparable to those in the ALWTRP.

The ASMFC approved a new *Atlantic herring plan and Amendment 1 to the plan* in October 1998. This plan is complementary to the Council FMP and includes similar measures for permitting, recordkeeping/reporting, area-based management, sea sampling, TAC management, effort controls, use restrictions, and vessel size limits as well as measures addressing spawning area restrictions, directed mealing, the fixed gear fishery, and internal waters processing operations (transfer of fish to a foreign processor in state waters). The ASMFC plan, implemented through regulations promulgated by member states, is expected to benefit listed species and critical habitat by reducing effort in the herring fishery.

(2) Private and Commercial Vessels
Private and commercial vessels operate in the action area of this consultation and have the potential to interact with whales and sea turtles. Shipping traffic, private recreational vessels, and private businesses such as high-speed catamarans for ferry services and whale watch vessels all contribute to the risk of vessel traffic to protected species. Shipping traffic to and from east coast ports poses a serious risk to cetaceans. Out of 27 documented right whale mortalities in the North Atlantic from 1970 to 1991, 22% were caused by ship propellor injuries (Perry *et* ***al.,*** 1999). Hamilton *et al.* (1998), using data from 1935 through 1995, estimated that an additional 6.4% of right whales exhibit signs of injury from vessel strikes. In Massachusetts Bay, alone, shipping traffic is estimated at 1,200 ship crossings per year with an average of three per day. Private recreational traffic, including sportfishing, can also pose a risk to protected species. Sportfishing contributes more than 20 vessels per day from May to September on Stellwagen Bank in the Gulf of Maine. Similar traffic may exist in many other areas within the scope of this consultation which overlap with whale and sea turtle high-use areas. Vessel interactions with sea turtles are known to be a problem along the east coast. The Sea Turtle Stranding and Salvage Network has reported many records of propellor injuries to sea turtles. High-speed catamarans for ferry services and whale watch vessels operating in congested coastal areas also contribute to the potential for impacts.

Other than injuries and mortalities resulting from collisions, the effects of disturbance caused by vessel activity on listed species is largely unknown. Attempts have been made to evaluate the impacts of vessel activities such as whale watch operations on whales in the Gulf of Maine. However, no conclusive detrimental effects have been demonstrated.

(3) Other Potential Sources of Impacts in the Baseline
A number of anthropogenic activities that may indirectly affect listed species in the action area of this consultation include dredging, ocean dumping and disposal, sonic activities, discharges from wastewater systems, and aquaculture. The impacts from these activities are difficult to measure. The section 7 process is used to support close coordination on dredging activities and disposal sites in order to develop monitoring programs and ensure that vessel operators do not

contribute to vessel related impacts.

The impact of acoustic activities on marine mammals has received increasing attention over the last several years. Projects such as the Acoustic Thermometry of Ocean Climate (ATOC) focused public attention on acoustic activities in the world's oceans. One of the difficulties in assessing projects that have acoustic impacts is determining the effect of the activity on marine mammals. In addition, given the differences in life histories and physiology of the various species, it is improbable to believe that acoustic activities will affect all marine mammals in the same manner. To address these issues and others, the NMFS hosted a workshop in September 1998 to gather information to support development of new acoustic criteria. However, the results of the workshop have not yet been released.

The U.S. Navy's use and testing of new types of s nar has received considerable attention following a stranding event earlier this year. On March 15, 2000, nineteen cetaceans, none of which are listed as threatened or endangered, stranded in the Bahamas. Navy operations were being conducted in the area at the time of the strandings, and reportedly included testing for a program known as Littoral Warfare Advanced Development (LWAD) that uses a form of high-frequency sonar. The NMFS and the Navy are currently investigating whether these activities or other Navy activities in the area contributed to the cetacean strandings.

Some aquaculture projects are occurring in Cape Cod Bay Critical Habitat, and in other inshore areas off the Massachusetts and New Hampshire coast.· NMFS is coordinating research to measure habitat related changes in Cape Cod Bay to help ensure that aquaculture facilities do not contribute to entanglements. Many applicants have voluntarily agreed to alter the design of their facilities to minimize or eliminate the use of lines to the surface that may entangle whales and/or sea turtles.

C. Conservation and recovery actions shaping the environmental baseline

A number of activities are in progress that may ameliorate some of the threat that activities summarized in the *Environmental Baseline* pose to threatened and endangered species. These include education/outreach activities, gear modifications, and measures to reduce ship and other vessel impacts to protected species. Many of these measures have been implemented to reduce risk to critically endangered right whales. As a result, the measures typically focus on areas in the northeast (within the action area) and southeast (outside of the action area) that are frequented by right whales. Despite these biases, other cetaceans will likely gain some benefit from the measures as well. Other directed activities have been taken to benefit sea turtles.

Education and outreach activities are considered one of the primary tools to reduce the threats to all protected species. Nearly all of the measures.described below include some education/outreach component For example, outreach efforts for fishermen under the ALWTRP are fostering a more cooperative relationship between all parties interested in the conservation of threatened and endangered species. NMFS has also been active in public outreach to educate fishermen regarding sea turtle handling and resuscitation techniques. NMFS has conducted workshops with longline fishermen to discuss bycatch issues including protected species, and to educate them regarding handling and release _guidelines. NMFS intends to continue these outreach efforts in an attempt to increase the survival of protected species through education on proper release techniques.

1. Whales

The *ALWTRP* has been instrumental in recovery activities for large cetaceans, including right, humpback, and fin whales. The ALWTRP, implemented pursuant to the MMPA, includes restrictions on the American lobster, northeast multispecies, monkfish, and Atlantic pelagic fisheries described above as well as the mid-Atlantic coastal gillnet fishery as defined under the MMPA. This plan has two goals. The short-term goal was to reduce serious injuries and mortalities of right whales in U.S. commercial fisheries to less than 0.4 animals per year by January 1998. The long-term goal is to reduce entanglement-related serious injuries and mortalities of right whales, humpback whales, fin whales, and minke whales to insignificant levels approaching a zero rate of serious injury and mortality by April 30, 2001. The ALWTRP has four major components: {a) the Sighting Advisory System (SAS), (b) the Whale Disentanglement Network, (c) gear research and development, and d) the Northeast Recovery Plan Implementation Team {NEIT). Each of these is discussed in further detail below.

SAS documents the presence of right whales in and around critical habitat and nearby shipping/traffic separation lanes in order to avert ship strikes. Through a fax-on-demand system, fishermen and other vessel operators can obtain SAS sighting reports, and, in some cases, make necessary adjustments in operations to decrease the potential for interactions with right whales. SAS has also served as the only form of active entanglement monitoring in the critical habitat areas, and several entanglements in both the Cape Cod Bay and Great South Channel areas have been reported by SAS flights. Some of these sighting efforts have resulted in successful disentanglement of right whales. SAS flights have also contributed sightings of dead floating animals that can occasionally be retrieved to increase our knowledge of the biology of the species and effects of human impacts. The Commonwealth of Massachusetts was a key collaborator in the 1996-1997 SAS pilot effort and has continued the partnership. The USCG has also played a vital role in this effort, providing air and sea support as well as a commitment of resources to the NMFS operations. Other potential sources of sightings include the U.S. Navy and independent research vessels that may contribute to this effort. Canada funded a small number of flights last year in the Bay of Fundy and is expected to do the same this year.

