APPENDIX C

15 September 1995 Biological Opinion

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

SEP 15 1995

Captain J. A. Creech
Commandant (G-Nd)
Chairman, Endangered Species Act
Compliance Team
U.S. Coast Guard
12100 Second Street, S.W.
Washington, DC 20593-0001

Dear Captain Creech:

The National Marine Fisheries Service (NMFS) received on August 3, 1995, your final Endangered Species Act Biological Assessment for the U.S. Atlantic Coast, submitted in accordance with Section 7 of the Endangered Species Act. This Biological Assessment was submitted in support of your request for consultation on the potential impacts of Coast Guard vessel and aircraft operations off the North American Atlantic shoreline.

The enclosed biological opinion concludes that the proposed activities are not likely to jeopardize the continued existence of endangered and threatened species under NMFS jurisdiction. Specific activities covered in the opinion are the continued operation of Coast Guard vessel and aircraft activities in the Atlantic including responses to marine pollution events, port safety and security issues, law enforcement efforts, search and rescue missions, vessel traffic control, and maintenance of aids to navigation. The proposed action would have the Coast Guard continue these operations in a manner and with a degree of caution commensurate with the nature of operations and presence of endangered and threatened species during these operations including measures specifically to mitigate potential impacts on listed species. In addition, the Coast Guard proposes to continue to undertake actions and to initiate new actions to enhance the recovery of endangered species of whales and sea turtles. This biological opinion is based on assessment of impacts that assumes these proposed and ongoing measures will be implemented by the Coast Guard.

Consultation is continuing on the Coast Guard's permitting of marine events in the Southeast Region. Although consultation on this activity was not specifically requested in this consultation, it has been addressed in the Biological Assessment and other correspondence between the Coast Guard, and the NMFS Southeast Regional Office has confirmed the Coast Guards's intent to consult on these activities. A biological opinion on these activities will be completed in the near future.

Further, specific Section 7 consultations should be initiated for all new, or major modifications to existing anchorage administration projects. Information on the timing (season and number of days required) of proposed anchorage projects, and the need for such projects should be submitted with the request for consultation. We also urge you to consider other activities conducted or authorized by the Coast Guard that may affect listed species, and initiate consultation as appropriate. If you have any questions, please contact the NMFS Southeast Regional Office, the NMFS Northeast Regional Office or my office for assistance.

Reinitiation of formal consultation is required if (1) the amount or extent of taking specified in the incidental take statement is exceeded (e.g. an endangered whale is struck or injured by a USCG vessel); (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion (e.g., if the measures outlined in the proposed activity are not implemented or are modified in a manner that results in increased risks to endangered or threatened species); or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

Sincerely,

William W. Fox, Jr., Ph.D.
Director
Office of Protected Resources

Enclosure

Endangered Species Act - Section 7 Consultation

Biological Opinion

Agency:	**United States Coast Guard (Atlantic Coast Districts)**
Activity:	**United States Coast Guard Vessel and Aircraft Activities along the Atlantic Coast**
Consultation Conducted By:	National Marine Fisheries Service Northeast and Southeast Regions
Date Issued:	September 15, 1995

Background

On July 6, 1991, while conducting operations east of Delaware Bay at 38° 21'30" N./73° 06'30" W. (longitude/latitude), the United States Coast Guard (USCG) Cutter CHASE struck a small whale. The Commanding Officer was on the bridge as the ship conducted sea-trials of recent turbine repairs. Seas were calm, winds negligible, and visibility was at least 8 nautical miles (nm). At 6:49 p.m., two adult right whales surfaced not more than 50 yards off the bow. They were moving starboard to port and dove quickly to clear the cutter. Within seconds of this sighting, the ship vibrated and the turbines were immediately declutched. As the ship slowed, a right whale calf, about 15 feet long, rolled out from under the ship to starboard. The animal had numerous large propeller gashes in its sides. After rolling a few times, the calf settled in a rostrum-up position for several minutes and then sank, obviously dead. The Commanding Officer speculated that the calf had been following the two adults below the surface, and attempted to surface beneath the ship's propeller. The commanding officer and crew of CHASE did not see the calf before the impact and did not have time to react.

On January 5, 1993, a USCG Cutter, POINT FRANCIS, collided with a juvenile right whale near Jacksonville, Florida, while transiting at 15 knots from Mayport to Ft. Pierce, Florida, in extremely foggy conditions. The incident occurred at 30° 02'44" N/81° 16'04" W, (about 8 miles north and 3 nm miles offshore of St.

Augustine, Florida). The whale surfaced in front of the vessel which was unable to avoid the collision. The right whale was reported as mortally wounded, but apparently was still alive during the two hours that the vessel remained on station. The animal's carcass was located on January 9, 1993, and was necropsied the following day.

To prevent more fatal interactions such as these, the USCG began drafting a "Marine Mammal and Endangered Species Protection Program". Programs were implemented in the First District (Maine to Toms River, New Jersey) on November 30, 1994, the Fifth District (Toms River, New Jersey through North Carolina) on March 28, 1995, and the Seventh District (South Carolina through Florida) on April 14, 1995.

Also, the USCG First District has been working on a Memorandum of Agreement (MOA) with NMFS since the fall of 1994, after their participation in the first meeting of the New England Implementation Team Meeting for the Right and Humpback Whale Recovery Plans (Implementation Team Meeting) in August 1994. The USCG activities considered in these discussions include many of the high priority recovery plan action items including the coordination of enforcement activities with NMFS (critical habitat areas, whale watch activity), data collection (sightings of dead and live whales, reporting concentrations to shippers, platform for research surveys), education (whale watch industry, general public), and logistical support (disentanglement efforts). This agreement is now in the final stages of review.

There is an existing MOA between the USCG First District, the Stellwagen Bank National Marine Sanctuary Program, and NMFS. This MOA is specific to activities within the boundaries of the sanctuary. A copy is included in the Biological Assessment.

Informal discussions between NMFS and the USCG began in May 1993 when the USCG requested a meeting to review the operation of vessels in the Atlantic and the effect on northern right whales. On July 5, 1994, the USCG officially requested a list of threatened and endangered species that may be affected by operation of USGS vessels off the U.S. North Atlantic coast. Informal consultation continued as the Coast Guard prepared drafts of a biological assessment, and provided them to NMFS for review and comment. NMFS received drafts on December 30, 1994 and March 31, 1995. Additional information was provided on June 22, 1995, and the final biological assessment was received August 3, 1995.

As a result of litigation in Strahan vs. Rear Admiral Linnon, Civ. No 94-11128 DPW, on May 2, 1995, the U.S. District Court for the District of Massachusetts issued an Order directing the Coast Guard to complete an Endangered Species Act section 7 consultation with NMFS. On August 10, 1995, NMFS notified the

Coast Guard that it would issue a biological opinion by September 15.

Proposed Activity

Chapters 5 (Proposed Action and Alternatives to Proposed Action) and 6 (USCG Cooperative Efforts to Protect and Enhance Threatened and Endangered Species) of the Biological Assessment (BA) (Batelle Ocean Sciences, 1995), outline the proposed action subject to this consultation. Specifically, the USCG patrols the Atlantic waters of the United States using about 300 east coast-based vessels and aircraft that it has at its disposal. These patrols are in response to marine pollution events, port safety and security issues, law enforcement efforts, search and rescue missions, vessel traffic control, and maintenance of aids to navigation. Although Coast Guard missions are conducted worldwide, most operations occur in coastal waters less than 20 miles from the U.S. shore.

Under the proposed action, the USCG will conduct its operations in a manner and with a degree of caution commensurate with the nature of operations and presence of endangered and threatened species, including measures specifically designed to mitigate potential impacts of USCG operations on listed species. In addition, the USCG proposes to continue to undertake and initiate new actions necessary to enhance the recovery of endangered species of whales and sea turtles.

This biological opinion is based on assessment of impacts that assumes the current measures will be adhered to and the proposed measures will be implemented by the USCG. These measures include establishing a marine mammal and endangered species program in the First, Fifth, and Seventh Districts; developing MOA's and MOU's with NMFS; developing and providing protected species training for USCG personnel; continuing notices/broadcasts to mariners; participating in the Right Whale Early Warning System (EWS); and implementing the protocol/guidelines recommended by the Right Whale Recovery Implementation Teams. Following are the current guidelines in the protocol for the EWS:

1. In Florida and Georgia, a designated lookout must be posted on USGC vessels at all times between December 1 and March 31 when these vessels are operating in the vicinity of channels and nearshore areas where humpback and right whales occur and in other areas of the southeastern United States that have been designated as critical habitat for right whales. USCG vessel operators must take the following precautions to avoid whales: All USCG vessels within a 15 nm or greater radius of a right whale sighting must operate at the slowest safe speed possible (except when the nature of the mission, such as emergency

response, precludes slow speeds), exercise caution, and keep a watch for right and humpback whales. During evening/night-time hours, or when there is limited visibility due to fog or sea states of greater than Beaufort 3, vessels must operate at the slowest safe speed possible (except as noted above) when transiting between areas if whales have been spotted within 15 nm within the previous 24 hours.

2. Between March 1 and May 30, when right whales are concentrated in the vicinity of right whale critical habitat in the Great South Channel and Cape Cod Bay, a dedicated lookout must be posted on USCG vessels to watch for whales, and the vessel operator must take precautions to avoid whales during all vessel operations. This includes reducing the speed of all vessels transiting these areas during this period in response to all non-emergency operations.

In addition, whenever a whale is sighted, vessel operators must follow the guidelines in the MOA between the First USCG District and NMFS, and the Coast Guard Marine Mammal and Endangered Species Program (LEB 33-94 First District, 05-95 Fifth District, Seventh District Instruction 16214.5).

