ATTACHMENT B

List of Threatened, Endangered, and Other Protected Species Inhabiting the

Scallop Management Unit

Excerpted from Amendment 10 and updated by Section 4.3

Protected Species

The following is a complete list of species that are protected either by the Endangered Species Act of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), or the Migratory Bird Act of 1918, and may be found in the environment utilized by the scallop fishery under the existing FMP and proposed Amendment 10.

<u>Cetaceans</u>

Northern 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 macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella* spp.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected

<u>Sea Turtles</u>

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

<u>Fish</u>

Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Barndoor Skate (*Dipturis laevis)*	Candidate Species

<u>Birds</u>

Roseate tern (*Sterna dougallii dougallii*)	Endangered
Piping plover (*Charadrius melodus*)	Endangered

<u>Critical Habitat Designations</u>

Right whale	Cape Cod Bay Great South Channel

Protected Species Not Likely Affected by this FMP

Upon review of the current information available on the distribution and habitat needs of the endangered, threatened, and otherwise protected species listed above in relation to the action being considered in the existing Scallop FMP and proposed Amendment 10, it can be stated that scallop fishing operations, as managed by the existing FMP and proposed Amendment 10, are not expected to affect the bulk of the species listed above, thus restricting the protected species impact assessment to the endangered green and Kemp's Ridley, and the threatened loggerhead sea turtles.

The following descriptions of the protected species not likely to be affected by the Scallop FMP, and the rationale for that determination are provided below.

Marine Mammals

There are several cetaceans protected under the Marine Mammal Protection Act of 1972 (MMPA) that are found within the management unit of the Scallop FMP (Northeast Region waters), namely the minke whale, Risso's dolphin, pilot whale, Atlantic white-sided dolphin, common dolphin, spotted and striped dolphins, and the coastal form of Atlantic bottlenose dolphin. These species are common along the continental shelf from the Gulf of Maine to Cape Hatteras, and generally forage for small schooling fish species, zooplankton, or squid that are found either near the surface or in the mid-water levels.

Although these species may occasionally become entangled or otherwise entrapped in bottom tending fixed gear or in mid-water trawls, it is unlikely that the bottom-tending dredge and trawl gear used by the scallop fishery will affect these species.

Shortnose Sturgeon

The shortnose sturgeon is a benthic fish that mainly occupies the deep channel sections of several Atlantic coast rivers. They can be found in most major river systems from the St. Johns River, Florida to the Saint John River in New Brunswick, Canada. There have been no documented cases of shortnose sturgeon taken in dredge gear used to catch scallops.

The scallop fishery in the Northeast Region does not extend to shallow water, or into the intertidal zone of major river systems where shortnose sturgeon are likely to be found. Therefore, there appears to be adequate separation between the two species making it highly unlikely that the scallop fisheries will affect shortnose sturgeon.

Atlantic Salmon

The wild populations of Atlantic salmon found in rivers and streams from the lower Kennebec River north to the U.S.-Canada border are considered to be endangered. These rivers include the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook. Atlantic salmon are an anadromous species with spawning and juvenile rearing occurring in freshwater rivers followed by migration to the marine environment. Juvenile salmon in New England rivers typically migrate to sea in

May after a two to three year period of development in freshwater streams, and remain at sea for two winters before returning to their U.S. natal rivers to spawn from mid October through early November. While at sea, salmon generally undergo an extensive northward migration to waters off Canada and Greenland. Data from past commercial harvest indicate that post-smolts overwinter in the southern Labrador Sea and in the Bay of Fundy. The numbers of wild Atlantic salmon that return to these rivers are perilously small, with total run sizes of approximately 150 spawners occurring in 1999 (Baum 2000).

Capture of Atlantic salmon in U.S. commercial fisheries or by research/survey vessels have occurred. However, none have been documented after 1992. No scallop landings have been recorded for the areas adjacent to the Atlantic salmon rivers. In addition, the NMFS fishery research surveys have rarely found scallop in the nearshore regions of the Atlantic salmon rivers. Therefore, it is unlikely that operation of the scallop fisheries occurs in or near the rivers where concentrations of Atlantic salmon are most likely to be found. Furthermore, bottom-tending gear used in the scallop fishery is not likely to encounter salmon in the open water environment, making it is highly unlikely that the fisheries occurring under the existing Scallop FMP and proposed Amendment 10 will affect the endangered runs of Atlantic salmon in the Gulf of Maine.