The ***Whale Disentanglement Network*** is an important component of the ALWTRP. The Center for Coastal Studies (CCS), under NMFS authorization, has responded to numerous calls since 1984 to disentangle whales entrapped in gear, and has developed considerable expertise in whale disentanglement. NMFS has supported this effort financially since 1995. In recent years, NMFS has greatly increased funding for this network, purchasing equipment caches to be located at strategic spots along the Atlantic coastline, supporting training for fishers and biologists, purchasing telemetry equipment, etc. This has resulted in an expanded capacity for disentanglement along the entire Atlantic seaboard, including offshore areas. Agreements developed with the USCG ensure their participation and assistance in the disentanglement effort. As a result of the success of the disentanglement network, NMFS believes that many whales that may otherwise have succumbed to complications from entangling gear have been freed and survived the ordeal.

Gear research and development is a critical component of the ALWTRP, with the aim of finding new ways of reducing protected species-gear interactions while still allowing for fishing activities. The gear research and development program follows two approaches: (a) reducing the number of lines in the water without shutting down fishery operations, and (b) devising lines that are weak enough to allow whales to break free and at the same time strong enough to allow continued fishing. This aspect of the ALWTRP is also important in that it incorporates the knowledge and participation of the fishing industry for developing and testing modified and experimental gear.

The *NEIT* was founded in 1994 to help implement a right whale protection plan developed under the Endangered Species Act. Through the NEIT, NMFS has implemented a number of activities that may ameliorate some of the potential threat from the state, federal, and private activities. The team is comprised of federal and state regulatory agencies, and representatives of private organizations, and is advised by a panel of scientists with expertise in right and humpback whale biology. The NEIT provides advice and expertise to address the issues affecting right whale and humpback whale recovery. Examples of NEIT activities include: (a) planning that is underway for a food web study to provide a better understanding of whale prey resource requirements and the activities that might affect the availability of plankton resources to feeding right whales in the Gulf of Maine, and (b) a comprehensive plan for reducing ship strikes of right and humpback whales in the Northeast.

Many of NMFS's recent Opinions on fisheries have relied on implementation of the ALWTRP as the primary basis for concluding that the fisheries, as modified by the ALWTRP, are not likely to jeopardize the continued existence of right whales. However, in 1999, the NMFS documented one entanglement-related mortality of a right whale, as well as several other entanglements. As a result, the NMFS and the ALWTRT are reyisiting the ALWTRP to determine what other measures can be taken to more effectively reduce serious injuries and mortalities of right whales in U.S. commercial fisheries. Since the ALWTRP has been used as a primary basis for avoiding a jeopardy finding in several fisheries, revisions to the ALWTRP will be considered during reinitiation of the section 7 consultation on these fisheries under the ESA.

Ship collisions pose a serious risk to large whales, particularly right whales. As a result, actions are being taken to reduce the risk of ship strikes to protected cetaceans. The USCG educates mariners on whale protection measures and uses its programs - such as radio broadcasts and notice to mariner publications - to alert the public to potential whale concentration areas. In April 1998, the USCG submitted on behalf of the United States, a proposal to the International Maritime Organization (IMO) requesting approval of a mandatory ship reporting system **(MSR)** in two areas off the east coast of the United States. The system became operational in July 1999, and requires ships greater than 300 gross tons to report to a shore-based station when they enter two key right whale habitats - one off the northeast U.S. and one off the southeast U.S. In return, ships receive a message about right whales, their vulnerability to ship strikes, precautionary measures the ship can take to avoid hitting a whale, and locations of recent sightings. Much of the program is aimed at increasing mariner's awareness of the severity of the ship strike problem and seeking their input and assistance in minimizing the threat of ship strikes.

Disturbance was identified in the Recovery Plan for the western north Atlantic right whale as one of the principal human-related factors impeding right whale recovery (NMFS 1991 b). As part of recovery actions aimed at minimizing human-induced disturbance, NMFS published an interim final rule in February 1997 (62 FR 6729) restricting vessel approach to right whales to 500 yards (50 CFR 224.103(b)). Exceptions for closer approach are provided when: (a) compliance would create an imminent and serious threat to a person, vessel or aircraft, (b) a vessel or aircraft is restricted in its ability to maneuver around the 500 yard perimeter of a whale and unable to comply with the right whale avoidance measures, (c) a vessel is investigating or involved in the rescue of an entangled or injured right whale, (d) the vessel is participating in a permitted activity, such as a research project, and (e) for aircraft operations, unless that aircraft is conducting whale watch activities. If the vessel operator finds that he or she has unknowingly approached closer than 500 yards, the rule requires that a course be steered away from the whale at a slow, safe speed. Similarly, aircraft are required to take a course away from the right whale and immediately leave the area at a constant airspeed. The regulations are consistent with the Commonwealth of Massachusetts' approach regulations for right whales.

2. Sea Turtles

Although measures to address threats to sea turtles within the action area of this consultation are less numerous than those for right whales and other cetaceans, some activities are directed at reducing threats to sea turtles in northeast and mid-Atlantic waters. These include an extensive array of Sea Turtle Stranding and Salvage Network (STSSN) participants along the Atlantic and Gulf of Mexico coasts who not only collect data on dead sea turtles, but also rescue and rehabilitate live stranded turtles. Data collected by the STSSN are used to monitor stranding levels and compare them with fishing activity in order to determine whether additional restrictions on fishing activities are needed. These data are also used to monitor incidence of disease, study toxicology and contaminants, and conduct genetic studies to determine population structure. STSSN participants also opportunistically tag live turtles (either via the stranding network through incidental takes or in-water studies). Tagging studies help provide basic life history information, including sea turtle movements, longevity, and reproductive patterns. In some cases, an STSSN-wide protocol is developed to address a particular problem. For example, currently all of the states that participate in the STSSN are collecting tissue for and/or conducting genetic studies to better understand the population dynamics of the small subpopulation of northern nesting loggerheads. Unlike cetaceans, there is no organized, formal program for at-sea disentanglement of sea turtles. However, recommendations for such programs are being considered by NMFS pursuant to conservation recommendations issued with several recent section 7 consultations. Entangled sea turtles found at sea in recent years have been disentangled by STSSN members, the whale disentanglement team, the USCG, and fishermen.

interactions with fishing gear pose a risk to sea turtles as well as cetaceans. NMFS has implemented a series of regulations aimed at reducing the potential for incidental mortality of sea turtles in commercial fisheries. Many of these are focused on fisheries that primarily operate in waters south of the action area for this consultation, such as the shrimp fishery. However, TEDs, which were first developed to address the take of turtles in the shrimp trawl fishery, have been used in summer flounder trawls in the mid-Atlantic area (south of Cape Henry, Virginia) since 1992. It has been estimated that TEDs exclude 97% of the turtles caught in such trawls. The 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), flotation, and more widespread use. As fisheries expand to include underutilized and unregulated species, trawl effort directed at these species may be an undocumented source of mortality for which TEDs should be considered. NMFS is also working to develop a TED that can be effectively used in a type of trawl known as a flynet, which is sometimes used in the mid-Atlantic and northeast fisheries for summer flounder, scup, and black sea bass. Regulations will be formulated to require use of TEDs in this fishery if observer data conclusively demonstrate a need for such TEDs.