Vessel Activity: The USCG Atlantic fleet consists of about 242 vessels, ranging from 21 feet to 378 feet in length. Each year the USCG fleet collectively logs over 12,000 vessel-days-at-sea. Table 4-3 in the BA summarizes the USCG's vessel activities (per vessel type) along the U.S. Atlantic Coast. During standard, non-emergency operations in critical habitat, whale concentration areas, and the National Marine Sanctuaries, USCG units are instructed to operate with "caution and [to] be alert for whales, using speeds proportional to the mission to reduce the possibility of whale strikes." Also, written guidelines have been given for vessel operations when a whale is sighted in any location to further reduce contact with the whales. Special instructions also have been given to the Seventh District when operating USCG vessels in the southeastern right whale critical habitat during calving season and for informing all mariners of their presence and vulnerability.

Of the USCG's missions, emergency operations have the greatest potential for impacting whales and turtles on the surface. Emergency missions, such as emergency search and rescue (SAR) operations that involve vessels responding to assist or to save persons and property distressed at sea, are presumed to have the least discretion in determining their operating speeds. In practice, USCG vessels respond to reports of such emergencies at "maximum safe speed." This speed is determined by weighing the response vessel's speed and sea-keeping characteristics against sea and weather conditions — wind, wave height and frequency, visibility, forecasts.

Not all SAR missions are emergency operations. In the large majority of SAR missions, the location of the distressed vessel or person is known (90 percent), and the victim is within 20 miles of the shore (95 percent). About 77 percent of SAR missions are not true emergencies and the vessel would be able to decrease speed and deviate from course to avoid interacting with listed species. Most USCG resources need not respond at "maximum safe speed". Therefore, in most cases, the vessel may reduce speed.

On the Atlantic Coast, the USCG responds to about 18,500 SAR cases each year (Battelle, 1995). The USCG states in the BA that there are no documented collisions of USCG vessels with whales or turtles during SAR missions.

Aircraft Activity: Along the Atlantic Coast, the USCG operates 17 fixed-wing aircraft and 32 helicopters. The fixed-wing aircraft generally operate at an altitude above 500 feet. Infrequently, the aircraft perform reconnaissance flights during oil and hazardous material spill response operations, and will fly below 500 feet. Most of the fixed-wing operations are within 20 miles of the shore.

The helicopters are used frequently in SAR operations. Low-altitude flights and hovers are used to extract victims and to pass rescue supplies. Low-altitude operations can be dangerous and are kept to a minimum. USCG aircraft transit critical habitats at an altitude of at least 3,000 feet.

Other Coast Guard Activities

As described above, this biological opinion specifically considers the potential impacts of the operation of USCG vessels and aircraft on listed species that may be affected by the proposed action. Numerous other Coast Guard Activities are outlined in section 4 of the BA "Description of Activities of U.S. Coast Guard". These other activities, including permitting of marine events, engineering projects, oil spill contingency planning, are not addressed in this biological opinion. Consultation is continuing on the Coast Guard's permitting of marine events in the NMFS SER. Although consultation on this activity was not specifically requested in conjunction with this consultation, it has been addressed in the BA and other correspondence between the Coast Guard, and NMFS' SER has confirmed the Coast Guards' intent to consult on these activities. A biological opinion on marine event permitting will be completed in the near future. The Coast Guard should review all activities that it authorizes, funds or conducts to determine if the activities may affect listed species, and should initiate consultation as appropriate.

Listed Species Likely to be Adversely Affected

Listed species under the jurisdiction of NMFS that occur in the Northwest Atlantic Ocean and may be affected by the proposed activities include:

Endangered

Humpback whale	*Megaptera novaeangliae*
Northern right whale	*Eubalaena glacialis*
Finback whale	*Balaenoptera physalus*
Leatherback sea turtle	*Dermochelys coriacea*
Kemp's ridley sea turtle	*Lepidochelys kempi*
Green sea turtle[1]	*Chelonia mydas*
Hawksbill sea turtle	*Eretmochelys imbricata*

([1]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 these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.)

Threatened

Loggerhead sea turtle	*Caretta caretta*

Critical Habitat Designations

Northern right whale	*Eubalaena glacialis*

The areas designated as critical habitat for the Northern Right Whale include the following:

the Great South Channel includes the area bounded by 41°40'N/69°45'W; 41°00'N/69°05'W; 41°38'N/68°13'W; and 42°10'N/68°31'W.; the area designated as critical habitat in Cape Cod Bay/Massachusetts Bay includes the area bounded by 42°04.8'N/70°10'W; 42°12'N/70°15'W; 42°12'N/70°30'W; 41°46.8'N/70°30'W; and on the south and east by the interior shore line of Cape Cod, Massachusetts; and the area designated as critical habitat in the Southeastern United States includes waters between 31°15'N (approximately located at the mouth of the Altamaha River, Georgia and 30°15'N (approximately Jacksonville, Florida) from the shoreline out to 15 nautical miles offshore, and the waters between 30°15'N and 28°00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles.

Listed and Proposed Species Not Likely to be Adversely Affected

NMFS has determined that due to their capabilities with respect to speed and agility, as well as their offshore distributions, the following species are not likely to be adversely affected by USCG activities:

Blue whale (Balaenoptera musculus),
Sei whale (B. borealis)
Sperm whale (Physeter macrocephalus) and
Gulf of Maine Population of harbor porpoise (Phocoena phocoena)[2].

([2]NMFS has proposed listing Gulf of Maine population of harbor porpoise as threatened under the ESA (58 FR 3108, January 7, 1993). This consultation represents the conference between the USCG and NMFS regarding the impacts of USCG vessel activities on harbor porpoise, as provided by 50 CFR §402.10. If harbor porpoise are listed as threatened, this conference may be adopted as a biological opinion if no new information becomes available and no significant changes are made to USCG operations that would alter the considerations of this conference.)

Biology and Distribution of Listed Species Likely to be Adversely Affected

Sea Turtles:

Precise data regarding the total number of sea turtles in waters of the southeastern U.S. Atlantic are not available. Trends in turtle populations are identified through monitoring of their most accessible life stages on the nesting beaches, where hatchling production and the number of nesting females can be directly measured.

The available data suggest that the loggerhead population in the southeastern Atlantic is not increasing, while green and Kemp's ridley turtle abundance may be rising. Stranding data, generally believed to reflect the nearshore distribution of sea turtles, do not refute this possibility (Figure 5). The use of turtle excluder devices (TEDs) in shrimp trawls is likely responsible for the sharp decrease in strandings after 1990 through a reduction in mortality resulting from incidental capture in shrimp trawls. While TEDs were required seasonally in most areas during much of 1990, compliance was poor until 1991. Since 1991, documented strandings of loggerheads have been steady, while green turtle strandings increased in 1994 and ridleys in 1993 and 1994. Of course, changes in nearshore sources of mortality, environmental factors, as well as other conditions, likely affect the distribution and abundance of sea turtles and turtle mortalities. While these data support cautious optimism regarding population trends of ridleys and greens, the numbers are well below recovery criteria established in the recovery plans.

The ACOE conducted a comprehensive research program, beginning in 1991, to investigate the occurrence of sea turtles in six southeast channels to determine seasonal abundance, as well as spatial distribution within the channel and within the water column. Monthly surveys were conducted in Canaveral, Kings Bay, Brunswick, Savannah, Charleston, and Morehead City channels. The Canaveral surveys supplement surveys conducted by NMFS and the COE since 1978.

Briefly, the surveys revealed the following: In areas where sea turtles occur, moderate to high abundance can be expected when water temperature is greater than or equal to 21°C. Lower abundances were observed when temperatures were less than 16°C. Other researchers have observed sea turtles in waters as low as 8°C, sometimes for extended periods (Morreale, pers. comm.). Loggerheads were the most abundant turtle captured (n = 645), although some Kemp's ridleys (n = 20) and green turtles (n = 5) were also taken. Juveniles of all species were observed, although few loggerheads were encountered in Canaveral. As documented in previous surveys, the Canaveral ship channel supports aggregations of sea turtles during all months of the year and particularly during cooler winter months (Henwood, 1987; Butler et al., 1987; Henwood and Ogren, 1987). North of Canaveral, turtles were seasonally abundant, with lower numbers from December through February. Recaptures of relocated sea turtles suggest some site fidelity, and the effectiveness of relocation efforts appeared to be related to the distance of relocation. Catch per unit effort (CPUE) in the surveyed channels, for all seasons cumulatively, was: Canaveral, 1.43 turtles per hour; Kings Bay, 0.571 turtles per hour; Brunswick Harbor, 0.489 turtles per hour; Charleston Harbor, 0.206 turtles per hour; and Morehead City Harbor, 0.025 turtles per hour.

In offshore waters, turtles have been observed buried in silt covering area reefs after beach renourishment or extreme freshwater runoff. Over 174 sea turtles have been observed on the sea surface during 16 right whale aerial surveys conducted between February 27 and March 19, 1995 along line transects within approximately 10 nm of the coast off of Jacksonville, Florida, suggesting an abundance of sea turtles in the area. These turtles may be vulnerable to human impacts offshore. Channel-specific information on sea turtle distribution has been collected by COE for channels at Morehead City, Charleston, Savannah, Brunswick, Fernandina and Canaveral, and is presented in detail in the COE summary report entitled "Assessment of Sea Turtle Abundance in Six South Atlantic U.S. Channels" (Dickerson et al., 1994) and in the COE's Biological Assessment. New information is included in the species specific discussions below.

Scientists views differ on why young sea turtles end up in northeastern waters, but it is now accepted that these waters provide important developmental habitat for a number of chelonid turtles, including loggerheads (Morreale and Standora, 1994). Loggerhead turtles were the most frequently sighted species of turtle during the CeTAP surveys (1982). The peak average abundance in the study area was 7702 (+/- 1748). Only one sighting was recorded for Cape Cod Bay, most of the sightings were concentrated on the continental shelf and in estuaries from Long Island to the Chesapeake Bay.

