DRAFT

PROTECTED SPECIES

Many species protected under laws such as the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA) or Migratory Bird Treaty Act (MBTA) are known to interact with various types of fishing gear. Measures within fishery management plans need to comply with regulations concerning these protected species.

ENDANGERED SPECIES ACT (link to ESA.pdf – to be added later)

Section 7 of the ESA requires federal agencies to ensure that any activity they authorize, fund or carry out is not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of designated critical habitat.

Listed species and designated critical habitat occurring within the South Atlantic Council's area of jurisdiction include:

Species under NOAA Fisheries jurisdiction

Endangered
Blue whale
Humpback whale
Fin whale
Northern right whale
Sei whale
Sperm whale
Leatherback sea turtle
Hawksbill sea turtle
Kemp 's Ridley turtle
Green turtle*
Smalltooth sawfish**

Threatened
Loggerhead turtle

Species under U.S. Fish and Wildlife Service (USFWS) Jurisdiction:

Endangered
Bermuda Petrel
Roseate Tern***

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

** In the U.S. distinct population segment

*** North American populations Federally listed under the ESA: endangered on Atlantic coast south to NC / threatened elsewhere.

ESA-Listed Species Descriptions

Birds

Bermuda petrel
During the summer, Bermuda petrels are occasionally seen in the warm waters of the Gulf Stream off the coasts of North and South Carolina (Alsop, III 2001). Sightings off the Carolinas have been of solitary birds. This pelagic species ranges widely on the open ocean, however, is considered rare and only occurring in low numbers off the Atlantic coast. Bermuda petrels forage primarily on cephalopods and small fish taken from the water's surface and are not known to follow boats (Alsop, III 2001). Predominant threats are habitat loss, predation and contaminants.

Roseate tern
Roseate terns are known to wander widely along the Atlantic coast during the summer but occur mainly off the northeast and in parts of the Florida Keys (data from USFWS). They are considered to be uncommon to rare in other areas of the SE Atlantic coast (Alsop, III 2001). Roseate terns are plunge divers and feed primarily on small schooling fish. Their numbers declined due, in large part, to hunting for the plume trade. Today, primary threats include losing territory on their island colonies to Herring gulls, human disturbance and predation by domesticated and feral cats on nesting grounds.

Whales

Sperm Whale
Sperm whales are listed as endangered under the Endangered Species Act of 1973, as amended. They are also protected under the Marine Mammal Protection Act of 1972, as amended. The primary reason for this species' decline was commercial whaling. The International Whaling Commission (IWC) prohibited commercial hunting of sperm whales in 1981 (Reeves and Whitehead 1997).

For management purposes, the IWC recognizes four stocks of sperm whales: the North Pacific, The North Atlantic, the Northern Indian Ocean and Southern Hemisphere. However, to date, the worldwide stock structure of sperm whales remains unclear (Dufault et al. 1999). In the western North Atlantic, sperm whales range from Greenland to the Gulf of Mexico and the Caribbean. Their occurrence in the waters of the U.S. Atlantic EEZ appears to be seasonal. Based on sightings data, during the winter concentrations of sperm whales are found east and northeast of Cape Hatteras. In the spring, this concentration shifts northward to east of Delaware and Virginia as well as throughout the central portion of the mid-Atlantic Bight and southern portion of Georges Bank. Their distribution is similar during the summer except sperm whales are also sighted east and north of Georges Bank as well as on the continental shelf south of New England. During the fall, sperm whales continue to be abundant on the continental shelf south of New England and are found along the edge of the continental shelf in the mid-

Atlantic Bight (see CeTAP 1982; Scott and Sadove 1997). Sperm whales typically prefer deep-water habitats, however, they are periodically found in coastal waters (Scott and Sadove 1997). Their occurrence closer to shore is usually associated with the presence of food. Sperm whales prey primarily on large sized squid but also occasionally take octopus and a variety of fish including shark and skate (Leatherwood and Reeves 1983).

Sperm whales were hunted in America from the 17th century through the early 20th century though specific numbers of animals taken are unknown (Townsend 1935). The IWC has estimated nearly a quarter-million sperm whales were killed worldwide from commercial whaling during the 19th century alone and another 700,000 taken from the early 1900's through the early 1980's (NMFS 2001). Since the IWC ban on commercial harvesting of sperm whales, human-induced mortality or injury does not appear to be a significant factor impacting the recovery of the species (Perry et al. 1999). Due to their more offshore distribution and benthic feeding habits, sperm whales seem less subject to entanglement in fishing gear than some cetacean species. Documented interactions have primarily involved offshore fisheries such as pelagic drift gillnets and longline fisheries. (On January 27, 1999, NMFS issued a Final Rule to prohibit the use of driftnets in the North Atlantic swordfish fishery, 65 FR 4055). Overall, the fishery-related mortality or serious injury for the western North Atlantic stock is considered to be less than 10% of the Potential Biological Removal level (PBR). PBR is a calculation required under the MMPA which estimates the number of animals that can be removed annually from the population or stock (in addition to natural mortality) while allowing that stock to remain at an optimum sustainable population level (OSP). The estimated PBR for the western North Atlantic sperm whale is 7.0 (Waring et al. 2002). Other impacts known to kill or injury sperm whales include ship strikes and ingestion of foreign material (i.e., fishing line, plastics).

The best available abundance estimate for sperm whales comes from a combination of two 1998 USA Atlantic surveys giving a combined estimates of 4,702 (CV=0.36), where the estimate from the northern USA Atlantic is 2,848 (CV=0.49) and from the southern USA Atlantic 1,854 (CV=0.53) (Waring et al. 2002). Together, these two surveys are considered to offer the most complete coverage of the species' habitat though the estimates were not corrected for dive-time (average dive-time for sperm whales = 45 minutes) and therefore may represent an underestimate of actual abundance. Currently, the population trend for this species is undeterminable due to insufficient data. The status of the North Atlantic stock relative to OSP in the Atlantic EEZ is unknown.

Blue Whale

Blue whales are listed as endangered under the Endangered Species Act of 1973, as amended. They are also protected under the Marine Mammal Protection Act of 1972, as amended. Modern whaling severely depleted the world's stocks of blue whales decreasing their population to only a small fraction of what it was thought to be in the early 20th century. Blue whales were given complete protection in the North Atlantic in 1955 under the International Convention for the Regulation of Whaling though Iceland did not recognize their protected status until 1960 (Sigurjónsson 1988).

Blue whales are the largest of the baleen whales, which instead of teeth, use a series of plates rooted in the upper jaw (made of material similar to that of finger-nails) to strain food from the water. As with most baleen whales, it is thought that blue whales undertake seasonal north/south movements, with summers spent in higher latitudes feeding and winters in lower latitudes, possibly breeding or calving. In the western North Atlantic, blue whales range from the Arctic to the mid-latitudes with only occasional sightings observed in the U.S. Atlantic EEZ during the late summer (CeTAP 1982; Wenzel et al. 1988). Records also exist of this species occurring off Florida and in the Gulf of Mexico though their distribution in southern waters remains largely unknown (Yochem and Leatherwood 1985). It has generally been accepted that the North Atlantic consists of two stocks of blue whales (western and eastern), however, stock structure has not been examined through molecular or other appropriate analyses. The U.S. Navy has acoustically tracked blue whales in much of the North Atlantic including subtropical waters north of the West Indies and in deep-water east of the U.S. EEZ (Clark 1995). Evidence from acoustic work has suggested that individual blue whales may range over the entire ocean basin leading some to speculate that they form a single population that breeds at random (NMFS 1998). The few population estimates that currently exist for blue whales in the western North Atlantic tend to be specific to particular areas (see NMFS 1998). Mitchell (1974) estimated the entire western North Atlantic population to number in the low hundreds during the late 1960's and 1970's. It's thought that since their protection from commercial hunting, some populations of blue whales have shown signs of recovery while others have not been monitored to the extent of being able to determine their status. Currently, there are insufficient data to determine population trends for blue whales.