Summary and synthesis of the status of species and environmental baseline
In summary, the potential for vessels, military activities, fisheries, *etc.* to adversely affect whales and sea turtles remains throughout the action area of this consultation. However, recovery actions. have been undertaken as described and continue to evolve. Although those actions have not been in place long enough for a detectable change in the northern right whale population (or other listed species populations) to have occurred, those actions are expected to benefit the western north Atlantic right whale and other listed species in the foreseeable future. These actions should not only improve conditions for listed whales and sea turtles, they are expected to reduce sources of human-induced mortality as well. However, a number of factors in the existing baseline for right whales, loggerhead sea turtles and leatherback sea turtles leave cause for considerabl concern regarding the status of these populations, the current impacts upon these populations, and the impacts associated with both state and federal fisheries:

- The western north Atlantic right whale population continues to be declining. Based on recent estimates this population currently numbers fewer than 300 individuals and only one new calf was observed in 1999. Losses of adult whales due to ship strikes and entanglements in fishing gear continue to depress the recovery of this species.

- The leatherback sea turtle is declining worldwide. The environmental baseline includes several ongoing sources of mortality to this population which exceed the I% sustainable level projected by Spotila *et al.* (1996).

- The northern subpopulation of loggerhead sea turtles is declining and currently numbers only about 3,700 nesting females. The percent of northern loggerheads represented in sea . turtle strandings in northern U.S. Atlantic states is over-representative of their total numbers in the overall loggerhead population. Pelagic immature phase animals are critical to growth of the population as a whole. Current take levels from other sources, particularly fisheries (especially trawl and gillnet fisheries), are high.

IV. Effects of the Proposed Action

This section of a Biological Opinion assesses the direct and indirect effects of the proposed action on threatened and endangered species or critical habitat, together with the effects of other activities that are interrelated or interdependent (50 CPR§ 402.02). Indirect effects are those that are caused later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CPR§ 402.02).

An assessment of impacts of the tilefish fishery on endangered and threatened species of whales, sea turtles, and fish is presented in the EIS prepared by the Council (MAFMC 2000).

A. Effects of the Tilefish Fishery

Factors affecting listed species

NMFS currently authorizes the use of longline, handline and otter trawl gear in the commercial tilefish fishery (64 FR 675 I 1). The dominant gear is bottom longline, with otter trawl gear being of secondary importance. No analysis of rates of incidental take of listed species in the tilefish fishery is available at the present time. However, incidental take of listed species has been recorded for these gear types where used in other fisheries such as the bottom longline fishery for sharks under the HMS fishery management plan, the bottom trawl fishery for multispecies as well as squid, mackerel, and butterfish, and bottom longline fisheries conducted outside of U.S. waters (e.g. the Patagonian toothfish fishery in South American waters). Therefore, taking of listed species as a result of the tilefish fishery may be possible when the fishery operates at times and in areas used by listed species. In addition, there is anecdotal information that sea turtles, in particular leatherbacks and loggerheads, are taken in the tilefish fishery.

Whales

The cetacean species considered in this Opinion occur in the action area for this consultation, but many are less likely to occur in the limited area where tilefish gear is deployed. The blue whale is uncommon in the action area, overall. Blue whales are considered an occasional visitor to the EEZ in the Atlantic (CeTAP, 1982; Wenzel *et al.,* 1988). Sei whales typically remain north of where the tilefish fishery currently operates. During the feeding season, a major portion of the sei whale population is centered in northerly waters, perhaps on the Scotian Shelf (Mitchell and Chapman, 1977) while the southern portion of the species range during spring and summer extends through the Gulf of Maine and to Georges Bank (Waring *et al.,* 1999). Although interaction with the Tilefish fishery is possible, NMFS believes interactions with blue or sei whales are rare. Right whales and humpback whales are commonly found in New England waters and Canadian waters of the Bay·ofFundy and the Scotian Shelf from spring through fall. Members of both species transit through mid-Atlantic waters to and from calving grounds in the south. Although right whales appear to favor more coastal waters, the exact distribution of right as well as humpback whales during the migrations are unclear. Therefore, they may occur in areas where the tilefish fishery operates during the fall and spring when animals are traveling to and from summer feeding grounds.

The cetacean species most likely to be found in the area where the tilefish fishery operates are fin whales and sperm whales. Both of these have a ubiquitous distribution in the western Atlantic. Fin whales are common in the EEZ, principally from Cape Hatteras northward

(Waring ***et al.,*** 1999). Sightings over the continental shelf are also common. Fin whales represented 24% of all cetaceans sighted over the continental shelf between Cape Hatteras and Nova Scotia during the CeTAP surveys from 1978-1982 (CeTAP 1982). Sperm whales are distributed throughout the central portion of the mid-Atlantic Bight in spring, although sperm whale occurrence on the continental shelf south of New England is highest in the fall. Effort in the tilefish fishery is greatest from October through June. Therefore, operation of the tilefish fishery, particularly in the fall, has the potential for overlapping with abundance of sperm whales in the area.

In general, gear entanglements and vessel collisions pose the primary risks to protected species from fishery interactions. The risk of gear entanglements and vessel collisions for cetacean species that may occur in the area and at the time where the tilefish fishery operates (i.e., right, humpback, fin and sperm whales) is described in more detail below.

The North Atlantic bottom trawl fishery, which includes otter trawls as used in the tilefish fishery, is listed as a Category III fishery under the MMPA List of Fisheries. Incidental injuries and/or mortalities of pilot whales and dolphin species have been recorded in bottom trawl fisheries, but there have been no recorded takes of ESA-protected cetaceans. The large size of baleen whales and their unique feeding habits makes it unlikely that they-will interact with otter trawl gear. These large whales should be able to easily avoid or maneuver around trawl gear. In addition, since baleen whales feed by targeting swarms of schooling fish or zooplankton it is unlikely that they will be attracted to the catch of a trawling vessel. Sperm whales, which are large, toothed whales, are also expected to be able to maneuver around otter trawl gear as used in the tilefish fishery. Based on this information, NMFS does not expect that any ESA-listed marine mammals will become entangled with an otter trawl associated with the tilefish fishery.

While cable and ropes of other types of gear, including gillnet and traps/pots, that float near the surface do pose an entanglement risk to baleen whales, bottom longline gear is not expected to pose a similar risk since it lies near or at the bottom. As described above, baleen whales have unique feeding habits. It is, therefore, unlikely that baleen whales would be attracted to the baited hooks and catch of longline gear.

Sperm whales may be attracted to longline gear as used in.the tilefish fishery. Observations have been made of sperm whales interacting with bottom longline gear for the Alaska sablefish and Pacific halibut fisheries in Alaska (Perry ***et al.,*** 1999), and with longline gear set for Patagonian toothfish in southern waters (Ashford ***et al.,*** 1996 and Nolan ***et al.,*** 2000). In all cases, sperm whales appeared to be attracted to the gear during hauling operations rather than while the line was fishing. Sperm whales were observed feeding on caught fish in the halibut and sablefish longline fisheries (Hill and DeMaster, 1999). Neither Ashford ***et al.,*** (1996) or Nolan ***et al.,*** (2000) observed spemi whales feeding on longline caught toothfish but the authors did observe numerous hooks missing from the gear which suggests that sperm whales were feeding from the line prior to its retrieval.