Cape Cod stranding records from 1974-1981 show that Kemp's ridley and loggerheads are equally represented. However, since 1980 ridleys have been occurring more often (Prescott, 1982). Of all the sea turtles, the loggerhead is the most temperate and subtropical in its nesting habits, which would make it the best candidate for use of more northerly waters in general.

Crouse et al. (1987) developed a population model of the loggerhead which suggests that the key to recovery of this species is in reducing mortality in later stages of life, particularly large juveniles.

Kemp's ridley sea turtle (Lepidochelys kempi)

Of the seven extant species of sea turtles of the world, the Kemp's ridley is in the greatest danger of extinction. The Recovery Plan for the Kemp's Ridley Sea Turtle (Lepidochelys kempi) (USFWS and NMFS, 1992a) contains a description of the natural history, taxonomy, and distribution of the Kemp's or Atlantic ridley turtle. Although the Kemp's ridley is considered to be the most endangered sea turtle, population estimates are imprecise due to the inaccessibility of the predominantly pelagic occurrence of these animals. Nesting females provide the only accessible contingent of sea turtle populations, and as a result, population trends are monitored through counts of adult females. Atlantic ridleys nest in daytime aggregations known as arribadas, primarily at Rancho Nuevo, a stretch of beach on the Yucatan Peninsula in Mexico. Virtually the entire world population of adult females nest annually 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 most recent estimate of the total population of sexually mature female Kemp's ridleys, based on total number of nests and the average number of nests per female per year, is approximately 490 turtles (Pritchard, 1990; Byles, pers. comm.). The abundance of ridley nests in Rancho Nuevo, Mexico has been increasing since 1987

(Figure 4). Over 1,500 nests were observed during the 1994 nesting season, representing the highest nesting year since monitoring was initiated in 1978. While these data need to be interpreted cautiously due to expanded monitoring efforts since 1990, up to 110,000 hatchlings were released from Rancho Nuevo during 1994, compared to 50,000 to 80,000 over the previous five to six years (Byles, pers. comm.).

Adult Kemp's ridleys are found primarily in the Gulf of Mexico. Hatchlings leave the beach and are not seen again until they reach over 20 cm, when they are found in northern Gulf of Mexico and inshore embayments along the eastern Atlantic seaboard as far north as Cape Cod Bay. These embayments appear to provide important summer foraging habitat for juvenile Kemp's ridleys as well as loggerheads, as they make the transition from a pelagic to a benthic diet (Morreale, pers. comm.).

Nothing is known about the movements of hatchling Kemp's ridley turtles, although it is believed that they may be controlled by current patterns: either the loop current for northward transport or an eddy for southward transport with occasional transportation through the Florida Straits via the Gulf Stream system (Hildebrand, 1982). Juvenile Kemp's ridleys are known to occur in eastern U.S. coastal waters from Florida to Canadian portions of the Gulf of Maine (Lazell, 1980). Pritchard and Marquez (1973) suggest that passive transportation via the Gulf Stream up the eastern coast of the United States may be the usual dispersal pattern of young Kemp's ridley turtles. They speculate that turtles feed and grow rapidly during passive transport, and by the time they reach offshore waters of New England are large enough for active swimming. Morreale et al. (1992), however, hypothesize that passive drifting would result in only sporadic occurrence of ridleys in the northeast United States and that the observed annual occurrence suggests some alternative mechanism. Regardless of the mechanism, ridleys enter northeast coastal embayments when water temperatures approach 20°C (Burke et al., 1989; Musick et al., 1984) and become benthic feeders. Sea turtles leave the northern embayments in the fall, when water temperatures cool (Burke et al., 1991). Morreale et al. (1992) give evidence for directed movements of Kemp's ridleys south, out of northeast coastal waters, as temperatures drop below 14°C, generally in late October (Morreale, pers. comm.). Keinath et al. (1987) observed sea turtle emigration from the Chesapeake Bay when waters dropped below 18°C in November.

Kemp's ridleys may be the most abundant sea turtle in Massachusetts waters (Prescott, pers. comm.). Juvenile ridleys (10 inches to 12 inches in length) regularly strand on Cape Cod Bay beaches in fall and winter months (nine in 1992, Teas, pers. comm.) as a result of cold-stunning. Surviving ridleys appear to leave northern waters with declining temperatures in the late fall to avoid lethal temperatures below 8°C (Morreale, Meylan, and Sadove, 1992).

The importance of the Cape Cod Bay habitat to the survival of the species is unknown, although Morreale et al. (1989) documented rapid growth (500 grams per month) for juvenile Kemp's ridleys that spent the summer months foraging in Long Island Sound. Ridleys rarely occur north of Cape Cod Bay. Precise information regarding the location of juvenile ridleys in waters of the northeastern United States is not available.

Adult and juvenile Kemp's ridley turtles feed primarily in shallow coastal waters on bottom-living crustaceans (Hildebrand, 1982). Organisms identified from stomachs include crabs (Polyonchus, Hepatus, Callinectes, Panopeus, Mineppe, Ovalipes, Calappa, Portunus, Arenaeus, Limulus, Libinia, Cancer), fish (Lutjanus, Leiostomus) and mollusks (Noculana, Corbula, Mulinia, Nassarius) (Bellmund et al., 1987; Burke et al., 1990a, 1990b, Dobie et al., 1961; Pritchard and Marquez, 1973). All these genera are forms common in the Gulf of Mexico and along the eastern coast of the United States.

Researchers in the Chesapeake Bay area have indicated that Kemp's ridleys feed primarily on blue crabs in that embayment, and frequently occur in waters less then 5 meters deep over grass beds such as those found in the Mobjack Bay, just north of the York River Entrance Channel (Lutcavage, 1981; Musick et al., 1984; Keinath et al., 1987; Byles, 1988).

Kemp's ridleys and loggerheads are apparently segregated by prey items and habitat preference in the Chesapeake Bay (Lutcavage, 1981; Keinath et al., 1987; Byles, 1988). Similar segregation is not seen in other northeast embayments such as Delaware Bay (Eggers, 1989) and Long Island Sound (Burke et al., 1990a). Offshore distribution and habitat use of Kemp's ridleys is unknown due to their small size and cryptic coloring. Despite the spatial differences in range that may exist in some inshore waters, due to their more general overlapping inshore distribution, Kemp's ridleys are assumed to occur in offshore waters known to be utilized by loggerheads (Figure 6).

In the Northeast, quantitative diet studies have only been conducted for sea turtles in New York waters (Burke et al., 1990a; 1990b). Stomach and fecal contents from Kemp's ridleys taken in New York waters indicated these turtles feed primarily on small benthic crab species such as rock and green crabs. It is likely that they exhibit similar feeding preferences in other northeastern U.S. waters. In New York waters, crabs made up 80 percent of the weight of loggerhead diets. In Massachusetts waters, crabs also made up the major component of stomach contents of stranded animals, supplemented by clams, quohogs, moon snails, and squid. (Prescott, 1982)

Although pathological effects of oil spills have been documented in laboratory studies of sea turtles (Vargo et al., 1986), the impacts of other anthropogenic toxins have not been investigated. Known sources of human caused mortality of Kemp's ridley sea turtles include incidental take in bottom trawl fisheries (Anonymous, 1992; Henwood and Stuntz, 1987), coastal gill net fisheries, marine debris, channel dredging (USFWS and NMFS, 1992a), and boat hits (STSSN database).

Leatherback turtle (Dermochelys coriacea)

The Recovery Plan for Leatherback Turtles (Dermochelys coriacea) contains a description of the natural history and taxonomy of this species (USFWS and NMFS, 1992b). Leatherbacks are widely distributed throughout the oceans of the world, and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour, 1972). Leatherbacks are predominantly distributed pelagically, feeding primarily on jellyfish such as Stomolophus, Chryaora, and Aurelia (Rebel, 1974). They may come into shallow waters if there is an abundance of jellyfish nearshore. Nesting of the leatherback is almost entirely in tropical waters. In the eastern Caribbean, nesting occurs primarily in the Dominican Republic, the Virgin Islands, and on islands near Puerto Rico. Sandy Point, on the western edge of St. Croix, Virgin Islands, was designated by the U.S. Fish and Wildlife Service as critical habitat for nesting leatherback turtles. Nesting also occurs, on a smaller scale, along the Atlantic Coast of Florida.

The largest of sea turtles, leatherbacks, are able to maintain body temperatures several degrees above ambient temperatures, likely by virtue of their size, insulating subdermal fat, and an arrangement of blood vessels in the skin and flippers that enables retention of heat generated during swimming (Paladino et al., 1990).

In the northwest Atlantic, leatherbacks have been reported in New England and as far north as Nova Scotia and Newfoundland from April to November (CeTAP, 1982). Although their tolerance of low temperatures is greater than for other sea turtles, leatherbacks are generally absent from northern waters in winter and spring. In Cape Cod Bay, sightings peak in August and September (Prescott, 1988).

Shoop and Kenney (1992) observed leatherbacks during summer months scattered along the continental shelf from Cape Hatteras to Nova Scotia. Relative concentrations of leatherbacks were seen off the south shore of Long Island and off New Jersey. Leatherbacks in these waters are thought to be following their preferred jellyfish prey, including Cyanea sp. (Lazell, 1980; Shoop and Kenney, 1992). Researchers in the Chesapeake have observed leatherbacks in the mouth of the Bay during summer months (Byles, 1988).

Hawksbill turtle (*Eretmochelys imbricata*)

The hawksbill turtle is relatively uncommon in the waters of the continental United States. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. However, there are accounts of hawksbills in south Florida and a surprising number are encountered in Texas. Most of the Texas records are small turtles, probably in the 1-2 year class range. Many captures or strandings are of individuals in an unhealthy or injured condition (Hildebrand, 1982). The lack of sponge-covered reefs and the cold winters in the northern Gulf of Mexico probably prevent hawksbills from establishing a viable population in this area.