Though commercial whaling has had a severe effect on the status of blue whales worldwide, the western North Atlantic population has not been subjected to legal hunting since the 1960's. Today, potential threats are more likely to occur from collisions with vessels, entanglement in fishing gear and habitat degradation in the forms of both noise and chemical pollution. Currently, there are no confirmed records of mortalities or serious injuries from fishery interactions occurring in the U.S. Atlantic EEZ. It is unclear as to whether blue whales are just less prone to becoming entangled or if their large size allows them to break through nets or carry gear away with them. If the latter is the case, there may be undiscovered mortalities resulting from gear-related injuries. The total level of human-caused mortality and serious injury is unknown but believed to be insignificant (Waring et al. 2002). Due to lack of data on current minimum population size, no PBR estimate can be calculated for the western North Atlantic stock of blue whales. A recovery plan for blue whales was published in 1998 and is in effect (NMFS 1998).

Fin whale

Fin whales are listed as endangered under the Endangered Species Act of 1973, as amended. They are also protected under the Marine Mammal Protection Act of 1972, as amended. Modern whaling depleted most stocks of fin whales. Commercial hunting in the North Atlantic ended in 1987 though Greenland still conducts an "aboriginal subsistence" hunt allowed under the IWC.

The overall distribution pattern of fin whales is complex. Fin whales are known to occur from the Gulf of Mexico northward to the arctic pack ice (NMFS 1998a). They appear to display a less obvious north/south pattern of migration exhibited by other baleen whales. Based on acoustic studies, a general southward "flow pattern" from the Labrador/Newfoundland region south past Bermuda and into the West Indies occurs in the fall (Clark 1995). They are common in the waters of the U.S. Atlantic EEZ primarily from Cape Hatteras northward (Waring et al. 2002). Regional distribution of fin whales is most likely influenced by prey availability with krill and small schooling fish such as capelin, *Mallotus villosus*, herring, *Clupea harengus*, and sand lance, *Ammodytes* spp., believed to be their main prey items (NMFS 1998a).

For management purposes, NOAA Fisheries (National Marine Fisheries Service) recognizes only a single stock of fin whales in the U.S. waters of the western North Atlantic, though genetic data support the idea of several subpopulations (see Bérubé et al. 1998). A survey conducted in 1999 from Georges Bank northward to the Gulf of St. Lawrence, led to an estimate of 2,814 (CV=0.21) individuals for the western North Atlantic population. This however, is considered a conservative estimate due to the extensive range of the fin whale throughout the entire North Atlantic and the uncertainties regarding population structure and exchange between surveyed and non-surveyed areas. To date, there is insufficient information in order to determine population trends.

Aside from the threat of illegal whaling or increased legal whaling, potential threats affecting fin whales include collisions with vessels, entanglement in fishing gear and habitat degradation from chemical and noise pollution. Fin whales are known to have been killed or seriously injured by inshore fishing gear (gillnets and lobster lines) off eastern Canada and the United States (NMFS 1998a). The status of the western North Atlantic stock relative to OSP in the U.S. Atlantic EEZ is unknown. The total level of human-caused mortality or serious injury is also unknown, but is considered to be less than 10% of the calculated PBR (4.7) and thus not significant (Waring et al. 2002). A draft recovery plan for fin whales is available but the plan has not yet been finalized (NMFS 1998a).

<u>Sei whale</u>

Sei whales are listed as endangered under the Endangered Species Act of 1973, as amended. They are also protected under the Marine Mammal Protection Act of 1972, as amended. Sei whales began to be regularly hunted by modern whalers after the populations of larger, more easily taken species (i.e., humpbacks, right whales and gray whales, *Eschrichtius robustus*) had declined. Most stocks of sei whales were also reduced, in some cases drastically, by whaling efforts throughout the 1950's into the early 1970's. International protection for the sei whale began in the 1970's though populations in the North Atlantic continued to be harvested by Iceland until 1986 when the IWC's moratorium on commercial hunting in the Northern Hemisphere came into effect.

The sei whale is one of the least well studied of the "great whales". Hence little is known about the distribution and current status for most stocks. They are believed to undertake seasonal north/south movements, with summers spent in higher latitudes feeding and winters in lower latitudes. In the western North Atlantic, it is thought that a large segment of the population is centered in northerly waters, perhaps the Scotian Shelf during the summer feeding season (Mitchell and Chapman 1977). Their southern range during the spring and summer includes the northern areas of the U.S. Atlantic EEZ (i.e., Gulf of Maine and Georges Bank). Strandings along the northern Gulf of Mexico and in the Greater Antilles, indicate those areas to be the southernmost range for this population (Mead 1977). The sei whale is generally found in deeper waters though they are known for periodic excursions into more shallow and inshore waters when food is abundant (Payne et al. 1990). Their primary food are calanoid copepods and euphausiids (NMFS 1998a).

Sei whales are not known to be common anywhere in U. S. Atlantic waters (NMFS 1998a). Stock identification in the western North Atlantic remains unclear however, there is some evidence of two stocks consisting of a Nova Scotia stock and a Labrador Sea stock (Mitchell and Chapman 1977). The Nova Scotia stock is thought to extend along the U. S. coast to at least North Carolina. The total number of sei whales in the U. S. Atlantic EEZ is not known and there are no recent abundance estimates.

Since the cessation of commercial whaling, threats to sei whales in the western North Atlantic appear to be few although do include ship collisions and entanglement in fishing gear. Because of their offshore distribution and overall scarcity in U. S. Atlantic waters, reports of entrapments and entanglements tend to be low. It is unknown whether sei whales are less prone to interact with fishing gear or if they break through or carry the gear away with them causing mortalities that go largely unrecorded. There were no reported fishery-related mortalities or serious injuries observed by NMFS during 1994-1998 (Waring et al. 2002). The total level of human-caused impacts on sei whales is unknown but due to the rarity of mortality reports it is thought to be insignificant (Waring et al. 2002). The status of the Nova Scotia stock relative to OSP in the Atlantic EEZ is unknown. PBR for this stock is also unknown since there is no minimum estimate of population size, however, any fishery-related mortality would be unlawful as there is no recovery plan currently in place (NMFS 1998a).

<u>Humpback whale</u>

Humpback whales are listed as endangered under the Endangered Species Act of 1973, as amended. They are also protected under the Marine Mammal Protection Act of 1972, as amended. Because of their nature to aggregate near coasts on both summer and winter grounds, humpbacks were relatively easy prey for shore-based whalers. As a result, their populations were severely depleted by the time they achieved protection from commercial hunting in 1966.