Barndoor Skate

Barndoor skate are considered a candidate species under the ESA as a result of two petitions to list the species as endangered or threatened that were received in March and April 1999. In June 1999, the agency declared the petitioned actions to be warranted and requested additional information on whether or not to list the species under the ESA. At the 30th Stock Assessment Workshop (SAW 30) held in November 1999, the Stock Assessment Research Committee (SARC) reviewed the status of the barndoor skate stock relative to the five listing criteria of the ESA. The SARC provided their report to the NMFS in the SAW 30 document (NEFSC 2000). As of the date of this document, NMFS has not published a decision on the petitioned action.

The barndoor skate occurs from Newfoundland, the Gulf of St. Lawrence, off Nova Scotia, the Gulf of Maine, and the northern sections of the Mid-Atlantic Bight down to North Carolina. It is one of the largest skates in the Northwest Atlantic and is presumed to be a long-lived, slow growing species. They inhabit mud and sand/gravel bottoms along the continental shelf, generally at depths greater than 150 meters. They are believed to feed on benthic invertebrates and fishes (Bigelow and Schroeder 1953).

The abundance of barndoor skate declined continuously through the 1960's. Since 1990, their abundance has increased slightly on Georges Bank, the western Scotian shelf, and in Southern New England, although the current NEFSC autumn survey biomass index is less than 5% of the peak observed in 1963. The species was identified as an overfished species at the SAW 30 (NEFSC 2000). Skates are sensitive to overutilization generally because of their limited reproductive capacity due to the characteristic of many larger fish species in the northeast that are relatively slow growing, long-lived, and late maturing.

The barndoor skate is often caught as a bycatch species in scallop dredge fishing operations, although they represent less than 1% of the skate landed in the Northeast. Restoration of the overfished skate species is major goal of the proposed Skate FMP, and a complete prohibition on possession of barndoor skate is one of the options being considered. Pending selection of measures to be implemented under the proposed Skate FMP to protect and restore the overfished barndoor stock, the relative low levels of barndoor skate landed by vessels participating in the existing scallop fishery, make it unlikely that this species will be further depleted by the proposed actions contained in Amendment 10.

Roseate Tern and Piping Plover

The roseate tern and piping plover inhabit coastal waters and nest on coastal beaches within the Northeast Region. The terns prey on small schooling fishes, and the plovers prey on shoreline invertebrates and other small fauna. Foraging activity for these species occurs either along the shoreline (plovers) or within the top several meters of the water column (terns). Bottom-tending dredge and trawl gear used in the scallop fishery pose no threat to these species or their forage species.

Leatherback Sea Turtle

Leatherback turtles are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour 1972). The leatherback sea turtle is the largest living turtle and ranges farther than any other sea turtle species, exhibiting broad thermal tolerances that allow it to forage into the colder Northeast Region waters (NMFS and USFWS 1995). In the U.S., leatherback turtles are found throughout the western North Atlantic during the warmer months along the continental shelf, and near the Gulf Stream edge. 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 (CeTAP 1982). Shoop and Kenney (1992) also observed concentrations of leatherbacks during the summer off the south shore of Long Island and New Jersey. Leatherbacks in these waters are thought to be following their preferred jellyfish prey.

Leatherbacks are predominantly a pelagic species and feed on jellyfish and other soft-body prey, and are susceptible to entanglement in lobster and crab pot gear. However, the pelagic mid-water nature of their prey species make it unlikely that they will be affected by the mobile dredge and trawl gear used in the scallop fishery.

Hawksbill Sea Turtle

The hawksbill turtle is relatively uncommon in the waters of the Northeast Region. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America where they feed primarily on a wide variety of sponges and mollusks. There are accounts of small hawksbills stranded as far north as Cape Cod, Massachusetts. However, many of these strandings were observed after hurricanes or offshore storms. No takes of hawksbill sea turtles have been recorded in northeast or mid-Atlantic fisheries where observers have been deployed in the scallop dredge and trawl fisheries.