Perhaps the best data to date on sperm whale interactions with bottom longline gear is provided by Hill ***et al.*** (1999). In 1997, NMFS initiated a pilot study to characterize the nature and extent of the interactions between sperm whales and Alaska's commercial sablefish longline fishery following reports from fisheries observers that sperm whales were preying on longline caught fish(Hillet. *al.,* 1999). Between May 17-December 14, 1997,andMarch31-November 14, 1998, fishery observers aboard 57 different vessels monitored a total of 1,617 longline sets. The data revealed that sperm whales were not present during any of the 1,075 sets in the Bering Sea, but were present in 28.5% of the 562 sets in the Gulf of Alaska. Observers recorded fish damage in 46.2% of the sets where sperm whales were present, suggesting that the whales did not a ways interact with the gear even when they were present in the same area and at the time when fishing occurred.

Although there is evidence that sperm whales do interact with longline gear, serious injuries or mortalities to sperm whales as a result of these interactions are rare. One sperm whale is known to have died as a result of longline gear used in the Patagonian toothfish fishery off southern Chile (Salas *et al.,* 1987) and the first entanglement of a sperm whale in Alaska's longline fishery was recorded in 1997, although the whale was not seriously injured and there is no evidence that mortality or serious injury occurs as a result of this fishery (Perry *et al.,* 1999). Neither Ashford *et al.,* (1996) or Nolan *et al.* (2000) observed mortalities or serious injuries to sperm whales during Patagonian toothfish operations around South Georgia or the Falkland Islands conservation zone, respectively. The sablefish longline and Pacific halibut longline fisheries are currently listed as Category III fisheries in the MMPA List of Fisheries.

Whether sperm whales will interact with longline fishing operations may be related to several factors, including geographic area, depth, and prey preference. The lack of any observations of sperm whales interacting with sablefish_longlines in the Bering Sea (1,075 sets observed) versus the Gulf of Alaska (562.sets observed) is strong evidence that whales in different areas may act differently. Even within the Gulf, the authors found that the presence of sperm whales appeared to be related to the area fished and the bottom depth (Hill *et al.,* 1999). Prey preference or availability may also play a role. Patagonian toothfish remains have been recovered from sperm whales in the southern oceans suggesting that this may be a common prey item (Ashford *et al.,* 1996). A preference for toothfish amongst southern sperm whales may lead to more frequent interactions with this longline fishery. Clearly some sperm whales in the Gulf of Alaska consume sablefish and halibut. However, it is unclear whether these fish species are primary prey items that are subsequently targeted by sperm whales during fishery operations or whether some sperm whales have learned to opportunistically take sablefish and halibut from longline gear. Sperm whales typically feed on medium-sized to large-sized squids but may also feed on large demersal and mesopelagic sharks, skates, and fishes, particularly in higher latitudes (Gosho *et al.,* 1984). Sperm whales in the high latitudes of the North Atlantic (i.e., Norwegian Sea and Iceland) feed on deep-dwelling fish species such as lumpsuckers and redfishes. Fish prey comprises almost half of the total biomass eaten by sperm whales in this region, while the other half is comprised of cephalopods (Perry *et al.,* 1999).

Although the tilefish fishery uses bottom longline gear comparable to that used in the Alaska sablefish, Pacific halibut and southern ocean Patagonian toothfish fisheries, there are substantial differences in how these fisheries operate. These differences would be expected to have a bearing on the risk of serious injury or mortality to North Atlantic sperm whales as a result of the tilefish fishery. First, there is no data to indicate that tilefish is a primary prey item of spenn whales that frequent the mid-Atlantic where the tilefish fishery operates. Given our knowledge of spenn whale diet and the mid-latitude range of the tilefish fishery versus the higher latitude range of longline fisheries in the Gulf of Alaska and Patagonian toothfish fisheries in the southern oceans, it appears probable that cephalopods, not fish, form the primary prey items of North Atlantic spenn whales that occur in the areas where the tilefish fishery operates. In addition, given the small size of the. tilefish fishery versus the greater size and effort of the Alaska longline and Patagonian toothfish fisheries, the opportunity for interactions between sperm whales and tilefish gear would appear to be less than for spenn whales that frequent the Gulf of Alaska and the southern oceans. Finally, given the already rare occurrence of spenn whale injuries and mortalities from Patagonian toothfish, sablefish and Pacific halibut longline gear, NMFS believes that, while there is still a small possibility of interaction between sperm whales and the tilefish fishery, these interactions are not likely to result in injury or mortality of sperm whales.

In the event that a sperm whale become hooked or entangled in bottom longline gear, it is likely that the line will be broken during the whale's struggling, or the fishermen may cut the line. Depending on the degree and duration of entanglement, the whale may be injured by the steel cables used in this fishery, or be wounded or scarred while attempting to disentangle itself. If the whale is unable to free itself, the Whale Distentanglement Network will be activated to attempt to remove entangled gear. Fishers participating in this fishery will be required to report any interaction with a protected species should one occur. Since NMFS currently does not anticipate that a sperm whale will become entangled or hooked, any reported interactions will represent new information on the interaction of sperm whales with the tilefish fishery requiring reinitiation of consultation.

The tilefish fishery may affect protected species as a result of gear interactions and/or vessel interactions. Large whales have been struck by large ships (i.e., those used in trans-Atlantic commercial shipping) as well as much smaller vessels (i.e., recreational vessels). Right whales, in particular, appear to be susceptible to ship strikes, probably due to their tendency to frequent shipping channels and their habit of sleeping or resting at or near the surface. Strikes of humpback, fin and right whales by smaller vessels (i.e., recreational vessels) have occurred. In some of these cases, the operators attempts to more closely observe whales likely contributed to the interaction. While serious injuries and mortalities can result from ship strikes, there are no · known mortalities of large whales as a result of collisions with smaller vessels. This is likely due to many factors, including: the much smaller size of these vessels as compared to vessels engaged in shipping (contributing to increased visibility and greater maneuverability), the slower speed at which these vessels operate, and the size of the whales in the action area. There have been no known strikes of any BSA-listed cetacean by a fishing vessel.

As described previously, fin whales and sperm whales are the cetacean species most likely to be found in the area where the tilefish fishery operates. Humpback and right whales may be observed in the early spring and fall when these species use mid-Atlantic waters as a migratory corridor to and from southern calving areas. Given the relatively small size of the fishing vessels used in the tilefish fishery (50 to 100 feet), the number of vessels currently participating in the tilefish fishery (12 full-time vessels), and the very low level of interaction between these cetacean species and vessels other than those engaged in shipping, it is highly unlikely that vessels as used in the tilefish fishery will interact with large cetaceans. In the unlikely event that a listed whale became entangled in bottom longline gear, NMFS believes that effects to the individual whale are not likely to exceed minor injuries inflicted during the animals' efforts to free itself of the entangling gear. Minor injuries associated with the entanglement of an individual whale (including a rare right whale) are not likely to be detectable.at a population level.