Humpback whales utilize the western North Atlantic as a feeding ground during the spring and summer. Their range encompasses the eastern coast of the United States (including the Gulf of Maine), the Gulf of St. Lawrence, Newfoundland/Labrador and western Greenland (Katona and Beard 1990). Other North Atlantic feeding grounds are found off Iceland and northern Norway (Christensen et al. 1992; Palsbøll et al. 1997). It is believed that that these six regions represent relatively discrete subpopulations which are matrilineally determined (Waring et al. 2002). During the fall, most humpback whales will migrate to calving and breeding areas found in lower latitudes (Clapham et al. 1993; Katona and Beard 1990). A number of animals, however, are observed remaining in mid- and high-latitude regions during the winter (Swingle et al. 1993). Based on sighting and stranding information, it appears that young humpbacks in particular have increased in occurrence along the coasts of Virginia and North Carolina during the winter (Wiley et al. 1995). Wiley et al. (1995), concluded that areas off the Virginia and North Carolina coast are important habitat for juvenile humpback whales and that anthropogenic factors may negatively impact whales in this area. There have also been increased wintertime sightings off the coastal waters further to the southeast (Waring et al. 2002).

It is presently unknown whether these increased sightings are due to a distributional change, or represent an increase in sighting effort and/or whale abundance. In order to determine the population identity of humpbacks over-wintering in the southeast and mid-Atlantic areas, a study by Barco et al. (2001) compared photographs of 40 living and dead whales observed in the southeastern and mid-Atlantic region to cataloged photographs collected from other areas of the North Atlantic. Matches linked individuals to the Gulf of Maine, Newfoundland and the Gulf of St. Lawrence feeding areas.

Photographic mark-recapture analyses from the Years of the North Atlantic Humpback (YONAH) project conducted in 1992/1993, gave an ocean-basin-wide estimate of 11,570 individuals (CV=0.069), which to date is regarded as the best available estimate for the North Atlantic (Waring et al. 2002). However, because the YONAH sampling was not spatially representative in the feeding grounds, this estimate is considered negatively biased. It appears that the humpback whale population is increasing though it is unclear whether this increase is ocean-wide or confined to specific feeding grounds.

Humpback whales are described as opportunistic feeders, foraging on a variety of food items including euphausiids and small schooling fish such as herring, sand lance and mackerel (Paquet et al. 1997; Payne et al. 1990). In the mid-latitudes during the winter, juvenile humpbacks are also known to eat bay anchovies and menhaden, *Brevoortia tyrannus* (Wiley et al. 1995).

Although habitat degradation, such as chemical and noise pollution, may be adversely affecting the recovery of humpbacks, the major threats appear to be vessel collisions and entanglements with fishing gear (see Waring et al. 2002 for synopsis of mortality/injury). Wiley et al. (1995) examining stranding data obtained principally from the mid-Atlantic, found that in the 20 cases where evidence of human impact was discernable, 30% had major injuries possibly caused by a vessel collision and 25% had injuries consistent with entanglement in fishing gear.

There are insufficient data to reliably establish population trends for humpback whales in the North Atlantic, overall. The total level of human-caused mortality or serious injury for the Gulf of Maine (formerly the western North Atlantic stock) stock is not less than 10% of the calculated PBR (1.3) and therefore cannot be considered to be insignificant

(Waring et al. 2002). The high mortality of humpbacks off the Mid-Atlantic States (52 mortalities recorded between 1990 and 2000) is of concern as some of these animals are known to be from the Gulf of Maine population. A recovery plan was published in 1991 and is in effect (NMFS 1991).

Northern right whale

Northern right whales are listed as endangered under the Endangered Species Act of 1973, as amended. They are also protected under the Marine Mammal Protection Act of 1972, as amended. Over-hunting is the major reason the western North Atlantic right whale population has declined to less than 300 individuals. Currently, the North Atlantic right whale is considered one of the most critically endangered populations of large whales in the world (Clapham et al. 1999). The species was continually hunted off the east coast of the United States for three centuries possibly reducing its numbers to less than 100 individuals by the time international protection from the League of Nations came into effect in 1935 (see Waring et al. 2001). Right whales have been protected from commercial whaling under legislation of the IWC since 1949 (NMFS 1991a).

Western North Atlantic right whales occur in the waters off New England and northward to the Bay of Fundy and the Scotian Shelf during the summer (Waring et al. 2002). During the winter, a segment of the population, consisting mainly of pregnant females, migrates southward to calving grounds off the coastal waters of the southeastern United States. Right whales use mid-Atlantic waters as a migratory pathway between their summer feeding grounds and winter calving grounds. During the winters of 1999/2000 and 2000/2001, considerable numbers of right whales were recorded in the Charleston, South Carolina area (NMFS 2001). Currently, it remains unclear whether this is typical or reflects a northern expansion of the normal winter range.

Based on photo-identification techniques, the western North Atlantic population size was estimated to be 291 individuals in 1998 (Kraus et al. 2001). This estimate may be low if animals were not photographed and identified or if animals were incorrectly presumed dead due to not being seen for an extended period of time. The population growth rate estimated for the western North Atlantic population during the late 1980's through early 1990's suggested that the stock was slowly recovering (Knowlton et al. 1994). However, a review by the IWC of work conducted on the status and trends of the right whale population indicated that the survival rate of the northern right whale had declined during the 1990's (Waring et al. 2002). One factor currently under review for this decline is the apparent increase in the calving interval. The mean calving interval pre-1992 was estimated at 3.67 years. An updated analysis considering data through the 1997/98 season indicated that the mean calving interval had increased to more than 5 years (Kraus et al. 2001). Reasons under consideration for this shift include contaminants, biotoxins, nutrition/food limitation, disease and inbreeding problems.

The primary sources of human-caused mortality and injury of right whales include ship strikes and entanglement in fishing gear. Hamilton et al. (1998) estimated that 61.6% of right whales show injuries consistent with entanglement in gear while 6.4% exhibited signs of injury from vessel strikes. A subsequent study by Knowlton et al. (2001)

reported that the frequency of right whale entanglements has been on an upward trend. The current estimate of the right whale population having been entangled is now 72%. With the small population size and low annual reproductive rate, human-caused mortalities have a greater impact on this species relative to other species. As such, due to the overall decline in the western North Atlantic right whale population, the PBR is set at zero (Waring et al. 2002).

Programs to foster both awareness and mitigate potential problems of anthropogenic injury and mortality to right whales have been implemented in both the northeast and southeast areas. One such program is the Mandatory Ship Reporting System requiring vessels over 300 tons to report information on their location, speed and direction once in a critical habitat. In return they receive information on right whale occurrence and recommendations on measures to avoid collisions with whales. A recovery plan was published in 1991 by NMFS and is in effect (NMFS 1991a). A revised plan is currently under review.

Three right whale critical habitats were designated by NMFS (59 FR 28793; June 3, 1994). Two are off New England, Cape Cod/Massachusetts Bay and Great South Channel. The third is off the southeastern coast of the United States [between 31°15' N. latitude (approximately the mouth of the Altamaha River, Georgia) and 30°15' N. latitude (approximately Jacksonville Beach, Florida) extending from the coast out to 15 nautical miles offshore and the coastal waters between 30°15' N. latitude and 28°00' N. (approximately Sebastain Inlet, Florida) from the coast out to 5 miles].