Hawksbills may occur in the southern range of the scallop management unit (i.e., North Carolina and South Carolina), but their distribution is not known to overlap with those waters fished by vessels that may catch scallop. Therefore, it is unlikely that interactions between hawksbill sea turtles and scallop vessels will occur.

Minke Whale

Minke whales have a cosmopolitan distribution in polar, temperate, and tropical waters. The species is common and widely distributed along the U.S. continental shelf. They show a certain seasonal distribution with spring and summer peak numbers, falling off in the fall to very low winter numbers. Like all baleen whales, the minke whale generally occupies the continental shelf proper, feeding on small schooling fish or zooplankton in the upper or mid-water zones.

Although minke whales may occasionally become entangled or otherwise entrapped in fixed sink gillnet or lobster trap gear, it is unlikely that the mobile dredge and trawl gear used by the scallop fishery will affect these species.

Right Whale

The northern right whale has the highest risk of extinction of all large whales; with the western North Atlantic subpopulation only estimated to number approximately 300 animals. Scarcity of right whales is the result of an 800-year history of whaling that continued into the 1960s (Klumov 1962). By the time the species was internationally protected in 1935 there may have been fewer than 100 North Atlantic right whales in the western North Atlantic (Hain 1975; Reeves et al. 1992; Kenney et al. 1995).

Right whales appear to prefer shallow coastal waters, but their distribution is also strongly correlated to zooplankton prey distribution (Winn et al. 1986). In the western North Atlantic, they are found west of the Gulf Stream and are most commonly associated with cooler waters (<21º C).

NMFS designated three right whale critical habitat areas on June 3, 1994 (59 FR 28793) to help protect important right whale foraging and calving areas within the U.S. These areas are: Cape Cod Bay; the Great South Channel (both off Massachusetts); and the waters adjacent to the southern Georgia and northern Florida coast. In 1993, Canada's Department of Fisheries declared two conservation areas for right whales; one in the Grand Manan Basin in the lower Bay of Fundy, and a second in Roseway Basin between

Browns and Baccaro Banks (Canadian Recovery Plan for the North Atlantic Right Whale 2000).

Right whales feed on zooplankton through the water column, and in shallow waters may feed near the bottom. In the Gulf of Maine they have been observed feeding primarily on copepods, by skimming at or below the water's surface with open mouths (NMFS 1991; Kenney et al. 1986; Murison and Gaskin 1989; and Mayo and Marx 1990). Research suggests that right whales must locate and exploit extremely dense patches of zooplankton to feed efficiently (Waring et al. 2000). New England waters include important foraging habitat for right whales and at least some portion of the right whale population is present in these waters throughout most months of the year. They 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) where they have been observed feeding predominantly on copepods, largely of the genera *Calanus* and *Pseudocalanus* (Waring et al. 2000). Right whales also frequent Stellwagen Bank and Jeffrey's Ledge, as well as Canadian waters including the Bay of Fundy and Browns and Baccaro Banks, in the spring and summer months. Mid-Atlantic waters are used as a migratory pathway from the spring and summer feeding/nursery areas to the winter calving grounds off the coast of Georgia and Florida.

The major known sources of anthropogenic mortality and injury of right whales clearly are ship strikes and entanglement in commercial fishing gear. Right whales are known to become entangled in fixed gear. However, no right whales have ever been observed or reported taken in the mobile dredge and bottom trawl gear used to catch scallops. The apparent preference of right whale prey resources to mid-water or surface zones further make it unlikely that the species will be affected by the scallop fishery.

<u>Humpback Whale</u>

Humpback whales calve and mate in the West Indies and migrate to feeding areas in the northwestern Atlantic during the summer months. Most of the humpbacks that forage in the Gulf of Maine visit Stellwagen Bank and the waters of Massachusetts and Cape Cod Bays. Sightings are most frequent from mid-March through November between 41º N and 43º N, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffreys Ledge (CeTAP 1982), and peak in May and August. However, small numbers of individuals may be present in this area year-round. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by filtering large amounts of water through their baleen to capture prey (Wynne and Schwartz 1999).