Based on the information provided above, NMFS does not anticipate that operation of the tilefish fishery will result in interactions with any BSA-listed cetacean. In the rare event that an entanglement occurred and an individual whale was injured, the effect of any subsequent injuries are not likely to be detectable at the population level, unless the entangled whale was a female right whale with calf. Based on the distribution of right whales in the action area, and the low potential for this species to approach bottom longline gear (as opposed to sperm whales), NMFS believes the likelihood of a right whale to be entangled or hooked in longline gear to be extremely rare. Based on the expectation that none of the listed whales considered in this Opinion will be entangled by long line gear asssociated with the tilefish fishery, NMFS does not expect prosecution of this fishery to result in an appreciable reduction in both the survival and recovery of these listed species by reducing their numbers, distribution, or reproduction.

Sea Turtles
As described previously, the four species of sea turtles found in the action area for this consultation are: green sea turtles, Kemp's ridley sea turtles, loggerhead sea turtles, and leatherback sea turtles. As is the case for some cetacean species considered in this consultation, all of these turtle species occur in the action area but some are less likely to occur in the limited area where the tilefish fishery operates.

Smaller Kemp's ridleys and loggerheads use inshore waters north of Cape Hatteras as developmental habitat during the summer and early fall and can be found as far north as Cape Cod Bay. While in these areas, ridleys and loggerheads appear to prefer inshore environments where they feed on crustaceans. Although uncommon north of Cape Hatteras, immature green sea turtles also use northern inshore waters during summer and may be found as far north as Long Island Sound (Musick and Limpus, 1997). Sea Turtle Stranding and Salvage Network (STSSN) personnel in New York typically see two to three green sea turtles a year that are recovered either as a result of strandings (i.e., cold-stunning) or are recovered alive from pound nets (Dana Hartley, pers. comm.). Inshore waters provide forage for green sea turtles which feed primarily on marine grasses and algae in shallow bays, lagoons and reefs (Rebel 1974) but also consume jellyfish, salps, and sponges. With the onset of winter and the decline of water temperatures, turtles migrate south to warmer waters (USFWS and NMFS, 1992). Studies by Morreale (1999) on juvenile loggerhead sea turtles have identified a "corridor" through which this species travels to wintering areas. Based on data collected by satellite transmitters, Morreale (1999) found that turtles left Long Island waters in the fall, and traveled a distance of approximately 1000 km to wintering areas in the south, in waters ranging in depth from 40-60 m. While the exact migratory path of ridleys and green turtles is unknown, it is generally believed that Kemp's ridleys and green sea turtles follow a similar path. Interactions with tilefish gear is, therefore, unlikely since the foraging activity of juvenile Kemp's ridleys, loggerheads and green sea turtles in northern waters and their migratory route do not overlap with the area where the tilefish fishery operates.

Of the turtle species common to the action area, leatherback sea turtles and larger-sized loggerheads are the most likely to occur in the area where the tilefish fishery operates; Less is known about the movements of larger loggerheads that occur along the continental shelf as compared to smaller specimens inhabiting inshore northern mid-Atlantic waters. However, studies have shown that loggerhead takes in the northeast area for the pelagic longline fishery are greatest from June/July through November. This suggests that larger, offshore loggerheads follow a migration pattern similar to the smaller inshore loggerheads; moving into northern mid-Atlantic waters in June and departing the area by October/November. Leatherback turtles are a pelagic species and may also occur in the deep waters where the tilefish fishery operates. Evidence from tag returns and strandings in the western Atlantic suggests that adults engage in routine migrations between boreal, temperate and tropical waters (NMFS and USFWS, 1992). Like loggerheads, they are typically found in northern mid-Atlantic waters from June through October (Wynne and Schwartz, 1999). In contrast, effort in the tilefish fishery is greatest from October through June (MAFMC, 2000). Because loggerhead and leatherback sea turtles are concentrated in the area during times when effort in the fishery is reduced, the risk of takes of these turtles in the tilefish fishery is expected to be less than if they occurred during the time of greatest effort. Nevertheless, because the tilefish fishery operates year-round, there is the potential for takes of these species in the tilefish fishery if they occur at the times and in the areas where the tilefish fishery operates. The level of anticipated take of loggerhead and leatherback sea turtles in the tilefish fishery must, therefore, be assessed.

There are anecdotal reports of loggerhead and leatherback sea turtle takes in the tilefish fishery. However, this fishery has not had an observer program and there is no data to either support or contradict these reports. In general, gear entanglements or other gear interactions (i.e., hooking) are the primary risks to sea turtles as a result of a fishery interaction. The primary gear types used in the tilefish fishery are bottom longline and otter trawl, although landings by longline gear far surpass landings by trawl (93% versus 7% in the ten-year interval of 1988-1997)(MAFMC, 2000).

There are few observed bottom longline fisheries in the area where the tilefish fishery operates. Therefore, it is difficult to assess what level of take may occur as a result of this fishery. Loggerhead takes have been observed in bottom longline fisheries in other regions. For example, sea sampling data from the bottom longline shark fishery (Branstetter and Burgess, 1997; Branstetter, pers. comm.) revealed that in 514 sets observed, 27 loggerheads were taken and released alive and another six were recorded dead, yielding a mortality rate of approximately 18%. However, this data is not directly applicable to the tilefish bottom longline fishery given the fundamental differences between the two fisheries. These include differences in the level of effort, the location of fishery effort and the overlap of the fisheries with loggerhead sea turtle abundance. For example, there are at least 50 full-time vessels in the shark bottom longline fishery versus 12 full-time vessels in the tilefish fishery. Effort in the shark fishery is concentrated at depths of 60-120 feet and occurs primarily in Florida (approximately 50-55% of the total landings). In contrast, tilefish effort is heavily concentrated in a relatively small area of northern mid-Atlantic waters at depths of 250-1500 feet. Finally, aerial surveys suggest that loggerheads (benthic immatures and adults) are more abundant in southeastern U.S. waters (54% of sightings) as compared to the northeast U.S. Atlantic (29% of sightings), and the eastern (12%) and western (5%) Gulf of Mexico (TEWG 1998). ·Loggerheads are, therefore, more likely to occur in the area where the shark bottom longline fishery operates, will occur at greater concentrations, and are subject to greater fishery effort as compared to the tilefish fishery. Takes of loggerhead sea turtles would be expected to be greater in the bottom longline fishery for sharks than for the bottom longline fishery for tilefish.