Turtles

<u>Loggerhead Sea Turtle</u>

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

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

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

Mating takes place in late March-early June, and eggs are laid throughout the summer, with a mean clutch size of 100-126 eggs in the southeastern United States. Individual females nest multiple times during a nesting season, with a mean of 4.1 nests/individual (Murphy and Hopkins 1984). Nesting migrations for an individual female loggerhead are usually on an interval of 2-3 years, but can vary from 1-7 years (Dodd 1988). Generally, loggerhead sea turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years or more. Stranding records indicate that when pelagic immature loggerheads reach 16-24 inches (40-60 cm) straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U. S. Atlantic and Gulf of Mexico, although some loggerheads may move back and forth between the pelagic and benthic environment (Witzell 2002). Benthic immature loggerheads (sea turtles that have come back to inshore and nearshore waters), the life stage following the pelagic immature stage, have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in Northeastern Mexico. Tagging studies have shown that loggerheads that have entered the benthic environment undertake routine migrations along the coast that are limited by seasonal water temperatures. Loggerhead sea turtles occur year round in offshore waters off of North Carolina where water temperature is influenced by the Gulf Stream. As coastal water temperatures warm in the spring, loggerheads begin to immigrate to North Carolina inshore waters (e.g., Pamlico and Core Sounds) and also move up the coast (Epperly et al. 1995c; Epperly et al. 1995a; Epperly et al. 1995b), occurring in Virginia foraging areas as early as April and on the most northern foraging grounds in the Gulf of Maine in June. The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by mid-September but some may remain in Mid-Atlantic and Northeast areas until late Fall. By December loggerheads have emigrated from inshore North Carolina waters and coastal waters to waters offshore of North Carolina, particularly off of Cape Hatteras, and waters further south where the influence of the Gulf Stream provides temperatures favorable to sea turtles (Epperly et al. 1995c; Epperly et al. 1995a; Epperly et al. 1995b).

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

A number of stock assessments (TEWG 1998; TEWG 2000; NMFS SEFSC 2001) have examined the stock status of loggerheads in the waters of the United States, but have been unable to develop any reliable estimates of absolute population size. Based on nesting data of the five western Atlantic subpopulations, the south Florida-nesting and the northern-nesting subpopulations are the most abundant (TEWG 2000; NMFS SEFSC 2001). Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually with a mean of 73,751 (TEWG 2000). On average, 90.7% of these nests were from the south Florida subpopulation and 8.5% were from the northern subpopulation (TEWG 2000). The Turtle Expert Working Group's (TEWG) (2000) assessment of the status of these two better-studied populations concluded that the south Florida subpopulation is increasing, while no trend is evident (maybe stable but possibly declining) for the northern subpopulation. However, more recent analysis, including nesting data through 2003, indicate that there is no discernable trend in the south Florida nesting subpopulation (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide and Index Nesting Beach Survey Programs). Another consideration adding to the importance and vulnerability of the northern subpopulation is that NOAA Fisheries' scientists estimate that the northern subpopulation produces 65% males (NMFS SEFSC 2001). Since nesting loggerhead sea turtles exhibit nest fidelity, the continued existence of the northern subpopulation is related to the number of female hatchlings that are produced. Producing fewer females will in turn limit the number of subsequent offspring produced by the subpopulation.

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

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

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

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

Green Sea Turtle

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

Green sea turtle mating occurs in the waters off the nesting beaches. Each female deposits 1-7 clutches (usually 2-3) during the breeding season at 12-14 day intervals.

Mean clutch size is highly variable among populations, but averages 110-115 eggs/nest. Females usually have 2-4 or more years between breeding seasons, while males may mate every year (Balazs 1983). After hatching, green sea turtles go through a post-hatchling pelagic stage where they are associated with drift lines of algae and other debris.

Green turtle foraging areas in the southeastern United States include any coastal shallow waters having macroalgae or sea grasses near mainland coastlines, islands, reefs, or shelves, and any open ocean surface waters, especially where advection from wind and currents concentrates pelagic organisms (Hirth 1997; NMFS and USFWS 1991a). Principal benthic foraging areas in the southeastern United States include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Doughty 1984; Hildebrand 1982; Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957; Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon System, Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward counties (Wershoven and Wershoven 1992; Guseman and Ehrhart 1992). Adults of both sexes are presumed to migrate between nesting and foraging habitats along corridors adjacent to coastlines and reefs. Age at sexual maturity is estimated to be between 20-50 years (Balazs 1982; Frazer and Ehrhart 1985).

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

The vast majority of green turtle nesting within the southeastern United States occurs in Florida (Meylan et al. 1995; Johnson and Ehrhart 1994). It is unclear how much green turtle nesting in the whole of Florida has been reduced from historical levels (Dodd 1981). However, based on 1989-2002 nesting information, green turtle nesting in Florida has been increasing (Florida Marine Research Institute Statewide Nesting 2002, Database). Total nest counts and trends at index beach sites during the past decade suggest that green turtles that nest within the southeastern United States are increasing.

There are no reliable estimates of the number of immature green turtles that inhabit coastal areas (where they come to forage) off the southeastern United States. However, information on incidental captures of immature green turtles at the St. Lucie Power Plant (average of 215 green turtle captures per year since 1977) in St. Lucie County, Florida (on the Atlantic coast) indicates that the annual number of immature green turtles captured has increase significantly in the past 26 years (FPL 2002). It is not known whether this increase is indicative of local or Florida east coast populations.

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

The principal cause of past declines and extirpations of green turtle assemblages has been the over-exploitation of green turtles for food and other products. Although intentional take of green turtles and their eggs is not extensive within the southeastern United States, green turtles that nest and forage in the region may spend large portions of their life history outside the region and outside United States jurisdiction, where exploitation is still a threat. However, there are still significant and ongoing threats to green turtles from human-related causes in the United States. These threats include beach armoring, erosion control, artificial lighting, beach disturbance (e.g., driving on the beach), pollution, foraging habitat loss as a result of direct destruction by dredging, siltation, boat damage, other human activities and fishing gear. There is also the increasing threat from occurrences of green turtle fibropapillomatosis disease. Presently, this disease is cosmopolitan and has been found to affect large numbers of animals in some areas, including Hawaii and Florida (Herbst 1994; Jacobson 1990; Jacobson et al. 1991).

<u>Kemp's Ridley Sea Turtle</u>

The Kemp's ridley was listed as endangered on December 2, 1970. Internationally, the Kemp's ridley is considered the most endangered sea turtle (Zwinenberg 1977; Groombridge 1982; TEWG 2000). Kemp's ridleys nest primarily at Rancho Nuevo, a stretch of beach in Mexico, Tamaulipas State. The species occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Occasional individuals reach European waters (Brongersma 1972). Adults of this species are usually confined to the Gulf of Mexico, although adult-sized individuals sometimes are found on the east coast of the United States.

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

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

Witzell 1997). The Turtle Expert Working Group (TEWG)(1998) estimates age at maturity from 7-15 years.