Hawksbills feed primarily on a wide variety of sponges but also consume bryozoans, coelenterates, and mollusks. The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands.

In the Atlantic, small hawksbills have stranded as far north as Cape Cod, Massachusetts (STSSN database, 1990). Many of these strandings were observed after hurricanes or offshore storms. Although there have been no reports of hawksbills in the Chesapeake Bay, one has been observed taken incidentally in a fishery just south of the Bay (Anonymous, 1992).

Green turtle (*Chelonia mydas*)

Green turtles are distributed circumglobally, mainly in waters between the northern and southern 20°C isotherms (Hirth, 1971). In the western Atlantic, several major nesting assemblages have been identified and studied (Peters, 1954; Carr and Ogren, 1960; Duellman, 1961; Parsons, 1962; Pritchard, 1969; Carr *et al.*, 1978). However, most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart, 1979). Only one nest has been reported on the Florida Panhandle (Schroeder, pers. comm.). Most green turtle nesting activity occurs on Florida index beaches. These index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the six years of regular monitoring (Figure 3) since establishment of the index beaches in 1989.

While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida, the northwestern coast of the Yucatan Peninsula, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth, 1971). The preferred food sources in these areas are Cymodocea, Thalassia, Zostera, Sagittaria, and Vallisneria (Babcock 1937; Underwood, 1951; Carr, 1952; 1954; Mexico, 1966).

Although no green turtle foraging areas or major nesting beaches have been identified on the Atlantic Coast, evidence provided by Mendonca and Ehrhart (1982) indicates that immature green turtles may utilize lagoonal systems for foraging. These authors identified a population of young green turtles (carapace length 29.5-75.4 cm) believed to be resident in Mosquito Lagoon, Florida. The Indian River system, of which Mosquito Lagoon is a part, supported a green turtle fishery during the late 1800s (Ehrhart, 1983), and these turtles may be remnants of this historical colony. Additional juvenile green turtles occur north to Long Island Sound, presumably foraging in coastal embayments. In North Carolina, green turtles are known from estuarine and oceanic waters. Recently, green turtle nesting occurred on Bald Head Island, just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. No information is available regarding the occurrence of green turtles in the Chesapeake Bay, although they are presumably present in very low numbers.

Loggerhead turtle (Caretta caretta)

The threatened loggerhead is the most abundant species of sea turtle occurring in U.S. waters. Like Kemp's ridleys, they commonly occur throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. The loggerhead's winter and early spring range is south of 37°00′ N in estuarine rivers, coastal bays, and shelf waters of the southeastern United States. Loggerheads move northward and enter northeast coastal embayments as water temperatures approach 20°C (Burke et al., 1989, Musick et al., 1984) to feed on benthic invertebrates, leaving the northern embayments in the fall when water temperatures drop. Juvenile and subadult loggerheads occur in southern Massachusetts waters from mid-summer through fall, probably feeding on crabs and other benthic invertebrates. They are commonly found in the Chesapeake from May through October, with peak numbers observed in June (Lutcavage, 1981) in water depths of 4 to 20 meters (Musick et al., 1984). Mark-recapture studies have shown that loggerheads in the Bay exhibit strong foraging site fidelity within and between seasons (Musick et al., 1984; Byles, 1988).

Like the Kemp's ridley sea turtle, the activity of the loggerhead is limited by temperature. Prolonged exposure to water temperatures below 8°C may result in dormancy, shock, or death. Loggerheads are regularly found cold-stunned in Cape Cod Bay (17 in 1992, Teas, pers. comm.). Keinath et al. (1987) observed sea turtle emigration from the Chesapeake Bay when water temperatures cooled to below 18°C, generally in November.

Aerial surveys of loggerhead turtles at sea north of Cape Hatteras indicate that they are most common in waters from 22 to 49m deep, although they occur from the beach to waters of 4481m (Shoop and Kenney, 1992). There is no information regarding the activity of these offshore turtles. They may be travelling to and from inshore foraging habitats, or feeding on resources available in the water column. The latter behavior is unquantified, although there are documented takes of loggerheads on longline hooks fishing in the water column with squid (NMFS, unpublished data), indicating that they do feed while in the pelagic environment. There is no information regarding the depths beyond which loggerheads will feed on the bottom.

The preferred prey of the loggerhead turtle includes mollusks, crustaceans and sponges (Mortimer, 1982). Crabs and conchs were identified (Carr, 1952) as the most frequently found items in stomachs, although loggerheads often eat fish, clams, oysters, sponges, and jellyfish. Ernst and Barbour (1972) included marine grasses and seaweeds, mussels, borers, squid, shrimp, amphipods, crabs, barnacles, and sea urchins among the foods of loggerhead turtles. The horseshoe crab (Limulus polyphemus) has been identified as a major food source of loggerheads in Mosquito Lagoon, Florida and the Chesapeake Bay (Mortimer 1982, Keinath et al., 1987); however, spider crabs (Libinia sp.) and rock crabs (Cancer irroratus) have been determined as the primary components of loggerhead diet in Long Island Sound (Burke et al., 1990a).

Index nesting beaches, on which data collection methods and effort were standardized were established in Florida in 1989. Over 90 percent of all U.S. loggerhead nests occur in Florida, and over 80 percent of these are within indexed beaches (B. Schroeder, pers. comm.). Over the six years monitored in this standardized manner (illustrated in Figure 2), loggerhead nesting appears to be stable.

Sources of human caused mortality are similar to those discussed above for ridleys. In their report entitled "Decline of the sea turtles: Causes and prevention," the National Research Council's Committee on Sea Turtle Conservation estimated that dredging mortalities, along with boat hits, were second only to fishery interactions as a source of probable lethal takes of sea turtles. Additionally, loss of nesting habitat on southeast United States beaches has likely contributed to the loggerhead's lack of recovery.

Whales:

Northern right whale (Eubalaena glacialis)

A description of the natural history and taxonomy of the northern right whale can be found in the Right Whale Recovery Plan (NMFS, 1991a).

This species was decimated during the 1700s by commercial whaling fleets; it was the preferred target species because it floated and was easily captured and butchered. Shore whaling was conducted off Massachusetts, New York, New Jersey, North Carolina, and Florida beaches. By 1750, directed harvest of right whales had reduced the population to numbers no longer able to sustain a vigorous coastal fishery (Allen, 1916). Currently, there are believed to be between 300 and 350 North Atlantic right whales extant, an estimated 1-4 percent of the initial population. The Right Whale Recovery Team set a recovery goal of 7,000 North Atlantic right whales, which represents 60-80 percent of the estimated pre-exploitation level (NMFS, 1991a).

Despite over 50 years of protection, there is no indication that the North Atlantic right whale population is recovering from eight centuries of harvest (NMFS, 1991a). Schevill et al. (1986) compared historical whaling data and modern sighting information and concluded that there was no evidence that the right whale population in the seventeenth century was any larger than it is today. Reeves and Mitchell (1987) also compiled whaling records in an attempt to determine the pre-exploitation population levels of right whales. Their studies of the North Atlantic harvest of other mysticetes resulted in population estimates through assumptions that the sum of removals during the peak decade was comparable to a conservative minimum estimate of the pre-exploitation population size. Incomplete records and conflicting evidence indicate levels of harvest of right whales may have been sustainable, with no peak decade evident. A minimum of 245 right whales were harvested from 1700-1709; however, similar levels were believed to have been harvested in all decades between 1680 and 1719. The authors noted the possibility that Basque whaling effort prior to the 1600s off Newfoundland likely included effort on right whales of the same, or a neighboring, stock (also see Reeves and Mitchell, 1986). NMFS (1991a) suggests that Basque whaling activities, which ceased by the late 1600s, may have extirpated the western North Atlantic right whale along the Labrador Coast before colonial times. Reeves and Mitchell (1987) conclude that, although they believe Schevill et al.'s (1986) suggestion regarding the similarity in abundance of whale now and in colonial time is unlikely, they cannot disagree with the possibility that the seventeenth century "population in this area may not have been as large as has been supposed." Allen (1916) does not give an estimate of pre-whaling population levels, but indicated that at the time of settlement of New England and into the following century, "right whales were present in considerable numbers ...", and cites Mayflower passengers and other writers of the period indicating whales were abundant in the 1600s. Reeves and Mitchell (1987) broadly estimate there were "some hundreds of right whales in the western North Atlantic during the late seventeenth century."

The current NMFS marine mammal stock assessment reports (MMSARs) (Blaylock et al., in press) estimate the minimum size of the northern Atlantic right whale population to be 295. This is based on a census of individual whales identified using photo-identification techniques (Knowlton et al., 1992).

NMFS has stated in previous correspondence and in Right Whale Implementation Team meetings attended by USCG personnel that due to the very limited size of the population, the lengthy calving interval and low population recruitment rate, as well as other factors placing stress upon the population (e.g., possible inbreeding depression), the incidental mortality of even one right whale could jeopardize the continued existence of the population.

Distribution: Cape Cod Bay and portions of Massachusetts Bay are among the five known right whale high-use areas (NMFS, 1991a). Figure 7 shows all sightings of right whales in the Cape Cod and Massachusetts bays between 1964 and 1988. Right whales occur in Massachusetts waters in most months (Watkins and Schevill, 1982; Schevill et al., 1986; Winn et al., 1986; Hamilton and Mayo, 1990). Most sightings occur between February and May, with peak abundance in late March. Schevill et al. (1986) report 764 sightings of right whales between 1955 and 1981 in Cape Cod waters. More than 70 right whales were seen in one day in 1970. Hamilton and Mayo (1990) report 2,643 sightings of 113 individual right whales in Massachusetts waters, with a concentration in the eastern part of Cape Cod Bay. A number of right whales, including cow/calf pairs, resided in Cape Cod and Massachusetts bays during the summers of 1986 and 1987. Hamilton and Mayo (1990) as well as Payne et al. (1990) attributed this shift in distribution to a dearth of sand lance in the bays and an associated abundance of calanoid copepods – the preferred prey of North Atlantic right whales.