Takes of loggerhead and leatherback sea turtles in the northeast longline fishery for swordfish have also been documented. Preliminary information from 1999 observer data indicates that 45 leatherbacks, 64 loggerheads, and 3 unidentified turtles were taken. One of the loggerheads was dead when boated. Others ingested the hook or were released with line still attached, both of which might contribute to subsequent mortality. However, the northeast swordfish fishery is a pelagic longline fishery. Sea turtles, particularly loggerheads, may be more attracted to pelagic longline gear versus bottom longline gear given the extent of their diving abilities and their range within the water colwnn. Leatherback sea turtles can dive to considerable depths. But their diet is believed to be composed of jellyfish species which are more likely to be found within the water column rather than at the bottom. Therefore, we would expect leatherback sea turtles to be more susceptible to gear interactions with pelagic longline gear that is suspended within the water column rather than bottom longline gear which is set at or near the bottom. The depth at which pelagic longline gear operates appears to be one of the critical factors for sea turtle takes in the fishery. One of the recommendations from a 1999 NMFS workshop on the pelagic longline fisheries was to set hooks deeper in the water colwnn in order to reduce takes of turtles (HMS BO, June 30, 2000).

Interactions between sea turtles and tilefish bottom longline gear, if they do occur, may be more likely when the gear is being retrieved. However, information on this is lacking, and even if it were to occur, we would expect hauling times of bottom longline gear to be less than the actual fishing time of pelagic longline gear. Therefore, fewer interactions with sea turtles should occur as a result of bottom longline gear versus pelagic longline gear. Given these gear differences and other dissimilarities in how these fisheries operate (e.g., use of lightsticks, amount of effort in the fishery, timing of effort), the observer data obtained from the swordfish pelagic longline fishery cannot be used to estimate takes of loggerhead or leatherback sea turtles in the tilefish bottom longline fishery.

At present, the short-finned squid fishery may provide the best data on which to base an estimate of turtle takes from bottom longline gear used in the tilefish fishery. Short-finned squid are primarily taken by bottom longline gear in mid to lower mid-Atlantic waters during June through October. Three takes of loggerhead sea turtles were recorded in this fishery from 1995 through 1997. It is important to note that effort in the short-finned squid fishery is greatest when sea turtles are most likely to be in the area. In contrast, tilefish effort is lowest from June through October when sea turtles are expected to be in the area. Additionally, the short-finned squid fishery occurs in mid-lower mid-Atlantic waters where sea turtles are more likely to occur as compared to the northern mid-Atlantic waters where the tilefish fishery operates. Therefore, we would expect that loggerhead sea turtles would be less likely to be taken in the tilefish bottom longline fishery than in the short-finned squid bottom longline fishery, such as less than one turtle per year.

As described above, tilefish are also taken by trawl gear. However, tilefish are not likely to be taken in a directed trawl fishery given the unique substrate of tilefish habitat and the depth of tilefish habitat (MAFMC 2000). Tilefish are taken incidental to directed trawl fisheries for other fish species such as lobster, flounder (Freeman and Turner, 1977), hake, and squid, mackerel and butterfish (MAFMC 2000). The mackerel, squid, butterfish fisheries are primarily mobile gear fisheries which use midwater and bottom trawl gear. Long-finned squid is primarily landed by bottom trawl gear; the type of gear most likely to incidentally take tilefish. Most landings occur January through April and October through December. The majority of landings come from southern New England to mid-Atlantic waters. One take of a loggerhead sea turtle was observed in the long-finned squid bottom trawl fishery from 1995-1997. Turtle takes have also been observed in trawl gear from other fisheries including northeast multispecies, and summer flounder, scup, and black sea bass. The Northeast Fisheries Science Center is currently reviewing all observer data for takes of sea turtles. The resulting bycatch analysis is expected to provide improved information on the level of sea turtle takes from fishery interactions. In the interim, however, the best information available is previously collected data which suggests that fisheries that use trawl gear may be expected to take up to six loggerhead sea turtles (no more than three lethal takes) and one lethal or non-lethal take of a leatherback sea turtle. We would, however, expect loggerhead and leatherback sea turtle takes in the tilefish trawl fishery to be less than what is currently estimated for directed trawl fisheries since tilefish are typically taken incidental to other trawl fisheries rather than as a directed fishery and bottom longline gear is the predominate gear type used in the tilefish fishery.

Bottom longline gear used in the tilefish fishery poses a risk of hooking for sea turtles, while the primary risk to sea turtles from trawl gear is entanglement. Both leatherbacks and loggerheads may be caught in trawl gear or by hooking. The level of serious injury or mortality associated with hooking is controversial and NMFS has recently reviewed available information and developed criteria for estimating the risk of mortality for turtles which are entangled and released (0% mortality), hooked externally or entangled where the line is left on the turtle and the hook does not penetrate the internal mouth structure (27%), and mouth hooked (penetrates) or ingested hook (42%) (NMFS 2001). Clearly, the degree to which an individual turtle is hooked or entangled will have an effect on the seriousness of any injuries.

Based on the information above, we anticipate that no more than one loggerhead and one leatherback will be taken each year due to entanglements or hooking with bottom longline gear used in the tilefish fishery. In addition, the trawl fishery is anticipated to entangle no more than six loggerhead sea turtles (no more than three lethal) and one leatherback (lethal or non-lethal) per year. These estimates are also based on the low number of vessels participating full-time in this fishery, the reduced effort when sea turtles are most likely to be in the area, and the expectation that the risk of interactions between the tilefish fishery and loggerhead and leatherback sea turtles is minimal. Overall, NMFS anticipates that incidental take of loggerhead and leatherback sea turtle in the tilefish fishery (bottom longline gear and trawl gear interactions combined) will not exceed more than six loggerhead sea turtles (of which no more than three are expected to be lethal) and one leatherback (lethal 9r non-lethal) per year.

Between 1989 and 1998, the total number of loggerhead sea turtles nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,016-89,034 annually, representing, on average, an adult female population of 44,780 turtles. On average, 90.7% of the nests were from the South Florida subpopulation and 8.5% were from the northern subpopulation There are an estimated 3,800 nesting females in the northern loggerhead subpopulation, and the status of this population is officially documented as stable or declining (TEWG 2000). Between 25 and 59 percent of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia are from the northern subpopulation (Bass *et al.,* 1998; Norrgard, 1995; Rankin-Baransky, 1997; Sears 1994, Sears *et al.,* 1995). Based on this information, the mortality of up to three loggerhead sea turtles each year could result in a loss of one to two individuals from the northern nesting subpopulation. If we were to assume the worst case scenario that each of these turtles was a nesting female, the population could suffer a loss of one to two mature, nesting females each year. Over a period of twenty years, these losses could effectively remove up to 40 individuals from the northern nesting subpopulation in addition to other ongoing state and federal actions which injure or kill sea turtles. Although any take of an ESA-listed species is of concern, the low numbers anticipated to be injured or killed (even under a worst case scenario) and the current population size, NMFS does not expect the anticipated injury or mortality of individual loggerhead sea turtles associated with the tilefish fishery to adversely affect the population dynamics of the northern subpopulation of loggerhead sea turtles in way which would appreciably reduce their numbers, distribution, or reproduction.

The leatherback sea turtle population in the Atlantic is estimated to number 15,000 nesting females. Based on model simulations, Spotila *et al.* (1996) argued that "stable leatherback populations could not withstand an increase in adult mortality above natural background levels without decreasing...Even the Atlantic populations are being exploited at a rate that cannot be sustained." The tilefish fishery is expected to increase the incidental take of individual turtles by one per year which may or may not result in mortality. Over a 20 period, these interactions could result in the mortality of up to 20 leatherbacks. Assuming the worst case scenario, even if one mortality of a nesting female occurred each year due to conduct of the tilefish fishery, the loss of these individual leatherbacks is not expected to adversely affect the population dynamics of the leatherback sea turtles in way which would appreciably reduce their numbers, distribution, or reproduction.