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

Of the seven extant species of sea turtles in the world, the Kemp's ridley has declined to the lowest population level. When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the mid-1980's nesting numbers were below 1,000 (with a low of 702 nests in 1985). However, recent observations of increased nesting (with 6,277 nests recorded in 2000) suggest that the decline in the Kemp's ridley population has stopped and the population is now increasing (USFWS 2000).

A period of steady increase in benthic immature Kemp's ridleys has been occurring since 1990 and appears to be due to increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990. The increased survivorship of immature turtles is due in part to the introduction of turtle excluder devices (TEDs) in the United States and Mexican shrimping fleets. As demonstrated by nesting increases at the main nesting sites in Mexico adult Kemp's ridley numbers have grown. The population model used by TEWG (2000) projected that Kemp's ridleys could reach the intermediate recovery goal, identified in the Recovery Plan, of 10,000 nesters by the year 2015.

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

<u>Leatherback Sea Turtle</u>

The leatherback sea turtle was listed as endangered throughout its global range on June 2, 1970. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian oceans; the Caribbean Sea; and the Gulf of Mexico (Ernst and Barbour 1972). Leatherback sea turtles are the largest living turtles and range farther than any other sea turtle species; their large size and tolerance of relatively low temperatures allows them to occur in northern waters such as off Labrador and in the Barents Sea (NMFS and USFWS 1995). Adult leatherbacks forage in temperate and subpolar regions from 71°N to 47°S latitude in all oceans and undergo extensive migrations between 90°N and 20°S, to and from the tropical nesting beaches. In 1980, the leatherback population was estimated at approximately 115,000 (adult females) globally (Pritchard 1982). By 1995, this global population of adult females had declined to 34,500 (Spotila et al. 1996).

In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (NMFS SEFSC 2001). Genetic analyses of leatherbacks to date indicate that within the Atlantic basin there are genetically different nesting populations; the St. Croix nesting population (U.S. Virgin Islands), the mainland nesting Caribbean population (Florida, Costa Rica, Suriname/French Guiana) and the Trinidad nesting population (Dutton et al. 1999). When the hatchlings leave the nesting beaches, they move offshore but eventually utilize both coastal and pelagic waters. Very little is known about the pelagic habits of the hatchlings and juveniles, and they have not been documented to be associated with the sargassum areas as are other species. Leatherbacks are deep divers, with recorded dives to depths in excess of 3281 feet (1,000 m) (Eckert et al. 1989).

Leatherbacks are a long-lived species, living for over 30 years. They reach sexually maturity somewhat faster than other sea turtles, with an estimated range from 3-6 years (Rhodin 1985) to 13-14 years (Zug and Parham 1996). 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). However, a significant portion (up to approximately 30%) of the eggs can be infertile. Thus, the actual proportion of eggs that can result in hatchlings is less than this seasonal estimate. The eggs will incubate for 55-75 days before hatching. Based on a review of all sightings of leatherback sea turtles of <57 inches (<145 cm) curved carapace length (ccl), Eckert (1999) found that leatherback juveniles remain in waters warmer than 78.8° F (26° C) until they exceed 40 inches (100 cm) ccl.

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

Evidence from tag returns and strandings in the western Atlantic suggests that adult leatherback sea turtles engage in routine migrations between boreal, temperate and tropical waters (NMFS and USFWS 1992). A 1979 aerial survey of the outer Continental Shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia showed leatherbacks to be present throughout the area with the most numerous sightings made from the Gulf of Maine south to Long Island. Leatherbacks were sighted in water depths ranging from 3.28-13,620 feet (1-4151 m) but 84.4% of sightings were in waters less than 180 m (Shoop and Kenney 1992). Leatherbacks were sighted in waters of a similar sea surface temperature as compared to loggerheads; from 44.6-80.9° F (7-27.2° C) (Shoop and Kenney 1992). However, this species appears to have a greater tolerance for colder waters since more leatherbacks were found at the lower temperature range as compared to loggerheads (Shoop and Kenney 1992). This aerial survey estimated the leatherback population for the northeastern U.S. at approximately 300-600 animals (from near Nova Scotia, Canada to Cape Hatteras, North Carolina).

The status of the Atlantic leatherback population is less clear than for the Pacific population. In 1996, the entire western Atlantic population was reported to be stable at best (Spotila et al. 1996), with numbers of nesting females reported to be on the order of 18,800, but subsequent analysis by Spotila (pers. comm.) indicated that by 2000, the western Atlantic nesting population had decreased to about 15,000 nesting females. According to NMFS SEFSC (2001) the nesting aggregation in French Guiana has been declining at about 15% per year since 1987. However, from 1979-1986, the number of nests was reported as increasing at about 15% annually which could mean that the current 15% decline could be part of a nesting cycle which coincides with the erosion cycle of Guiana beaches described by Schultz (1975). In recent years, the number of leatherback nests in Suriname have shown a large increase (more than 10,000 nests per year since 1999 and a peak of 30,000 nests in 2001) with the long-term trend for the Suriname and French Guiana population showing an apparent increase overall (Girondot 2002). The number of nests in Florida and the U.S. Caribbean has been increasing at about 10.3% and 7.5%, respectively, per year since the early 1980's but the magnitude of nesting is much smaller than that along the French Guiana coast (NMFS SEFSC 2001). 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 they are down. Tag return data emphasize the global nature of the leatherback and the link between these South American nesters and animals found in U.S. waters. For example, a nesting female tagged May 29, 1990, in French Guiana was later recovered and released alive from the York River, Virgina. Another nester tagged in French Guiana on June 21, 1990, was later found dead in Palm Beach, Florida (STSSN database).

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

Of the Atlantic turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear. This susceptibility may be the result of their body type (large size, long pectoral flippers, and lack of a hard shell), and their 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 longline fisheries. They are also susceptible to entanglement in gillnets (used in various fisheries) and capture in trawl gear (e.g., shrimp trawls).

Leatherbacks are exposed to pelagic longline fisheries in many areas of their range. Unlike loggerhead turtle interactions with longline gear, leatherback turtles do not ingest longline bait. Instead, leatherbacks are foul hooked by longline gear (e.g., on the flipper or shoulder area) rather than mouth or throat hooked. According to observer records, an estimated 6,363 leatherback sea turtles were caught by the U.S. Atlantic tuna and swordfish longline fisheries between 1992-1999, of which 88 were released dead (NMFS SEFSC 2001). Since the U.S. fleet accounts for only 5-8% of the hooks fished in the Atlantic Ocean, adding up the under-represented observed takes of the other 23 countries actively fishing in the area would likely result in annual take estimates of thousands of leatherbacks over different life stages. Lewison et al. (2004) estimated that, basin-wide, 30,000-60,000 leatherback sea turtles were caught in Atlantic pelagic longline fisheries in the year 2000 alone.