Allen (1916) lists two takes of right whales in Boston Harbor, one in Boston Bay, one off Nahant and two off Duxbury. He indicates that "[r]ight whales occasionally came even into Boston Harbor in Colonial times...." However, no right whales have been reported by marine mammal observers on the Boston Harbor dredge disposal barges which transit the area between Boston Harbor and the Massachusetts Bay disposal site.

Precise interpretation of data regarding the normal length of residency of individual right whales in the bays is difficult to interpret, especially in light of recent satellite transmitter results indicating right whales tagged in the Bay of Fundy may travel long distances in the few days or weeks between sightings (Mate, 1992). Schevill et al. (1986) report individual right whales residing in Cape Cod waters for no more than a few successive days. In 1976 they observed a cow and calf over a 7-week period, the longest residence time documented between 1955 and 1981. Prior to the summer of 1986, Hamilton and Mayo (1990) report observations of individual whales up to 12 times in a year, with the longest apparent residency being 89 days. Prior to 1986, 50 percent of the individual right whales observed by Hamilton and Mayo (1990) were seen in more than one year.

Right whales are present in foraging areas such as Cape Cod Bay, the Great South Channel, the mouth of the Bay of Fundy and Brown's Bank (NMFS, 1991) in the spring and summer months. Recent satellite tracking efforts have identified individual animals embarking on far-ranging foraging episodes not previously known (Knowlton, pers. comm.).

Reproduction and Calving: During the winter, a portion of the population moves from the summer foraging grounds to the calving/breeding grounds off Florida, Georgia, and South Carolina. The winter location of the bulk of the population is unknown. During the winter in 1992, right whales were reported in North Carolina waters, north of Cape Hatteras (Knowlton, pers. comm.).

Calves are produced in winter off the coast of the southeastern United States. Adult females calve every three to five years. Sexual maturity is reached as early as the fifth year and as late as age nine (Knowlton and Kraus, 1989). The animals size at this stage is from 30-40 feet in length.

The whereabouts of 85 percent of the population during the breeding season, including a significant portion of the female segment, is unknown. Those whales not congregating on the Georgia/Florida breeding grounds are likely scattered in distribution. Sightings over this season have been reported from the Gulf of Mexico (Moore and Clark, 1963; Schmidley et al., 1972).

Nursery: Mead (1986) identifies Massachusetts waters as second only to Florida waters for documented right whale calf sightings. Winn et al. (1986) observed right whale calves in this region, and indicate calves throughout the western Atlantic were sighted in significantly shallower depths than adult right whales without calves. Hamilton and Mayo (1990) report the occurrence of mother/calf pairs in the bays in six of the ten years of their study, and indicate cow/calf pairs remain in the bays for only short periods. A total of 30 calves were observed between 1979 and 1987, associated with 21 different cows. Nine of the 21 mothers were observed with calves in two different years, and calving intervals appeared to average three years. This is consistent with Kraus et al.'s (1986) estimates of calving intervals, which ranged from two to five years with a mean of 3.1

years. Schevill et al. (1986) report 21 sightings of small calves in 12 of the 26 years of their study, including two calves likely born in the bays. Hamilton and Mayo (1990) indicate 28 percent of the calves identified prior to 1987 have been resighted in the bays as juveniles or adults. Both studies documented observations of mating behavior, and Hamilton and Mayo (1990) report observations of nursing.

Foraging: Right whales feed primarily on copepods, but also consume euphausiids and other zooplankton. Estimates of right whale energetic requirements (Kenney et al., 1986) indicate only very dense patches of zooplankton provide sufficient calories to meet the needs of right whales. While precise energetic requirements have not been determined, this model has been supported by two quantitative studies of zooplankton patches in the vicinity of feeding right whales (Murison and Gaskin 1989, Mayo and Marx, 1990). Both studies indicate right whales are capable of detecting dense prey patches and may not exploit patches if concentrations are reduced below certain threshold levels (around 1,000 individual copepods per cubic centimeter). Payne et al. (1990) show the strong correlation between abundance of copepods due to the absence of sand lance in the summers of 1986 and 1987 in Massachusetts waters, and the occurrence of right whales in the area in those summers. Competition between sand lance and right whales may be the basis for the seasonal patterns of right whale use of this area (Payne et al., 1990; Kenney et al., 1986). Kenney et al. (1986) suggest variations in the location of adequate prey patches from year to year would compel right whales to expend significant amounts of energy to locate acceptable zooplankton patches. Gaskin (1991) identified the availability of dense concentrations of calanoid copepods as the "bottom line" for right whales in the northwest Atlantic. Inadequate prey availability and/or competition for prey with other planktivorous animals has also been suggested by Mitchell (1975), Reeves et al. (1978) and NMFS (1991a) as one possible factor in the lack of recovery of this species.

Mortality: Anthropogenic causes of right whale mortality are discussed in detail in Kraus (1990) as well as in NMFS (1991a). Ship collisions and entanglements are the most common direct causes of mortality identified through right whale strandings. Twenty percent of all right whale mortalities observed between 1970 and 1989 were caused by vessel collisions/interactions with right whales. An additional 8 percent of these mortalities are suspected to have resulted from vessel collision. Seven percent of the population exhibit prop-wound scars indicating additional, non-lethal vessel interactions. It has been estimated that 19 percent of all vessel/right whale collisions are lethal (Kraus, 1990). The observed entanglement rate for right whales is 57 percent; of these, an estimated 4.3 percent were fatal (Kraus, 1990). Stranding data suggest that one-third of all right whale mortality results from either vessel collision or entanglement

(Kraus, 1990). Including known neonatal mortality and all other sources, 27 percent of all right whales die before reaching age four (Kraus, 1990); thus over a fourth of the population is prevented from reaching maturity.

Including those incidents discussed in the background section above, there have been five known ship strikes, causing three injuries and two mortalities in coastal waters of the southeastern United States since the Kraus (1990) summary report was published (Blaylock et al., in press). There were also two mortalities likely due to ship collisions in the Bay of Fundy area in 1992 and 1994. There have been four ship strike mortalities, a fifth probable, and two more possible during 1990-1994, yielding a human-induced, non-fishery-related mortality rate of between 0.8 and 1.4 right whales a year (Blaylock et al., in press). As with entanglements, some injury or mortality due to ship strikes, particularly in offshore waters, may go undetected.

As a result of the potential for interactions between vessels and right whales from December through March in the calving area off Georgia and northern Florida, aerial surveys funded by the COE, Navy and USCG have been implemented as the right whale early warning system. These surveys are conducted to identify the occurrence and distribution of right whales in the vicinity of ship channels in the winter breeding area, and to notify nearby vessel operators of whales in their path.

Whales observed on aerial and shipboard surveys are individually identified and counted, cow/calf pairs are recorded, and the movements and distribution of the whales are noted. Speeds of hopper dredges working in these channels are reduced to 5 knots or less during evening hours or periods of low visibility for 24 hours after sightings of right whales within 10 nm of the channel or disposal areas.

Data collected during these surveys indicate that right whales are observed off Savannah, Georgia, in December and March, and are relatively abundant between Brunswick, Georgia, south to Cape Canaveral from December through March. During early 1995, a right whale was also observed by shipboard observers off Morehead City, North Carolina (1/10/95, probable right whale).

Habitat degradation is cited as potentially the most important factor affecting the recovery of the species (NMFS, 1991a). The Right Whale Recovery Team (NMFS, 1991a) indicated disposal of terrestrially generated pollutants into Massachusetts and Cape Cod bays could slow the recovery of the species.

Another factor possibly inhibiting recovery of the right whale population is inbreeding depression. Scaeff et al. (1993) have determined through genetic analyses that western North Atlantic right whales probably represent a single breeding population based on three matrilines.

Right Whale Critical Habitat

There are five well-known habitats used annually by right whales, including 1) coastal Florida and Georgia, 2) the Great South Channel, east of Cape Cod, 3) Cape Cod and Massachusetts bays, 4) the Bay of Fundy and, 5) Browns and Baccaro Banks, south of Nova Scotia. The first three areas occur in U.S. waters and have been designated by NMFS as critical habitat (59 FR, 28793, June 3, 1994).

The nearshore waters of northeast Florida and southern Georgia were first identified as a likely calving and nursery area for right whales in 1984. Since that time, Kraus et al. (1993) have documented the occurrence of 74 percent of all the known mature females from the North Atlantic population in this area. While sightings off Georgia and Florida include primarily adult females and calves, juveniles have also been observed.

Criteria for designation of critical habitat (50 CFR Section 424.12) include, but are not limited to:

> (1) Space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and generally (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Kraus and Kenney (1991) provide an overview of data regarding right whale use of these areas and include information discussed above.

Habitat in the Great South Channel, Massachusetts and Cape Cod bays are used for foraging, breeding, and nursing. Important habitat components include seasonal availability of dense zooplankton patches and protection from weather afforded by the land masses surrounding the bays. The coastal harvest of right whales discussed by Allen (1916), among others, illustrates the historical importance of the bay areas.

Actions that impact habitat elements identified as integral to critical habitat designation must come under the ESA Section 7 consultation procedures, regardless of the presence of right whales at the time of impacts. Therefore, any impacts to these areas that may affect prey availability and quality or nursery protection must be considered when analyzing whether habitat is adversely modified or destroyed.

Humpback Whale (*Megaptera novaeangliae*)

The Humpback Whale Recovery Plan (NMFS, 1991b) contains information regarding humpback life history, distribution, and taxonomic parameters.

Worldwide, humpbacks are thought to number between 10,000 and 12,000 individuals (Braham, 1991), down from in excess of 125,000 prior to exploitation. Humpback whales were commercially hunted from the seventeenth century into the twentieth century. At least 9,125 humpback whales were killed within the North Atlantic Ocean west of Iceland between 1850 and 1971 (Mitchell and Reeves, 1983).