Humpback whales use the mid-Atlantic as a migratory pathway. However, observations of juvenile humpbacks since 1989 in the mid-Atlantic have been increasing during the winter months, peaking January through March (Swingle et al. 1993). The whales using this mid-Atlantic area were found to be residents of the Gulf of Maine and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding stocks in the mid-Atlantic region. New information has become available on the status and trends of the humpback whale population in the North Atlantic that indicates the population is increasing (Barlow and Clapham 1997).

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. Humpback whale entanglements in fixed gear are well documented. However, no humpback whales have ever been observed or reported taken in the mobile dredge and bottom trawl gear used to catch scallops. The apparent preference of humpback whale prey resources to mid-water or surface zones make it further unlikely to be affected by the scallop fishery.

Fin Whale

In the North Atlantic today, fin whales are widespread and occur from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic pack ice (NMFS 1998a). Most migrate seasonally from relatively high-latitude Arctic feeding areas in the summer to relatively low-latitude breeding and calving areas in the winter (Perry et al. 1999).

The overall distribution of fin whales may be based on prey availability. This species preys opportunistically on both zooplankton and fish (Watkins et al. 1984). The predominant prey of fin whales varies greatly in different geographical areas depending on what is locally available. In the western North Atlantic fin whales feed on a variety of small schooling fish (i.e., herring, capelin, sand lance) as well as squid and planktonic crustaceans (Wynne and Schwartz 1999). As with humpback whales, fin whales feed by filtering large volumes of water for their prey through their baleen plates. Photo identification studies in western North Atlantic feeding areas, particularly in Massachusetts Bay, have shown a high rate of annual return by fin whales, both within years and between years (Seipt et al. 1990).

As discussed above, fin whales were the focus of commercial whaling, primarily in the 20th century. The IWC did not begin to manage commercial whaling of fin whales in the North Atlantic until 1976, and the species was not given total protection until 1987, with the exception of a subsistence whaling hunt for Greenland. In total, there have been 239 reported kills of fin whales from the North Atlantic from 1988 to 1995.

As was the case for the right and humpback whales, fin whale populations were heavily affected by commercial whaling. The remaining major known sources of anthropogenic mortality and injury of fin whales include ship strikes and entanglement in commercial fishing gear. However, no fin whales have ever been observed or reported taken in the mobile dredge and bottom trawl gear used to catch scallops. The apparent preference of fin whale prey resources to mid-water or surface zones make it further unlikely to be affected by the scallop fishery.

Sei Whale

Sei whales are a widespread species in the world's temperate, subpolar and subtropical and even tropical marine waters, favoring deep water, over the continental slope or in basins situated between banks. In the western North Atlantic, the whales travel along the eastern Canadian coast in autumn on their way to and from the Gulf of Maine and Georges Bank where they occur in winter and spring. Within the Northeast Region, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer. Individuals may range as far south as North Carolina.

Although sei whales may prey upon small schooling fish and squid in the Northeast Region, available information suggests that zooplankton are the primary prey of this species. There are occasional influxes of sei whales 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 there is no evidence of interspecific competition for food resources.

Sei whales became the target of modern commercial whalers primarily in the late 19th and early 20th century after stocks of other whales, including right, humpback, fin and blues, had already been depleted. Few instances of injury or mortality of sei whales due to entanglement or vessel strikes 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. As with the other baleen whales discussed above, the apparent preference of sei whale prey resources to mid-water or surface zones make it unlikely to be affected by gear used in the scallop fishery.

Blue Whale

Like the fin whale, blue whales occur worldwide and are believed to follow a similar migration pattern from northern summering grounds to more southern wintering areas (Perry et al. 1999). Blue whales are only occasional visitors to east coast U.S. waters. They are more commonly found in Canadian waters, particularly the Gulf of St. Lawrence where they are present for most of the year, and in other areas of the North Atlantic. It is assumed that blue whale distribution is governed largely by food requirements (NMFS 1998b). In the Gulf of St. Lawrence, blue whales appear to predominantly feed on several copepod species (NMFS 1998b).