Leatherbacks are also susceptible to entanglement in the lines associated with trap/pot gear used in several fisheries. From 1990-2000, 92 entangled leatherbacks were reported from New York through Maine (Dwyer et al. 2002). Additional leatherbacks that stranded were wrapped in line of unknown origin or with evidence of a past entanglement (Dwyer et al. 2002). Fixed gear fisheries in the Mid-Atlantic have also contributed to leatherback entanglements. In North Carolina, two leatherback sea turtles were reported entangled in a crab pot buoy inside Hatteras Inlet (D. Fletcher, pers. comm. to S. Epperly). A third leatherback was reported entangled in a crab pot buoy in Pamlico Sound off of Ocracoke. This turtle was disentangled and released alive, however, lacerations on the front flippers from the lines were evident (D. Fletcher, pers. comm. to S. Epperly). In the Southeast, leatherbacks are vulnerable to entanglement in Florida's lobster pot and stone crab fisheries as documented on stranding forms. In the U.S. Virgin Islands, where one of five leatherback strandings from 1982 to 1997 were due to entanglement (Boulon 2000), leatherbacks have been observed with their flippers wrapped in the line of West Indian fish traps (R. Boulon, pers. comm. to J. Braun-McNeill). Since many entanglements of this typically pelagic species likely go unnoticed, entanglements in fishing gear may be much higher.

Leatherback interactions with the southeast shrimp fishery, which operates predominately from North Carolina through southeast Florida (NOAA Fisheries 2002), have also been a common occurrence. Leatherbacks are likely to encounter shrimp trawls working in the coastal waters off the Atlantic coast (from Cape Canaveral, Florida to the Virginia/North Carolina border) as they make their annual spring migration north. For many years the TEDs required in the southeast shrimp fishery were less effective for leatherbacks as compared to the smaller, hard-shelled turtle species. To address this problem, on February 21, 2003, NOAA Fisheries issued a final rule to amend the TED regulations (68 FR 8456). Modifications to the design of TEDs are now required in order to exclude leatherbacks and large and sexually mature loggerhead and green turtles. Other trawl fisheries are also known to interact with leatherback sea turtles. In October 2001, a Northeast Fisheries Center Observer documented the take of a leatherback in a bottom otter trawl fishing for *Loligo* squid off of Delaware. TEDs are not required in this fishery.

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

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

Leatherback sea turtles may be more susceptible to marine debris ingestion than other species due to their pelagic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding areas and migratory routes (Lutcavage et al. 1997; Shoop and Kenney 1992). Investigations of the stomach contents of leatherback sea turtles revealed that a substantial percentage (44% of the 16 cases examined) contained plastic (Mrosovsky 1981). Along the coast of Peru, intestinal contents of 19 of 140 (13%) leatherback carcasses were found to contain plastic bags and film (Fritts 1982). The presence of plastic debris in the digestive tract suggests that leatherbacks might not be able to distinguish between prey items and plastic debris (Mrosovsky 1981). Balazs (1985) speculated that the object may resemble a food item by its shape, color, size or even movement as it drifts about, and induce a feeding response in leatherbacks.

It is important to note that, like marine debris, fishing gear interactions and poaching are problems for leatherbacks throughout their range. Entanglements are common in Canadian waters where Goff and Lien (1988) reported that 14 of 20 leatherbacks encountered off the coast of Newfoundland/Labrador were entangled in fishing gear including salmon net, herring net, gillnet, trawl line and crab pot line. Leatherbacks are reported taken by the many other nations, including Taipei, Brazil, Trinidad, Morocco, Cyprus, Venezuela, Korea, Mexico, Cuba, U.K., Bermuda, People's Republic of China, Grenada, Canada, Belize, France, and Ireland that participate in Atlantic pelagic longline fisheries (see NMFS SEFSC 2001, for a complete description of take records). Leatherbacks are known to drown in fish nets set in coastal waters of Sao Tome, West Africa (Castroviejo et al. 1994; Graff 1995). Gillnets are one of the suspected causes for the decline in the leatherback sea turtle population in French Guiana (Chevalier et al. 1999), and gillnets targeting green and hawksbill turtles in the waters of coastal Nicaragua also incidentally catch leatherback turtles (Lagueux et al. 1998). Observers on shrimp trawlers operating in the northeastern region of Venezuela documented the capture of six leatherbacks from 13,600 trawls (Marcano and Alio 2000). An estimated 1,000 mature female leatherback sea turtles are caught annually in fishing nets off of Trinidad and Tobago with mortality estimated to be between 50-95% (Eckert and Lien 1999). However, many of the turtles do not die as a result of drowning, but rather because the fishermen butcher them in order to get them out of their nets (NMFS SEFSC 2001).

Hawksbill Sea Turtle

The hawksbill turtle was listed as endangered on June 2, 1970. The hawksbill is a medium-sized sea turtle with adults in the Caribbean ranging in size from approximately 25-37 inches (62.5 to 94 cm) straight carapace length. The species occurs in all ocean basins although it is relatively rare in the Eastern Atlantic and Eastern Pacific, and absent from the Mediterranean Sea. Hawksbills are the most tropical of the marine turtles, ranging from approximately 30° N to 30° S. They are closely associated with coral reefs and other hard-bottom habitats, but they are also found in other habitats including inlets, bays and coastal lagoons (NMFS and USFWS 1993).

There are five regional nesting populations with more than 1,000 females nesting annually. These populations are in the Seychelles, Mexico, Indonesia, and two in Australia (Meylan and Donnelly 1999). Reproductive females undertake periodic (usually non-annual) migrations to their natal beach to nest. Movements of reproductive males are less well known, but are presumed to involve migrations to the nesting beach or to courtship stations along the migratory corridor (Meylan 1999). Females nest an average of 3-5 times per season (Meylan and Donnelly 1999; Richardson et al. 1999). The average clutch size of hawksbill sea turtles is higher (up to 250 eggs) than other turtle species (Hirth 1980). Reproductive females may exhibit a high degree of fidelity to their nest sites.

The life history of hawksbill turtles consists of a pelagic stage lasting from hatchlings until they are approximately 9-10 inches (22-25 cm) in straight carapace length (Meylan 1988; Meylan and Donnelly 1999), followed by residency in developmental habitats (foraging areas where immature turtles reside and grow) in coastal waters. Adult foraging habitat, which may or may not overlap with developmental habitat, is typically coral reefs, although other hard-bottom communities and occasionally mangrove-fringed bays may be occupied. Hawksbill turtles show fidelity to their foraging areas over periods of time as great as several years (van Dam and Diez 1998).

Their diet is highly specialized and consists primarily of sponges (Meylan 1988) although other food items, notably corallimorphs and zooanthids, have been documented to be important in some areas of the Caribbean (van Dam and Diez 1997; Mayor et al. 1998; Leon and Diez 2000).

There has been a global population decline of over 80% during the last three generations (105 years) (Meylan and Donnelly 1999).

In the Western Atlantic, the largest hawksbill nesting population occurs in the Yucatán Península of Mexico, where several thousand nests are recorded annually in the states of Campeche, Yucatán, and Quintana Roo (Garduño-Andrade et al. 1999). Important but significantly smaller nesting aggregations are documented elsewhere in the region in Puerto Rico, the U.S. Virgin Islands, Antigua, Barbados, Costa Rica, Cuba, and Jamaica (Meylan 1999a). Estimates of the annual number of nests for each of these areas are of the order of hundreds to a few thousand. Nesting within the southeastern U.S. and U.S. Caribbean is restricted to Puerto Rico (>650 nests/yr), the U.S. Virgin Islands (~400 nests/yr), and, rarely, Florida (0-4 nests/yr)(Eckert 1995; Meylan 1999a; Florida Statewide Nesting Beach Survey database 2002). At the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out, populations appear to be increasing (Mona Island, Puerto Rico) or stable (Buck Island Reef National Monument, St. Croix, USVI) (Meylan 1999a).