The Humpback Whale Recovery Team has recommended an interim recovery goal of twice the current population estimates within the next 20 years. The western North Atlantic population is currently estimated to include approximately 5,543 individuals (CV = 0.16, Katona et al., 1994). Katona and Beard (1990) estimate the population's annual growth rate at 9.4 percent (with broad confidence intervals). The current NMFS MMSARs (Blaylock et al., in press) estimate the minimum size of the North Atlantic humpback whale population to be 4,848. This is based on the lower limit of the two-tailed 60 percent confidence interval of the above estimate by Katona et al. (1994). This is equivalent to the 20th percentile of the log-normal distribution as specified by NMFS (Anon., 1994).

Distribution: After calving and mating in warm waters of the Caribbean, whales return to five separate foraging areas, distributed between latitudes of 42° N to 78° N. These feeding areas are (with approximate number of humpback whales in parenthesis): Gulf of Maine (400); Gulf of St. Lawrence (200); Newfoundland and Labrador (2,500); western Greenland (350); and the Iceland-Denmark strait (up to 2,000) (Katona and Beard 1990). The western North Atlantic stock is considered to include all humpback whales from these five feeding areas. Courtship groups on the wintering ground contain whales from different feeding aggregations, so humpbacks from the western North Atlantic probably interbreed (Katona et al., 1994).

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 41° N and 43° 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. Small numbers of individuals may be present in this area year-round, including the waters of Stellwagen Bank.

Until recently, humpback whales in the mid- and south Atlantic were considered transients. Few were seen during aerial surveys conducted over a decade ago (Shoop et al., 1982). However, since 1989, sightings of feeding juvenile humpbacks have increased along the coasts of Virginia and North Carolina, peaking during the months of January through March in 1991 and 1992 (Swingle et al., 1993). Studies conducted by the Virginia Marine Science Museum (VMSM) indicate that these whales are feeding on, among other things, bay anchovies and menhaden. Researchers theorize that juvenile humpback whales, which are unconstrained by breeding requirements that result in the migration of adults to relatively barren Caribbean waters, may be establishing a winter foraging area in the mid-Atlantic (Mayo, pers. comm.). The lack of sightings south of the VMSM study area is a function of shipboard sighting effort, which was restricted to waters surrounding Virginia Beach, Virginia.

Shipboard observations conducted during daylight hours during dredging activities in the Morehead City Harbor entrance channel during January and February 1995 documented sightings of young humpback whales on at least six days near the channel and disposal area, through January 22, 1995. Three humpback strandings were documented in North Carolina in that year, one each in February, March, and April, suggesting that humpback whales remained within South Atlantic waters through April.

Reproduction and Calving: Katona and Beard (1990) summarized information gathered from a catalogue of photographs of 643 individuals from the western North Atlantic population of humpback whales. These photographs indicated reproductively mature western North Atlantic humpbacks winter in tropical breeding grounds in the Antilles, primarily on Silver and Navidad Banks, north of the Dominican Republic. The primary winter range also includes the Virgin Islands and Puerto Rico (NMFS, 1991). In general, it is believed that calving and copulation take place on the winter range. Calves are born from December through March and are about 4 meters at birth. Sexually mature females give birth approximately every 2 to 3 years. Sexual maturity is reached between 4 and 6 years of age for females and between 7 and 15 years for males. Size at maturity is about 12 meters.

Nursery: Clapham and Mayo (1987) studied the reproduction and recruitment of humpbacks in Massachusetts Bay between 1979 and 1985. During this period, cows and calves occurred in the Bay as early as April. Apparent nursing behavior has been observed, although this could not be verified. Calves were observed feeding, or attempting to feed, on sand lance by late July. Clapham and Mayo (1987) reported that 44 adult females were identified with 72 calves, including 20 females which returned with calves more than once during their 1979-1985 study period. Cows with calves were seen from one to 62 times during a year, with a mean of 18.5 occurrences. This was significantly higher than cows without calves, which were seen from one to 45 times with a mean of 10.1. This difference in occurrence of cows with and without calves indicates Massachusetts Bay may provide important nursery habitat to humpbacks. This is supported by Goodale's (1981), observation of a significant difference in mean depth of water where calves were sighted as compared to water depths associated with sightings of mature animals without calves. Of the 49 calves born prior to 1985, 75.5 percent returned in one or more years after separation from the cow, indicating that an affinity for foraging areas may be determined maternally.

Foraging: All humpback whales feed while on the summer range. Overholtz and Nicolas (1979) observed humpback whales apparently feeding on the American sand lance (Ammodytes americanus) in 1977 on Stellwagen Bank. Since that time, sand lance have been identified as the major prey species for humpbacks in Massachusetts and Cape Cod bays. Payne et al. (1986) discuss the correlation between the decline of herring stocks from the mid-1960s through the mid-70s, resultant increase in stocks of sand lance and the shift of the distribution of humpback whales from the northern to the southwestern Gulf of Maine, including Stellwagen Bank. Payne et al. (1986) identified a relationship between the observed number of humpbacks per effort and the log-mean number of sand lance per tow after 1978, and sharp changes in depth such as those found in the Great South Channel and at Stellwagen Bank. They suggest humpbacks follow the Great South Channel north to the Gulf of Maine until they reach concentrations of sand lance off Cape Cod or on Stellwagen Bank. Concentration of sand lance in response to their zooplankton prey found near the surface in areas of high bottom relief provide an energetically efficient source for the whales when compared to feeding at depth.

Sand lance were virtually absent from Massachusetts Bay in the summers of 1986 and 1987 (Payne et al., 1990). As a result, copepods were abundant and were associated with longer residence and more frequent occurrences of right whales in the Bay, as well as the rare occurrence of blue and sei whales, which also feed on zooplankton. Payne et al. (1990) identify the affect of shifts in herring, mackerel, and sand lance abundance on the distribution and abundance of humpbacks, right whales, and other species in the southern Gulf of Maine.

Mortality: The Humpback Whale Recovery Plan (NMFS, 1991b) identifies entanglement and ship collisions as potential sources of mortality, and disturbance, habitat degradation, and competition with commercial fisheries as potential factors delaying recovery of the species.

Volgenau and Kraus (1990) identify entanglement in fishing gear as a threat to the speed of recovery of the Gulf of Maine population of humpbacks. There is an average of four to six entanglements of humpback whales a year in waters of the southern Gulf of Maine, and additional reports of ship-collision scars (D.L. DeKing, pers. comm.). An entanglement database maintained by NMFS NE Regional Office contained 64 records of entangled or injured humpbacks from 1975-1992. Humpbacks also become entangled offshore. On January 18, 1993, a dead juvenile humpback was observed entangled in a swordfish drift net along the 200m isobath northeast of Cape Hatteras. Entangled animals are often released, although some dead or injured animals likely go unobserved and unreported. Occasionally, "floaters" are encountered at sea (NMFS, unpublished data).

Swingle et al. (1993) identify a shift in distribution of juvenile humpback whales in the nearshore waters of Virginia, primarily in winter months. Those whales using this mid-Atlantic area that have been identified were found to be residents of the Gulf of Maine feeding group, suggesting a shift in distribution that may be related to winter prey availability. In concert with the increase in mid-Atlantic whale sightings, strandings of humpback whales have increased between New Jersey and Florida since 1985. Strandings were most frequent during the months of September through April in North Carolina and Virginia waters, and were composed primarily of juvenile humpback whales of no more than 11 meters in length (Wiley et al., 1995). Six of 18 humpbacks (33 percent) for which the cause of mortality was determined were killed by vessel strikes. An additional humpback had scars and bone fractures indicative of a previous vessel strike that may have contributed to the whale's mortality. Sixty percent of those mortalities that were closely investigated showed signs of entanglement or vessel collision (Wiley et al., 1993).

Humpback whale entanglements occur in relatively high numbers in Canadian waters. Reports of collisions with fixed fishing gear set for groundfish around Newfoundland averaged 365 annually from 1979 to 1987 (range 174-813). An average of 50 humpback whale entanglements (range 26-66) were reported annually between 1979 and 1988 and 12 of 66 humpback whales that were entangled in 1988 died (Lien et al., 1988).

Observers on dredges have documented close approaches between whales and dredges. On February 6, 1988, a right whale reacted to the approach of a hopper dredge within 100 yards by orienting itself toward the vessel in a defensive profile. On February 28, 1988, during clamshell dredging of Canaveral channel, a right whale remained in the Canaveral channel for a period of about 10 minutes; fortunately, during daylight hours and when no vessels were transitting the channel. On January 12, 1995, a humpback whale was observed within a quarter of a mile of the dredge at Wilmington channel and resurfaced near the dredge. An approaching humpback on January 13, 1995 was observed ahead of the dredge initially, but resurfaced near the stern after the vessel slowed. Dredging was stopped while this whale and two other humpbacks nearby approached within 100 yards, including one passage under the bow. On January 18, still within the Wilmington Harbor channel dredging area, one of a few humpbacks observed feeding surfaced and quickly dove again within 10 meters of the dredge. These incidents illustrate the potential for collisions between whales and vessels in coastal waters.

NMFS believes that cooperation of vessel operators with trained lookouts or endangered species observers greatly reduces the chance of whale/vessel interactions. In concert with aerial surveys conducted in right whale critical habitat during the breeding season, the use of trained lookouts or endangered species observers, the adoption by vessel operators of necessary precautions when whales are sighted, and reduction in vessel speed during evening hours or days of limited visibility when whales have been spotted within the previous 24 hours, are necessary precautions that reduce the likelihood of vessel collisions with endangered whales.