Blue whales were intensively hunted in all of the world's oceans from the turn of the century to the mid-1960's when development of steam-powered vessels and deck-mounted harpoon guns in the late 19th century made it possible to exploit them on an industrial scale (NMFS 1998b). Although entanglements in fishing gear and ship strikes may be the major sources of mortality and injury of blue whales, confirmed deaths or serious injuries are few. As with the other baleen whales discussed above, the apparent preference of blue whale prey resources to mid-water or surface zones make it unlikely to be affected by gear used in the scallop fishery.

Sperm Whale

Sperm whales range from Greenland to the Gulf of Mexico and the Caribbean in the western North Atlantic.

The IWC 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, whaling pressure again focused on smaller rorquals and sperm whales. From 1910 to 1982 there were nearly 700,000 sperm whales killed worldwide from whaling activities (Clarke 1954). Some sperm whales were also taken off the U.S. Mid-Atlantic coast (Reeves and Mitchell 1988; Perry et al. 1999), and in the northern Gulf of Mexico (Perry et al. 1999). Recorded North Atlantic sperm whale catch numbers for Canada and Norway from 1904 to 1972 total 1,995. All killing of sperm whales was banned by the IWC in 1988.

Sperm whales generally occur in waters greater than 180 meters in depth with a preference for continental margins, seamounts, 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 with a migration to higher latitudes during summer months where they are concentrated east and northeast of Cape Hatteras. Distribution extends further northward to areas north of Georges Bank and the Northeast Channel region in summer and then south of New England in fall, back to the mid-Atlantic Bight (Waring et al. 2000).

Few instances of injury or mortality of sperm whales due to human impacts have been recorded in U.S. waters. Because of their generally more offshore distribution and their benthic feeding habits, sperm whales are found at the fringe of the area fished by scallop vessels. In addition, they are unlikely to be affected by mobile gear used in the scallop fishery.

Risso's Dolphin and Pilot Whale

The Risso's dolphin and pilot whale are two odontocetes with similar distribution and feeding patterns. Both species are distributed along the continental shelf edge of North America from Cape Hatteras to Georges Bank. Both species have been observed taken in the pelagic drift gillnet, pelagic longline, and mid-water trawl fisheries, but have never been reported in the dredge gear. Although their feeding habitat overlaps with the distribution of the scallop fishery, their pelagic prey species (squid and schooling fishes) would make it unlikely that they would encounter the bottom tending mobile gear used in the scallop fishery.

Atlantic White-Sided Dolphin

White-sided dolphins are found in the temperate and sub-polar waters of the North Atlantic, primarily on the continental shelf waters out to the 100 meter depth contour. The species is distributed from central western Greenland to North Carolina, with the Gulf of Maine stock commonly found from Hudson Canyon to Georges Bank and into the Gulf of Maine to the Bay of Fundy. White-sided dolphins have been observed taken in the multispecies sink gillnet, the pelagic drift gillnet, and several mid-water and bottom trawl fisheries. Although their feeding habitat overlaps with the distribution of the scallop fishery, their pelagic prey species (squid and schooling fishes) would make it unlikely that they would encounter the bottom tending mobile gear used in the scallop fishery.

Pelagic Delphinids (Common, Spotted, Striped, and Offshore Bottlenose Dolphins)

The pelagic delphinid complex is made up of small odontocete species that are broadly distributed along the continental shelf edge where depths range from 200 - 400 meters. They are commonly found in large schools feeding on schools of fish. The minimum population estimates for each species number in the tens of thousands found on or near the surface. They are known to be taken in pelagic and sink gillnets gear as well as mid-water trawl gear. Their pelagic prey species suggest they do not forage near the bottom, making it unlikely that they would encounter the bottom tending gear used in the scallop fishery.

Coastal Bottlenose Dolphins

The coastal form of the bottlenose dolphin occurs in the shallow, relatively warm waters along the U.S. Atlantic coast from New Jersey to Florida and the Gulf of Mexico. They rarely range beyond the 25 meter depth contour north of Cape Hatteras. They forage on small coastal fish, and rarely are found in the deeper cold water regions where the scallop fishery occurs. Therefore, vessels participating in the scallop fishery are not expected to have an impact on the coastal form of bottlenose dolphin.