Fish

Smalltooth sawfish

The smalltooth sawfish, *Pristis pectinata*, was listed as endangered, April 2003 (68 FR 15674). Its historic range in the western Atlantic extended from New Jersey to Brazil, including the Gulf of Mexico and Caribbean islands. Available information indicates that some large [>13 ft (>4 m)] mature smalltooth sawfish historically migrated northward along the Atlantic coast in late spring, occupying the coastal waters of Georgia, South Carolina, North Carolina and Virginia (Adams and Wilson 1995) and, occasionally, reaching as far north as New Jersey (Bigelow and Schroeder 1953). Recently, there have been no records of sawfish north of Florida in summer months and it is unknown if any animals currently undertake this migration. However, if conservation efforts are successful and the population rebuilds, it is possible that this migration may become important for mature animals.

In 1999, Mote Marine Laboratory (MML) began a research project assessing the distribution, abundance, movement, habitat use, and population biology of the smalltooth sawfish. MML data indicate that smalltooth sawfish occur over a range of temperatures but appear to prefer water temperatures greater than 64.4 °F (18°C). Data suggest that sawfish may utilize warm water sources such as thermal outflows from power stations as thermal refuges during colder months to enhance their survival or are trapped by surrounding cold water from which they would normally migrate. Significant use of these areas by sawfish may disrupt their normal migratory patterns.

Data from the MML research project show that the majority of smalltooth sawfish are observed in waters less than 23 ft (7 m) deep and that almost half of the fish are observed in waters less than 3.28 ft (1 m) deep (Simpfendorfer 2001). This is consistent with literature for North American waters indicating that smalltooth sawfish occur in waters less than 32.8 ft (10 m) deep (e.g., Boschung 1979; Adams and Wilson 1995). However, the MML data also show that smalltooth sawfish occur in deeper water with records of fish being captured in over 230 ft (70 m) of water depth. An examination of the relationship between the depth at which sawfish occur and their estimated size indicates that larger animals are more likely to be found in deeper waters. Since large animals are also observed in very shallow waters, it is believed that smaller (younger) animals are restricted to shallow waters, while large animals roam over a much larger depth range (Simpfendorfer 2001).

The feeding habitats of smalltooth sawfish have been poorly studied. They are known to forage off the bottom using their saw to dig up small crustaceans (mostly shrimp and crabs) (Simpfendorfer 2001). They also appear to use the bottom for pushing fish off their saw after impaling them (Breder 1952). Norman and Fraser (1937) suggested that the saw was mostly used to slash through schooling fish. However, Breder (1952) demonstrated that sawfish are capable of using their saw to strike at individual fish. Mullet are considered to be the most common prey of sawfish in southwestern Florida, as well as jacks and ladyfish. In addition to fish, small smalltooth sawfish also consume crustaceans (mostly shrimp and crabs) that they locate by digging up the bottom with their saw (Simpfendorfer 2001).

Information on the habitat needs for this species is almost non-existent in the literature. Areas off the eastern coast of Florida that MML has identified as important for smalltooth sawfish include:

St. Johns River (north east Florida)
This area was described as an important nursery area for sawfish around the turn of the century, with small animals occurring in lower salinity areas on the river around Jacksonville. This area has been identified because of its historic importance.

Indian River (east central Florida)
This area was historically important to smalltooth sawfish with a large resident population present in the late 1800's. Although Snelson and Williams (1981) suggested that sawfish were extirpated from this area, there continue to be occasional sightings reported. This area was identified because this area may again become important if the sawfish population recovers.

Everglades, Florida Bay, Biscayne Bay and Florida Keys (southern Florida)
This area represents the center of abundance for smalltooth sawfish in US waters and contains vast areas of suitable habitat, including shallow waters, mangroves, river mouths, low salinity areas, channels through shallow banks, and abundant prey. This area is essential to the long-term survival of sawfish. The presence of the Everglades National Park, the Biscayne Bay National Park, and the Florida Keys National Marine Sanctuary provides a good framework for the protection of sawfish.

Bycatch in fisheries has played a principal role in the decline of smalltooth sawfish. Historical records indicate that smalltooth sawfish were often caught as bycatch in various fishing gears, including gillnet, otter trawl, trammel net, seine, and, to a lesser degree, hand line (NMFS 2000). Sawfish in general are extremely vulnerable to incidental capture in gillnets (Cook and Compagno 1994; Compagno and Cook 1995). Their long, toothed saw make it difficult to avoid entanglement in virtually all kinds of large mesh gillnet gear. The saw easily pierces though net causing the animal to become entangled. An entangled fish being cut free often causes extensive damage to nets and presents a substantial hazard if brought on board. For these reasons, most smalltooth sawfish caught by fishermen, historically, were either killed outright or released only after removal of their saw (Adams and Wilson, 1995).

Once abundant on the east coast of the United States, a thorough review of available scientific data, anecdotal fishery observations, limited landings per unit effort, publications and museum records indicate that smalltooth sawfish have declined dramatically in U.S. waters over the last century (NMFS 2000). Though it is unclear as to the number of smalltooth sawfish remaining in U. S. waters today, it is thought that the population has declined by at least as much as 95% since 1900 (MML). The decline in abundance has been attributed primarily to bycatch in various fisheries and to habitat destruction. These together with the smalltooth's slow growth, late maturation and low fecundity, reduce the recovery potential for this species.

(link to Reference.doc for ESA-listed species descriptions)

Candidate Species and Species of Concern

Candidates are any species being considered by the Secretary (of Commerce or Interior) for listing as endangered or threatened but not yet subject to a proposed rule. NOAA Fisheries has also established a Species of Concern (SOC) list so as to maintain an available list identifying species that, although not actively being considered for listing, are of biological concern. Species occurring in the U.S. Southeast Atlantic on the SOC list include:

Dusky shark	Mangrove rivulus	Speckled hind
Sand Tiger Shark	Opposum pipefish	Warsaw grouper
Night Tiger	Key silverside	Nassau grouper
Atlantic sturgeon	Goliath grouper	Atlantic White Marlin

There is no mandatory federal protection for a species of concern under the ESA though voluntary protection of these species is urged. Efforts to promote the conservation of such species, if effective, may alleviate or eliminate existing threats thus perhaps avoiding a future need for listing.

ESA-Related Links

NOAA Fisheries Endangered Species Program:
http://www.nmfs.noaa.gov/prot_res/overview/es.html

U.S. Fish and Wildlife Service Endangered Species Program:
http://endangered.fws.gov/

Recovery Plans:
Species under NOAA Fisheries jurisdiction:
http://www.nmfs.noaa.gov/prot_res/PR3/recovery.html

Species under USFWS:
http://endangered.fws.gov/recovery/Index.html#plans

MARINE MAMMAL PROTECTION ACT (link to MMPA.pdf)

The Marine Mammal Protection Act (MMPA), enacted in 1972, established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas. The 1994 reauthorization of the MMPA introduced substantial changes to the provisions of the MMPA of 1972. One of the more notable changes involved the development of a long-term strategy for governing interactions between marine mammals and commercial fishing operations. Among other things, the new strategy established a registration and incidental take monitoring program for certain commercial fisheries; a marine mammal incidental injury and mortality self-reporting requirement for all fisheries; and the development of take reduction plans for strategic stocks, which when implemented, reduce incidental take in commercial fisheries to below the potential biological removal (PBR) level within 6 months and to insignificant levels approaching zero (commonly referred to as ZMRG) within 5 years.