Right Whale Critical Habitat
Since the tilefish fishery does not currently operate in right whale critical habitat, conduct of this fishery is not expected to affect the value of designated critical habitat. Historical fishing areas for tilefish also do not appear to overlap with right whale critical habitat.

V. Cumulative effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this Opinion. 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 Act

Commercial fishing activities in state waters are likely to take several protected species. However, it is not clear to what extent state-water fisheries may affect listed species differently than the same fisheries operating in federal waters. Further discussion of state water fisheries is contained in the Environmental Baseline section. The Atlantic Coast Cooperative Statistics Program (ACCSP), when implemented, is expected to provide information on takes of protected species in state fisheries and systematically collected fishing effort data which will be useful in monitoring impacts of the fisheries.

Ship strikes have been identified as a significant source of mortality for the northern right whale population (Kraus 1990) and are also known to impact all other endangered whales. Small vessel traffic is also known to take sea turtles. Commercial shipping traffic in the northern portion of the action area is estimated at 1200 ship crossings per year with an average of three per day. In one region, about 20 whale watch companies representing 40 to 50 boats conduct several thousand trips from April through September, with the majority of effort in the summer months. In addition, an unknown number of private recreational vessels frequent coastal waters; some of these are engaged in whale watching or sportfishing activities. Significant hubs of vessel activity occur to the south as well. These activities have the potential to result in lethal (through entanglement or boat strikes) or non-lethal (through harassment) takes oflisted species that could prevent or slow a species recovery. Effects of harassment or disturbance which may be caused by whale watch operations are currently unknown.

Various initiatives have been planned or undertaken to expand or establish high-speed watercraft service in the northwest Atlantic, including one service between BarHarbor, Maine and Nova Scotia with a vessel operating at higher speeds than established watercraft service. The Bar Harbor-Nova Scotia high speed ferry conducted its first season of operations in 1998. The operations of these vessels and other high speed craft may adversely affect threatened and endangered whales and sea turtles, as discussed previously with private and commercial vessel traffic in the Action Area. NMFS and other member agencies of the Northeast Implementation Team will continue to monitor the development of the high speed vessel industry and its potential threat to listed species and critical habitat.

Sources of pollutants in the Gulf of Maine and other coastal regions include atmospheric loading of pollutants such as PCBs, storm water runoff from coastal towns, cities and villages, runoff into rivers emptying into bays, groundwater discharges and river input and runoff. Nutrient loading from landbased sources such as coastal community discharges is known to stimulate plankton blooms in closed or semi-closed estuarine systems. The effects to larger embayments is unknown.

Integration and synthesis of effects
Six species of whales, all listed as endangered under the ESA, and four species of turtles, listed

as either endangered or threatened, may occur in the management unit for the proposed tilefish FMP. However, only four of these are expected to occur in the limited area where tilefish gear is set. These are fin and sperm whales, and loggerhead and leatherback sea turtles.

The tilefish fishery opetates in canyons along the continental shelf in an area of the mid-Atlantic Bight, south of New England and east of New Jersey. The area is not frequented by blue or sei whales, and right and humpback whales typically use these mid-Atlantic waters only during migrations between northern foraging areas and southern calving/mating areas. Similarly, juvenile loggerhead, Kemp's ridley and green sea turtles which use mid-Atlantic inshore waters for summer foraging are not expected to occur in the deep-water areas where the tilefish fishery operates.

The tilefish fishery is most likely to affect ESA-listed species through gear interactions. Tilefish are primarily taken by bottom longline gear. Fin whales, a species of baleen whale that targets swarms of prey, are not known to interact with longline gear. Sperm whales have been known to interact with b.ottom longline gear used in other fisheries. There are also anecdotal reports that loggerhead and leatherback sea turtles have been hooked on bottom longlines set for tilefish. However, there has been no observer coverage in the tilefish fishery, and there are no confirmed reports of takes of any marine mammal or sea turtle in the fishery.

Several factors help to limit interactions between tilefish gear and sperm whales, loggerhead sea turtles and leatherback sea turtles. First, all three species occur only seasonally in the area where the tilefish fishery operates. Turtles are most abundant from June through November while sperm whales are typically found in mid-Atlantic waters in the fall. Secondly, effort in the fishery is greater when these protected species are not present (October through June with peak landings from January through June). Finally, life history characteristics for these three species, including their prey and depth preferences, are incompatible with the catch of tilefish or the depths at which this gear operates.

The new tilefish fishery management plan is intended to reduce effort in the fishery by limiting the number of participants, establishing an annual commercial quota, and reducing the annual quota if overages occur in the preceding year. In addition, the new FMP includes licensing requirements for vessel operators and dealers and a requirement to carry observers when requested. These measures are expected to be of benefit to sperm whales and loggerhead and leatherback sea turtles by further reducing the opportunities for interactions with tilefish gear, by helping to enforce participation and quotas, and by providing a means of obtaining first-hand information on interactions between tilefish gear and protected species.

Based on the information currently available on the tilefish fishery as well as observed interactions between sperm whales and the bott m longline fisheries for Patagonian toothfish, Pacific halibut and Alaska sablefish, interactions between sperm whales and tilefish gear are expected to be rare. In the unlikely event that an individual sperm whale interacted with any of the gear associated with the tilefish fishery, NMFS believes that serious injuries or mortalities (i.e., hooking or entanglement in the gear) are unlikely. Overall, NMFS does not anticipate that approval and implementation of a federally-permitted commercial fishery targeting tilefish in federal waters will result in the incidental take of sperm whales.

Interactions between loggerhead and leatherback sea turtles with tilefish gear are expected to be uncommon given the limited seasonal overlap of sea turtles with tilefish fishery effort. Some loggerheads have been taken in the bottom longline fishery for short-finned squid, and takes of loggerhead sea turtles also occur in bottom trawl fisheries. Therefore, incidental take of loggerhead sea turtles could occur in either the tilefish bottom longline or bottom trawl fishery at times when the fishery operates in areas where loggerheads occur. Similarly, the opportunity for interactions between leatherback sea turtles and tilefish gear are expected to be low. However, interactions could occur when the tilefish bottom longline fishery operates in areas and at the times that leatherback sea turtles are present. NMFS has estimated levels of take for each of these species that may result from interactions with the tilefish fishery at six loggerheads (of which three could involve serious injury or mortality), and one leatherback (which could involve injury or mortality) on an annual basis. The effect of these losses on loggerhead and leatherback populations will be in addition to injuries and mortalities caused by several other state and federal activities in the Atlantic region. Based on the current population status of these species, the environmental baseline, and cumulative effects, NMFS does not anticipate that levels of interaction and/or serious injury and mortality anticipated to occur on an annual basis associated with implementation of the tilefish fishery will adversely affect the population dynamics of loggerhead or leatherback sea turtles in way which would appreciably reduce their numbers, distribution, or reproduction.