Right Whale Critical Habitat

Two right whale critical habitat areas (Great South Channel and Cape Cod Bay) have been designated within the scallop fishery management unit. However, the Great South Channel area is the only one where scallop fishing activity occurs. The potential effects of several fisheries operations on both prey availability and quality and nursery protection in the critical habitat have been evaluated in other FMP's (Multispecies, Lobster, Monkfish, and Spiny Dogfish). The concern has been that the operation of these fisheries could diminish the value of the habitat by altering trophic dynamics that could reduce the availability of right whale prey within the critical habitat areas. However, right whales feed primarily on copepods that live in the mid-water zone, making it highly unlikely that bottom-tending scallop gear will have any adverse effect on these small copepods.

Status of Protected Species Potentially Affected by this FMP

The potential impacts to protected species that may result from the management alternatives and measures being considered under this FMP are described in Section ??? . The section below will focus on the status of the various species listed above that are found in the scallop management unit (Northeast Region) and may be affected by the fishing operations occurring under the existing Scallop FMP and proposed Amendment 10. Additional background information on the range-wide status of these species can be found in a number of published documents, including sea turtle status reviews (NMFS and USFWS 1995, Marine Turtle Working Group - TEWG, 1998, 2000) and biological reports (USFWS 1997), recovery plans for the Kemp's Ridley sea turtle (USFWS and NMFS 1992), Atlantic green sea turtle (NMFS and USFWS 1998a), and loggerhead sea turtle (NMFS and USFWS 1998b); and the 2000 and Draft 2001 Marine Mammal Stock Assessment Reports (Waring et al. 2000, 2001).

Kemp's Ridley Sea Turtle

The Kemp's ridley is the most endangered of the world's sea turtle species. Of the world's seven extant species of sea turtles, the Kemp's ridley has declined to the lowest population level. Kemp's ridleys nest in daytime aggregations known as arribadas, primarily on a stretch of beach in Mexico called Rancho Nuevo. 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 1970s, 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.

Status and Trends of Kemp's Ridley Sea Turtles

The TEWG (1998; 2000) indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Nesting data, estimated number of adults, and percentage of first time nesters have all increased from lows experienced in the 1970's and 1980's. From 1985 to 1999, the number of nests observed at Rancho Nuevo and nearby beaches has increased at a mean rate of 11.3% per year, allowing cautious optimism that the population is on its way to recovery. For example, 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 702 nests in 1985 then increased to produce 1,940 nests in 1995. Estimates of adult abundance followed a similar trend from an estimate of 9,600 in 1966 to 1,050 in 1985 and 3,000 in 1995. 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.

Kemp's ridley nesting occurs from April through July each year. Little is known about mating but it is believed to occur before the nesting season in the vicinity of the nesting beach. Hatchlings emerge after 45-58 days. Once they leave the beach, neonates presumably enter the Gulf of Mexico where they feed on available sargassum and associated infauna or other epipelagic species (USFWS and NMFS 1992). Ogren (1988) suggests that the Gulf coast, from Port Aransas, Texas, through Cedar Key, Florida, represents the primary habitat for subadult ridleys in the northern Gulf of Mexico. However, at least some juveniles will travel northward as water temperatures warm to feed in productive coastal waters off Georgia through New England (USFWS and NMFS 1992).

Juvenile Kemp's ridleys use northeastern 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. 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 (Keinath et al., 1987; Musick and Limpus, 1997). Studies have found that post-pelagic ridleys feed primarily on a variety of species of crabs. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal, 1997).

With the onset of winter and the decline of water temperatures, ridley's migrate to more southerly waters from September to November (Keinath et al., 1987; Musick and Limpus, 1997). Turtles who do not head south soon enough face the risks of cold-stunning in northern waters. Cold stunning can be a significant natural cause of mortality for sea turtles in Cape Cod Bay and Long Island Sound. For example, in the winter of 1999/2000, there was a major cold-stunning event where 218 Kemp's ridleys, 54 loggerheads, and 5 green turtles were found on Cape Cod beaches. The severity of cold stun events depends on: the numbers of turtles utilizing Northeast waters in a given year; oceanographic conditions; and the occurrence of storm events in the late fall. Cold-stunned turtles have also been found on beaches in New York and New Jersey. Cold-stunning events can represent a significant cause of natural mortality, in spite of the fact that many cold-stun turtles can survive if found early enough.