Geraci et al. (1989) identified bioaccumulation of the neurotoxin responsible for paralytic shellfish poisoning (saxitoxin) in mackerel consumed by humpback whales as the possible cause of mortality of 14 observed humpbacks between November of 1987 and January of 1988. No saxitoxin was identified in plankton or shellfish sampled in Massachusetts waters at the time of the mortality. The authors suggest the neurotoxin could have been transported by mackerel obtaining the toxin from planktonic sources in the Gulf of St. Lawrence, the spawning ground for mackerel. While a similar multiple mortality of large whales has not been observed, the authors suggest individual mortalities caused by the biotoxin would go unnoticed. The reason for the multiple mortalities in the winter of 1987 and 1988 has not been explained, although they may have been related to a shift in the normal diet of humpbacks due to the lack of sand lance in the bays the previous summer.

Fin Whale (Balaenoptera physalus)

The fin whale is considered one of the more abundant large whale species, with a worldwide population estimate of 120,000 (Braham, 1991). The fin whale was a prime target for commercial whaling after the Norwegian development of the explosive harpoon in 1864. North Atlantic stocks were heavily fished and because these stocks were relatively small, they were quickly depleted.

Braham (1991) indicates that although fin whales are abundant compared to other stocks, they remain depleted relative to historic levels. Only a few thousand are believed to exist in the North Atlantic (Gambell, 1985). Current estimates for fin whales found in the northwest Atlantic are not available, although CeTAP (1982) estimated 5,423 fin whales occurred in the waters between Cape Hatteras and the Bay of Fundy in the spring, more than half of which (2,788) occur in the Gulf of Maine.

Current MMSARs (Blaylock et al., in press) continue to use CeTAP (1982) data as the best available. A population estimate based on an inverse variance weighted pooling of CeTAP (1982) spring and summer data is 4,680 fin whales (CV = 0.23) and includes a dive-time correction factor of 4.85. An average for these two seasons was chosen because the greatest proportion of the population off the northeast U.S. coast appears to be in the CeTAP study area in these seasons. However, this estimate is highly uncertain because the data are a decade old, and values were estimated just after cessation of extensive foreign fishing operations in the region.

Surveys conducted by NMFS in 1991 and 1992 covered a portion of the area included in the CeTAP study, produced an estimate of 2,700 fin whales (uncorrected for dive time). This figure has been used in the NMFS MMSARs (Blaylock et al., in press) to estimate the minimum size of the North Atlantic fin whale population. The minimum population estimate is 1,704 fin whales, and is based on the lower limit of the two-tailed 60 percent confidence interval of the above estimate of 2,700. This is equivalent to the 20th percentile of the log-normal distribution as specified by NMFS (Anon. 1994).

Distribution: During summer in the western North Atlantic, fin whales can be found along the North American coast to the Arctic and around Greenland. The wintering areas extend from the ice edge southward to the Caribbean and Gulf of Mexico. They are widely distributed in the Gulf of Maine, and may stay in the region through the winter. Fin whales in the Gulf of Maine concentrate in the area extending from the southern base of the Great South Channel, northwest along the 50 fathom contour into the southwestern Gulf of Maine over Stellwagen Bank, to Jeffreys Ledge. Sightings are most numerous in spring and summer with peaks in May and July and occur at Jeffreys Ledge, Stellwagen Bank and the Great South Channel.

Seipt et al. (1990) discuss characteristics of the population of fin whales in Massachusetts Bay as observed through the photo-identification of individuals between 1980 and 1987. During that period, 156 individuals were identified. Ninety-eight were observed more than once, including 70 that were observed in more than one year. The authors suggest this information indicates that the occurrence and annual return of individual fin whales is similar to that observed for humpbacks as discussed above. They conclude that fin and humpback whales in high latitudes are distributed according to the occurrence of their prey, and return repeatedly to consistently productive habitats such as Jeffreys Ledge, Stellwagen Bank, and Massachusetts Bay. As suggested by

Kenney et al. (1986) and Payne et al. (1990), regarding right and humpback whales, such a strategy would be energetically efficient.

Fin whales are often spotted in mid-Atlantic waters, although nearshore occurrences off Virginia were undocumented until recently. Some fin whales were observed off the Delmarva Peninsula during aerial surveys conducted over a decade ago (Shoop et al., 1982). However, since 1989, sightings of feeding juvenile fin whales have increased along the coast of Virginia in the same area as the humpback whales mentioned above (Swingle, pers. comm.). Fin whales are more difficult to study due to their speed; however, they are believed to be feeding with the humpbacks, on bay anchovies and menhaden.

Foraging: Fin whales in the North Atlantic feed on herring, cod, mackerel, pollack, sardine, and capelin, as well as squid, euphausids, and copepods. In the 1970s and 80s, fin whales were observed to feed primarily on sand lance, in proximity to humpbacks (Overholtz and Nicolas, 1979; Payne et al., 1990). Bigelow and Schroeder (1953) reported fin whales feeding on sand lance that were abundant in Cape Cod Bay in 1880. Affects of the abundance of finfish on the distribution of fin whales are similar to those discussed for humpback whales above. Changes in fin whale distribution have not been as distinct as those observed for humpbacks, suggesting greater success at exploiting alternative prey species.

Reproduction: The peak months for breeding are December and January in the Northern Hemisphere. A single calf averaging about 6 meters in length is produced after a gestation period of a little more than 11 months. Fully mature females may reproduce every 2 to 3 years. In the Northern Hemisphere, females become sexually mature at a length of 18.3 meters and males at 17.7 meters. Although fin whales are sometimes found singly or in pairs, they commonly form larger groups of 3 to 20 which may in turn coalesce into a broadly spread concentration of a hundred or more individuals, especially on the feeding grounds (Gambell, 1985).

Mortality: At least two fin whales died in association with the 1987-1988 multiple mortality of humpbacks, the cause of which has been linked to ingestion of mackerel that had concentrated neurotoxins from plankton (Geraci et al., 1989). Lambertson (1986) identifies the occurrence of the nematode Crassicauda in fin whales taken in whaling efforts off Iceland, and describes the associated pathology. Known and theorized anthropogenic effects on recovery of fin whales are similar to those discussed above for humpbacks.

Assessment of Impacts

(1) Vessel Collisions

Vessel collisions are the primary threat to all endangered and threatened species that may result from Coast Guard operations. All vessels have the potential to interact with protected species, although the vessels involved in emergency operations have the least operational options for performing their mission and are, consequently, the most likely operational component to injure or kill marine animals. The impacts of all operations will be considered.

The documented collision with a right whale in the southeastern calving grounds is best explained by the lack of training and information available to the Coast Guard personnel at the time, which would have alerted them that they were operating in a high use area for right whales. Had that information been available to them, the Coast Guard asserts that they would have transitted another area. The other documented strike was not in a high use area.

The biological assessment correctly notes on pages 3-43 and 3-59 that boat and propeller related injuries are frequently found on the carcasses of sea turtles documented by the Sea Turtle Stranding and Salvage Network (STSSN). From 8.7% to 13.5% of the turtle carcasses reported each year between 1990 and 1993 exhibited boat-related injuries. An additional 10.4% to 12.2% showed carapace damage of unknown cause. While numerous factors can confound the analysis of stranding data, Magnuson et al. (1990) estimated from STSSN data that 400 turtles are killed each year by boat collisions outside of coastal beaches. No estimate was made for mortality rates in inshore waters. Turtles are often difficult to see at the ocean's surface and move slowly in the shallower coastal areas.

The ability of turtles to avoid vessels operating at high speeds is questionable. Available studies of turtles' response to auditory stimuli do not provide encouraging information on turtles' ability to avoid surface craft based on hearing (Lenhart, 1994; Moein et al, 1994). Sea turtles generally spend greater than 90% of the time submerged.

The possibility that sea turtles may be directly taken through collision with Coast Guard vessels exists, but the likelihood of such direct takings is minimal. The conservation recommendations contained in this opinion should further minimize the chance for any negative sea turtle interactions.

The endangered right whale and humpback whale are the most likely ESA-listed species to be affected by Coast Guard vessel operations. As previously discussed, 90% of Coast Guard operations occur within 20 miles of shore. This is also the primary habitat associated with these two whale species, as well as the fin whale and most species of sea turtles on the western Atlantic coast. This area also encompasses the 3 right whale Critical Habitat areas in the western north Atlantic.

The northern right whale is considered the most endangered of the large whales. There are two documented cases of USCG vessels striking and killing right whales. Given current information, the impact of an individual mortality to the currently precarious population of northern right whales is assumed to be significant. The North Atlantic population has been estimated at between 300 and 350 **individuals. However, as previously mentioned, the** current **minimum** estimate of population size is 295 (Blaylock et al., in press). In 1985, Kraus estimated that the growth rate of the North Atlantic population was approximately 3.9%. The most recent data (1994) show a current population growth rate estimated at 2.5% (Blaylock et al., in press). This growth rate is slow and well below the 6-7% growth rate seen in the South Atlantic population over the same period. Efforts have been proposed to study the demographics of the right whale population in order to better assess the impacts of the loss of an individual to the population as a whole, but these studies have not yet been conducted. The slow recovery of the population is due to the following factors as discussed in the Right Whale Recovery Plan (NMFS, 1991a):

- Human interaction (fishery entanglement/ship strikes),
- Habitat degradation, and
- Inbreeding depression.

Blaylock et al. (in press) report that five (20%) out of 25 recorded mortalities are attributed to ship strikes. Fifty-seven percent of living northern right whales bear evidence of entanglements in fishing gear and three out of 25 (12%) recorded mortalities were due to entanglement. Young animals seem to be the most likely to be impacted. Hamilton et al. (1994) report that interactions between right whales and fishing gear and boats is increasing.

While the majority of Coast Guard operations occur within 20 miles of shore, some missions call for vessel operations further offshore. Offshore whale species are faster moving than are humpback and right whales and are thus less prone to vessel strikes, although some have come into shore impaled on the bow of commercial ships. The faster moving whale species like the fin whale (an inshore species) are less likely to be struck than the cumbersome and slow moving right whale. Most of the individuals struck by ships are calves or juveniles possibly because they travel just below the surface. Young animals have limited experience in navigating around vessels, and may be more likely to surface beneath an oncoming vessel.