VI. CONCLUSION

After reviewing the current status of the endangered and threatened species under NMFS jurisdiction, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is NMFS' biological opinion that implementation of the tilefish fishery FMP as proposed is not likely to jeopardize the continued existence of humpback, fin, blue, sei, sperm, or right whales; or green, Kemp's ridley, loggerhead, or leatherback sea turtles, and is not likely to destroy or adversely modify designated right whale critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act and federal regulations pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as "to harass, hann, pursue, hunt, shoot, capture, or collect, or to attempt to engage in any such conduct." Hann is further defined by NMFS to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the execution of an otherwise lawful activity. Under the terms of Sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

The measures described below are non-discretionary and must therefore be undertaken in order for the exemption in section 7(o)(2) to apply. NMFS, Northeast Regional Office (NERO), Office of Sustainable Fish ries (OSF) has a continuing duty to regulate the activity covered by this ITS. If NMFS, NERO OSF fails to implement the terms and conditions through enforceable measures, the protective coverage section of 7(o)(2) may lapse.

When a proposed NMFS action which may incidentally take individuals of a listed species is found to be consistent with section 7(a)(2) of the ESA, section 7(b){4) of the ESA requires NMFS to issue a statement specifying the impact of any incidental taking. It also states that reasonable and prudent measures necessary to minimize such impacts be provided along with implementing terms and conditions. Only those takes resulting from the agency action (including those caused by activities approved by the agency) that are identified in this statement and are in compliance with the specified reasonable and prudent alternatives and terms and conditions are exempt from the takings prohibition of Section 9(a), pursuant to section 7(o) of the ESA.

An incidental take authorization for marine mammals is not being included at this time since the incidental take of marine mammals has not been authorized under Section 101(a)(S)(E) of the MMPA and/or its 1994 Amendments. Following issuance of such regulations or authorizations, NMFS may amend this Opinion to include an incidental take allowance for these species, as appropriate.

Anticipated Amount or Extent of Incidental Take

NMFS anticipates that the operation of the federal tilefish fishery under the proposed FMP may result in the injury or mortality of loggerhead or leatherback sea turtles. Based on observed takes from Sea Sampling data for gear types which may be used in the tilefish fishery, NMFS anticipates that the following numbers of incidental takes of sea turtles may be observed annually in the tilefish fishery:

- 6 takes (no more than 3 lethal or having ingested the hook) of loggerhead sea turtles, and;
- 1 lethal or non-lethal take (includes having ingested the hook) of leatherback sea turtle.

Effects of Take

In the accompanying Opinion, NMFS has determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

NMFS has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of sea turtles:

1. NMFS' NERO must provide adequate guidance to tilefish fishers such that any sea turtle

incidentally taken is handled with due care, observed for activity, and returned to the water. NMFS' NERO must send a letter to all tilefish permit holders detailing the protocol for handling a turtle interaction.

2. NMFS' NERO should notify all tilefish permit holders within 30 days of the beginning of each fishing year of their responsibility to report protected species interactions in the manner agreed to at the NERO implementation meeting (see RPM no. 4).

3. NMFS' Northeast Fisheries Science Center must evaluate observer information from the tilefish fishery, including the percentage of observer coverage, and any other relevant information. NMFS NERO will also review vessel trip reports submitted by fishers and with these pieces of information determine whether the incidental take levels provided in this Opinion should be modified or if other management measures need to be implemented to reduce take. The conclusion(s) reached as a result of the evaluation should be provided to the NMFS, Office of Protected Resources at the time and in the manner agreed to at the NERO implementation meeting (see RPM no. 4).

4. NMFS' NERO, Regional Administrator will hold an implementation meeting within 30 days of signature of this Opinion to assign responsibility for the above tasks.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, NMFS must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

I. The guidance letter required by Reasonable and Prudent Measure No. i. shall include the following measures that are provided in 50 CFR Part 227.72(e)(l)(I):
   a. Live animals must be handled with care and released as soon as possible without further injury.
   b. Animals are to be released when the vessel is in neutral and only in areas where they are unlikely to be recaptured or injured by vessels.
   c. Dead sea turtles can not be consumed, sold, landed, offloaded, transshipped or kept below deck, but must be released over the stern of the vessel.

2. NMFS will monitor incidental takes of listed species in the tilefish fishery using any combination of observer programs and mandatory reporting and observations (Vessel Trip Reports), if available. In cases where logbook data is utilized, the data will be corrected for under-reporting based on the best available information comparing logbook data and observer data. The overall monitoring program should be designed to 1) detect any adverse effects resulting from the proposed action, 2) assess the actual level of incidental take in comparison with the anticipated incidental take level documented in the biological opinion, 3) detect when the level of anticipated incidental take is exceeded, and 4) determine the effectiveness of any reasonable and prudent measures and their implementing terms and

conditions to minimize the effect of the take on listed species

NMFS believes that not more than 6 loggerhead sea turtles (no more than 3 lethally or having ingested the hook) and one leatherback sea turtle (lethally or non-lethally including having ingested the hook) will be incidentally taken in any given year as a result of the proposed tilefish fishery. A take is counted as any loggerhead sea turtle that is either taken alive and released, or dead. The extent of incidental take of loggerhead and leatherback sea turtles in the tilefish fishery may be determined by the number of observed takes, the number of takes calculated to have occurred based on the number of observed takes and the percentage of observer coverage, the number of reported takes (i.e., on the Vessel Trip Reports), the number of turtles found stranded where the cause of the stranding can be attributed to the tilefish fishery, or any combination of the above. The reasonable and prudent measures are designed to minimize the impact of the incidental take that might otherwise result from the proposed action. If, during the course of the tilefish fishery, this level of incidental take is exceeded, the additional level of take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures that have been provided. If authorized levels of incidental take are exceeded, the NMFS's, Northeast Regional Office, Office of Sustainable Fisheries must immediately provide an explanation of the causes of the taking and, with the Office of Protected Resources, review the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

In addition to section 7(a)(2), which requires agencies to ensure that proposed projects will not jeopardize the continued existence of listed species, section 7(a)(l) of the ESA places a responsibility on all Federal agencies to "utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered species". Conservation Recommendations are discretionary activities designed 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. As described in the Tilefish FMP, the Council is recommending that fishers move to another location after an interaction with a protected species. NMFS, NERO, should work with fishers and the Council to determine whether this recommendation is followed, and whether it is an effective means of reducing protected species interactions in the tilefish fishery.

2. NMFS, NERO should work with the Council and fishers to develop reliable methods to determine the extent of interactions between the tilefish fishery and ESA-protected species. This could include observations of marine mammals and sea turtles in the area where gear is set, observations of sea turtles or marine mammals following longline gear to the surface, etc.

3. In order for NMFS, Office of Protected Resources (QPR) to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NMFS, OPR requests notification of the implementation of any conservation recommendations.

4. Observer coverage of at least 5%-10% is recommended for this newly regulated fishery in order to more effectively determine the extent of species interactions with the tilefish fishery.

Reinitiation Notice

This concludes formal consultation on the proposed action for implementation of an FMP for golden tilefish. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where 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 incidental take is exceeded; (2) new information reveals effects of the 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 considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, NMFS' NERO must immediately request reinitiation of formal consultation.

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