General human impacts and entanglement

Like other turtle species, the severe decline in the Kemp's ridley population appears to have been heavily influenced by a combination of exploitation of eggs and impacts from fishery interactions. From the 1940's through the early 1960's, nests from Ranch Nuevo were heavily exploited (USFWS and NMFS 1992), but beach protection in 1966 helped to curtail this activity (USFWS and NMFS 1992). Currently, anthropogenic impacts to the Kemp's ridley population are similar to those discussed for other sea turtle species. Takes of Kemp's ridley turtles have been recorded by sea sampling coverage in the Northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries.

Kemp's ridleys may also be affected by large-mesh gillnet fisheries. In the spring of 2000, a total of five Kemp's ridley carcasses were recovered from a North Carolina beach where 277 loggerhead carcasses were found. Cause of death for most of the turtles recovered was unknown, but the mass mortality event was suspected to have been from a large-mesh gillnet fishery operating offshore in the preceding weeks. It is possible that strandings of Kemp's ridley turtles in some years have increased at rates higher than the rate of increase in the Kemp's ridley population (TEWG 1998). Recent NMFS observer information has recorded a Kemp's ridley caught in a scallop dredge off New Jersey during the summer of 2001.

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). Most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart

1979). Green turtles were traditionally highly prized for their flesh, fat, eggs, and shell, and directed fisheries in the United States and throughout the Caribbean are largely to blame for the decline of the species. In the Gulf of Mexico, green turtles were once abundant enough in the shallow bays and lagoons to support a commercial fishery. However, declines in the turtle fishery throughout the Gulf of Mexico were evident by 1902 (Doughty 1984).

In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Occasional nesting has been documented along the Gulf coast of Florida, at southwest Florida beaches, as well as the beaches on the Florida panhandle (Meylan et al*.*, 1995). The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring, perhaps due to increased protective legislation throughout the Caribbean (Meylan et al*.*, 1995). 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). 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 and breeding grounds. 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 carnivory 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). Green turtles appear to prefer marine grasses and algae in shallow bays, lagoons and reefs (Rebel 1974) but also consume jellyfish, salps, and sponges.

As is the case for loggerhead and Kemp's ridley sea turtles, green sea turtles use mid-Atlantic and northern areas of the western Atlantic coast as important summer developmental habitat. Green turtles are found in estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds (Musick and Limpus 1997). Like loggerheads and Kemp's ridleys, green sea turtles that use northern waters during the summer must return to warmer waters when water temperatures drop, or face the risk of cold stunning. Cold stunning of green turtles may occur in southern areas as well (*i.e*., Indian River, Florida), as these natural mortality events are dependent on water temperatures and not solely geographical location.

General human impacts and entanglement

Anthropogenic impacts to the green sea turtle population are similar to those discussed for other sea turtles species. 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. 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.

Loggerhead Sea Turtle

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans in a wide range of habitats. These include open ocean, continental shelves, bays, lagoons, and estuaries (NMFS and USFWS 1995). 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 (NMFS and USFWS 1998b). Horseshoe crabs are known to be a favorite prey item in the Chesapeake Bay area (Lutcavage and Musick 1985).

Status and Trends of Loggerhead Sea Turtles

The loggerhead sea turtle was listed as threatened under the ESA on July 28, 1978. The species was considered to be a single population in the North Atlantic at the time of listing. However, further genetic analyses conducted at nesting sites indicate the existence of five distinct subpopulations ranging from North Carolina, south along the Florida east coast and around the keys into the Gulf of Mexico, to nesting sites in the Yucatan peninsula and Dry Tortugas (TEWG 2000 and NMFS SEFSC 2001). Natal homing to those nesting beaches is believed to provide the genetic barrier between these nesting aggregations, preventing recolonization from turtles from other nesting beaches.