Take Reduction Teams

Take reduction teams are established to recommend methods of reducing the incidental mortality and serious injury of marine mammals due to commercial fishing operations. Teams are composed of fishermen, scientists, conservationists, and state and federal fishery managers. Currently, the South Atlantic Council participates on two take reduction teams to address marine mammal interactions with fisheries within the South Atlantic Council's area of jurisdiction: the Atlantic Large Whale Take Reduction Team and the Mid-Atlantic Bottlenose Dolphin Take Reduction Team. Fishery management efforts should coordinate with conservation and take reduction efforts outlined in take reduction plans.

Atlantic Large Whale Take Reduction Team

The Atlantic Large Whale Take Reduction Team (ALWTRT) was established in 1996 to reduce injuries and deaths of large whales due to accidental entanglement in fishing gear. A final plan was published in February, 1999 and was intended to be an evolving plan that would change as whale researchers learn more about the status of whale stocks and gain a clearer understanding of how and where entanglements occur. The Atlantic Large Whale Take Reduction Plan (ALWTRP) focuses on the endangered northern right whale, *Eubalaena glacialis*, but also is intended to reduce entanglements of humpback, *Megaptera noveangliae*, and finback, *Balaenoptera physalus*, whales both of which are also listed as endangered. Fisheries currently regulated under the ALWTRP are northeast/mid-Atlantic American lobster trap/pot, northeast sink gillnet, mid-Atlantic coastal gillnet and South Atlantic gillnet. The ALWTRP includes restrictions on where and how gear can be set; ongoing research into whale populations, whale behavior and fishing gear; outreach to inform fishermen of the entanglement problem and to incorporate their help in solving the entanglement problem; and a program to disentangle entrapped whales.

Despite efforts of the plan to reduce large whale entanglements, however, annual mortalities attributed to fishery interactions are still higher than what is allowed under the MMPA. Consequently, NOAA Fisheries has recently reconvened the ALWTRT to review elements of the plan and discuss changes that may reverse this trend. Changes to the plan include the addition of certain pot/trap fisheries not currently regulated under the plan such as the SAFMC's black sea bass pot fishery.

(link to right whale_info.doc and humpback whale_info.doc) – info on fin whale to be added.

<u>Bottlenose Dolphin Take Reduction Team</u>
The Bottlenose Dolphin Take Reduction Team (BDTRT) was established in 2001 to address the incidental mortality or serious injury of western North Atlantic coastal bottlenose dolphins (*Tursiops truncatus*) incidentally taken in the course of commercial fishing operations. In April 2003, the BDTRT submitted a report to NOAA Fisheries with consensus recommendations to reduce the take of bottlenose dolphins incidental to commercial fisheries. The Team's consensus recommendations for a Take Reduction Plan for the western North Atlantic coastal bottlenose dolphin include regulatory recommendations, based on management units, that apply to specific fisheries and generally seek to reduce soak times, the amount of gear in the water at any given time, or to modify practices in order to limit interactions with and take of bottlenose dolphins. The Team also adopted non-regulatory recommendations for all management units including education and outreach, as well as improved research, monitoring, stranding data, and observer coverage. Due to differences in gear characteristics from the net fisheries, the Team developed a separate set of recommendations for the blue crab pot/trap fishery. NOAA Fisheries is currently in the process of developing a regulatory package based on the Team's recommendations and public comments.

Affected Fisheries: North Carolina Inshore Gillnet; Southeast Atlantic Gillnet Southeastern U.S.; Atlantic Shark Gillnet; U.S. Mid-Atlantic Coastal Gillnet; Atlantic Blue Crab Trap/Pot; Mid-Atlantic Haul/Beach Seine; North Carolina Long Haul Seine; North Carolina Roe Mullet Stop Net; Virginia Pound Net

(link to bottlenose dolphin_info.doc)

MMPA-RELATED LINKS

NOAA Fisheries Marine Mammal Program:
http://www.nmfs.noaa.gov/prot_res/overview/mm.html

Atlantic Large Whale Take Reduction Plan:
http://www.nero.noaa.gov/whaletrp/

Bottlenose Dolphin Take Reduction Plan:
http://www.nmfs.noaa.gov/prot_res/PR2/Health_and_Stranding_Response_Program/bdtp.htm

MIGRATORY BIRD TREATY ACT (link to seabird.pdf)

Seabirds are frequent companions to commercial marine fishing vessels as they will feed on fish that escape trawl nets, seines and other fishing gear. Many are also known to target baited hooks of hook-and-line fishing gear. In the process of feeding, seabirds can become entangled or hooked on gear and be incidentally killed. The probability of incidental catches of seabirds is a function of many interrelated factors including: the type of fishing operation and gear used, the length of time that fishing gear is at or near the surface of the water, the behavior of the bird (specific feeding/foraging techniques), water and weather conditions, and the time of year and location in which the fishery takes place. The occurrence and density of seabirds in an area can vary greatly depending on breeding activity, migration patterns and foraging needs.

Seabirds, and other migratory birds, are protected under the Migratory Bird Treaty Act (MBTA) of 1918. The MBTA prohibits taking any migratory bird except as permitted by regulations issued by the Department of the Interior. However, conservation law to protect seabirds with regard to fisheries has been lacking until recently. To address on-going concerns with seabird and fisheries interactions, NOAA Fisheries recently initiated an Interagency Seabird Working Group (ISWG). The group includes representatives from NOAA Fisheries, the U.S. Fish and Wildlife Service, regional Councils including the South Atlantic Fishery Management Council and coastal states. This new initiative looks to find practicable and effective solutions for reducing or eliminating seabird/fishery interactions.

Another recent initiative, Executive Order 13186, signed January 2001, requires every Federal agency that takes action(s) likely to have a measurable negative impact on migratory birds to enter into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service, which is the lead federal agency for managing and conserving seabirds. The MOU is to outline how an agency will promote the conservation of migratory birds. Other obligations under E.O. 13186 include supporting various conservation planning efforts already underway (e.g., Partners in Flight initiative and the North American Waterfowl Management Plan) and incorporating bird conservation considerations into agency planning. The latter includes considering impacts on migratory birds while conducting National Environmental Policy Act (NEPA) analyses and reporting annually on the level of take that is occurring. NOAA Fisheries is currently drafting an MOU with the U.S. Fish and Wildlife Service.

As part of NOAA Fisheries regional implementation of national seabird directives, the South Atlantic Council has participated in ISWG meetings and has contributed to the progress/status report on seabird bycatch assessments in longline fisheries in the form of providing detailed descriptions of longline fisheries currently managed by the South Atlantic Council.

(link to SEUS priority bird list.doc)

Migratory/Seabird-Related Links

US Fish and Wildlife Division of Migratory Bird Management:
http://migratorybirds.fws.gov/

NOAA Fisheries Seabird Incidental Take Reduction Program:
http://www.fakr.noaa.gov/protectedresources/seabirds.html