The loggerhead sea turtle is the most abundant of the sea turtles listed as threatened or endangered in the U.S. waters. In the western North Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the gulf coast of Florida. The total number of nests along the U.S. Atlantic and Gulf coasts between 1989 and 1998, ranged from 53,014 to 92,182 annually, with a mean of 73,751. Since a female often lays multiple nests in any one season, the average adult female population was estimated to be 44,780 (Murphy and Hopkins 1984).

However, the status of the northern loggerhead subpopulation is of particular concern. Based on the above, there are only an estimated 3,800 nesting females in the northern loggerhead subpopulation, and the status of this northern population based on number of loggerhead nests, has been classified declining or stable (TEWG 2000). Another factor that may add to the vulnerability of the northern subpopulation is that genetics data show that the northern subpopulation produces predominantly males (65%). In contrast, the much larger south Florida subpopulation produces predominantly females (80%) (NMFS SEFSC 2001).

The activity of the loggerhead is limited by temperature. Loggerheads commonly occur throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. Loggerheads may also occur as far north as Nova Scotia when oceanographic and prey conditions are favorable. Surveys conducted offshore as well as sea turtle stranding data collected during November and December off North Carolina suggest that sea turtles emigrating from northern waters in fall and winter months may concentrate in nearshore and southerly areas influenced by warmer Gulf Stream waters (Epperly et al. 1995). This is supported by the collected work of Morreale and Standora (1998) who tracked 12 loggerheads and 3 Kemp's ridleys by satellite. All of the turtles followed similar spatial and temporal corridors, migrating south from Long Island Sound, New York, during October through December. The turtles traveled within a narrow band along the continental shelf and became sedentary for one or two months south of Cape Hatteras.

Loggerhead sea turtles do not usually appear on the most northern summer foraging grounds in the Gulf of Maine until June, but are found in Virginia as early as April. They remain in the mid-Atlantic and Northeast areas until as late as November and December in some cases, but the majority leave the Gulf of Maine by mid-September. Aerial surveys of loggerhead turtles north of Cape Hatteras indicate that they are most common in waters from 22 to 49 meters deep, although they range from the beach to waters beyond the continental shelf (Shoop and Kenney 1992).

All five loggerhead subpopulations are subject to natural phenomena that cause annual fluctuations in the number of young produced. For example, there is a significant overlap between hurricane seasons in the Caribbean Sea and northwest Atlantic Ocean (June to November), and the loggerhead sea turtle nesting season (March to November). Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. 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. 1994). Other sources of natural mortality include cold stunning and biotoxin exposure.

General Human Impacts and Entanglements

The diversity of the sea turtles life history leaves them susceptible to many human impacts, including impacts on land, in the benthic environment, and in the pelagic environment. Anthropogenic factors that impact 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, and an increased presence of native species (e.g., raccoons, armadillos, and opossums) which raid and feed on turtle eggs.

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 before settling into benthic environments. Loggerhead sea turtles are impacted by a completely different set of threats from human activity once they migrate to the ocean. During that period, they are exposed to a series of long-line fisheries that include the U.S. Atlantic tuna and swordfish longline fisheries, 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). Observer records indicate that an estimated 6,544 loggerheads were captured by the U.S. Atlantic tuna and swordfish longline fleet between 1992-1998, of which an estimated 43 were dead (Yeung 1999). For 1998, alone, an estimated 510 loggerheads (225-1250) were captured in the longline fishery. Aguilar et al. (1995) estimated that the Spanish swordfish longline fleet, which is only one of the many fleets operating in the region, captures more than 20,000 juvenile loggerheads annually (killing as many as 10,700).

Once loggerheads enter the benthic environment in waters off the coastal U.S., they 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. 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 gillnet fisheries in the Mid-Atlantic and elsewhere, and in monkfish, spiny dogfish, and northeast sink gillnet fisheries. Recent NMFS observer information has recorded seven loggerhead sea turtles caught in a scallop dredge off New Jersey during the summer of 2001.

In addition to fishery interactions, loggerhead sea turtles also face other man-made threats in the marine environment. These include oil and gas exploration and coastal development, as well as marine pollution, underwater explosions, and hopper dredging. Offshore artificial lighting, power plant entrainment and/or impingement, and entanglement in debris or ingestion of marine debris are also seen as possible threats. Boat collisions and poaching are two direct impacts that affect loggerheads.

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