Since the collisions with right whales in 1991 and 1993, the

Coast Guard has implemented information programs to inform their personnel as to which seasons and what locations represent high-use areas for these species. Units are instructed to use caution during standard operating procedures, operate at speeds proportional to the mission to avoid impacts to whales, and post lookouts to monitor for the presence of whales and sea turtles in their path. Specifically, the following programs that may significantly reduce the probability of future impacts to protected marine species have been implemented or are in the final stages of implementation:

(a) A marine mammal and endangered species program is in place for the First, Fifth, and Seventh Coast Guard Districts. This program dedicates surface and air patrols for enforcement purposes and for public education efforts, provides specific instructions to units if they sight a whale, provides information on critical habitat, coordinates safety broadcasts, provides support for disentanglement and stranding efforts, and maintains a sighting program.

Specifically, dedicated surface and air patrols are tasked to conduct enforcement boardings, disseminate information packets and make broadcasts to mariners during the seasons when whales are transiting through district waters or are concentrated in summer feeding or winter calving areas. This helps prevent USCG vessels from impacting whales, and makes the public more aware of protection laws and the presence of these animals. Patrols may be directed to provide other agencies with platforms to conduct surveys and aircraft sightings of high concentrations or entangled marine animals. Unit operators are instructed to identify the situation and to notify OPCON immediately upon landing to initiate the appropriate response from NMFS. In the case of the right whale in the Delaware river, platforms provided by the Coast Guard (vessel, helicopters) were instrumental in preventing potentially lethal collisions with commercial shipping.

In addition, unit responsibilities are outlined that specify actions when a whale is sighted. Coast Guard personnel are instructed to give whales a wide berth and reduce speed to avoid the probability of whale strikes. The actual speed chosen needs to be left up to the commanding officer based not only on protected species issues but also on the vessel capabilities, sea state, and the mission (emergency operations require greater response speed than a routine transit). Personnel are instructed to maintain a lookout, notify vessels in the vicinity, and advise those vessels to proceed with caution. They will secure areas where response to entanglement, injured, dead or stranded individuals are occurring and will submit sighting reports. All these efforts will significantly reduce any impacts from operations to protected species.

(b) An MOA between the First Coast Guard District and the National Marine Fisheries Service is in the final stages of agency review. This is a cooperative effort to protect marine species under the MMPA and ESA through coordination of enforcement activities, data collection, education, and logistical support. The MOA adds to the directives discussed above by the following:

1) specifically delineating procedures to implement enforcement and educational programs (e.g., designating personnel as points of contact);
2) providing a mechanism to identify and educate the commercial marine industry with information on USCG and NMFS regulatory and educational programs to protect marine resources;
3) providing periodic patrols with particular emphasis on critical habitat for the northern right whale;
4) publishing a notice to mariners identifying not only critical habitat but other high use areas; and
5) providing all Coast Guard surface units with information about whale identification, behaviors, details of prohibitions, and recommended vessel operating guidelines in waters where species are expected to occur, among other specific procedures to coordinate protection of these resources with the National Marine Fisheries Service.

This MOA will not only educate Coast Guard vessel operators, but also the general public to avoid vessel impacts on protected species, particularly northern right whales.

(c) Critical habitat boundaries have been added to nautical charts. This is a quick and obvious reference to inform all Coast Guard operators where right whales are likely to be concentrated. As mentioned, had operators been aware of high use areas at the time of the 1993 right whale strike, they would have transitted another area and probably avoided the incident.

(d) The curricula for regional fisheries enforcement training programs now include a segment on marine mammal identification and guidelines for responding to strandings. This is reinforced through the MOA being developed with the First District and should be implemented in the other two districts.

(e) During periods of high whale use of each critical habitat area, broadcasts are made via notice-to-mariner announcements to all vessels informing them of collision danger and providing information for reporting violators of harassment and harm prohibitions. The direct positive results of this activity in reducing impacts are obvious.

(f) Coast Guard representatives are participating in regional whale recovery and implementation groups and are contributing funds to support recovery efforts such as reconnaissance flights. This keeps them abreast of the latest information from researchers and the most significant methods to reduce mortality and injury while promoting recovery goals.

A cooperative multi-agency team known as the Southeastern Right Whale Recovery Plan Implementation Team was established in 1993. This team, composed of representatives of the Navy, Coast Guard, Army COE, the states of Georgia and Florida, Port Authorities and NMFS, has implemented an aerial survey early warning system (EWS) to identify the locations of whales and communicate this information to vessels in the area through broadcasts to mariners. The team has established a set of guidelines for the operation of vessels in the southeastern calving area, and has been working towards establishing these operational guidelines as an MOU between the various state and federal agencies and port authorities. Following these guidelines will significantly reduce the potential for collisions with right whales.

(g) The Coast Guard actively supports emergency efforts of NMFS and its representatives in stranding response (when CG resources are available) by providing vessels, equipment, facilities, communications, and even public relations staff to stem the media blitz associated with these events. As previously mentioned, a case in point is the recent incident (12/94) in which a right whale wandered up and down the Delaware River. The Coast Guard was instrumental in providing services that probably prevented the whale from being struck and killed by commercial vessel traffic in a heavily used shipping area.

All these efforts will reduce the probability of impacts. However, emergency operations are given priority over other concerns, including the safety of protected species, based on the belief that any alteration of these activities could result in loss of human life or property. Impacts that might result from these activities are unavoidable, but given the fact that high speed responses are only a small portion of vessel activity, the probability of impacts remains low.

(2) Physical and Acoustic Harassment

The presence or movement of a USCG vessel or aircraft could physically harass, or, through noises generated by vessels (engine, propeller, sonar), disrupt, alter, or displace normal activities such as feeding, breeding, migrating, nursing of calves, breathing patterns, and other behaviors. It has been shown that marine mammals respond to engine noise in their environment (Baker et al., 1983, Richardson et al., 1985, Stewart et al., 1983, Swartz and Jones, 1978, Malme et al., 1986; 1988), and that this may affect their distribution. However, not all responses by marine mammals to vessels are "negative". Some responses indicate that the animal is curious about the vessel, such as orientation or approach towards the vessel. Such behaviors may be viewed as "positive" responses to vessels (although if an approach is too close, this could endanger the animal). Watkins (1986) compared responses by whales to whale watch vessels over the years 1957-1975 ("pre-whale watch years") and 1976-1982 ("whale watch years"), as recorded in log-books of vessel captains. The data indicated that different species exhibited different responses to vessels, and that these responses varied between the 2 time-periods compared. For example, minke whales shifted their response from positive (approach) to neutral. Humpbacks exhibited a higher number of positive responses during the whale watch years. This does not mean that positive or negative approaches are good or bad for the whales (we do not know). However, there is no evidence that the presence of vessels (or their associated noise) exerts a negative long-term impact on their populations. Kraus (1989) noted that preliminary studies indicate that right whales may be showing signs of habituation to vessels. Although a comparison of adult females showed that the number of vessel encounters did not seem to affect the number of calves produced, there is some concern that this habituation to vessels could lead to greater frequency of vessel strikes. It has been suggested that, for right whales, limiting approaches of all types of vessels to 500m or greater (as required in Massachusetts state waters) may be the solution to this particular problem.

Another concern is that vessel noise/traffic could lead to the abandonment of areas that are critical to breeding, calving, nursing, sheltering, or feeding. For example, for years it was believed that growth of the whale watching industry in Baja Lagoon could force calving gray whales to relocate to less suitable areas to bear and nurse their young. So far however, this has not occurred; perhaps due to strict controls put in place by the Mexican government on the number of vessels permitted to enter the lagoons and on which areas the vessels can visit in the lagoons (Tache, 1989).

The study of long-term impacts of vessel traffic/noise has been hindered by difficulty in establishing cause and effect relationships. However, although physical and acoustic harassment by USCG vessels is possible, such disturbance would be infrequent, short in duration, and unlikely to have an effect as a whole on the populations of endangered or threatened marine species. This is particularly true if the Marine Mammal and Endangered Species Programs in place for the First, Fifth and Seventh USCG Districts are strictly adhered to – these programs provide specific instructions to avoid impact or harassment of whales once they are detected (visual sightings) or determined to be in nearby waters (from sighting networks information). However, while USCG operations are a possible source of disturbance, they comprise only a fraction of the acoustical and physical disturbance generated by the commercial and recreational vessel activity on the oceans. If acoustical disturbance were shown to be a significant problem for protected marine species, decreasing recreational and commercial vessel traffic may also be an effective approach.

Even less is known regarding the effects of aircraft on marine mammals. Extremely loud aircraft (for example, the Concord) may introduce enough noise into the marine environment to be disturbing to marine mammals. However, all that has been documented to date are "startle responses", such as a sudden dive. Such responses are generally in response to the shadow of an aircraft rather than to noise (Hain, pers. comm.). The degree of response, and from what altitude, seems to be distinctly variable between species, but spotted seals seem to be the species most sensitive to approach observed thus far. Startle responses have been observed in this species from flyovers at altitudes above 2,000 ft. (DeMaster, pers. comm.). The BA states that flights over critical habitat will be flown at altitudes greater than 3,000 ft. It is highly unlikely that flights at this altitude would be disturbing to right whales, the species/habitat areas of most concern with respect to this biological opinion.

While USCG operations are a possible source of disturbance, they comprise only a fraction of the acoustical and physical disturbance generated by the commercial and recreational vessel activity on the oceans. If acoustical disturbance were shown to be a significant problem for protected marine species, decreasing recreational and commercial vessel traffic may also be an effective approach.

(3) Prey Dispersal

The presence or movement of a USCG vessel could disperse the prey of listed whales, particularly the dense patches of plankton required for efficient trophic transfer to right whales. This effect might occur in the high-use feeding areas of these whales in Cape Cod Bay or the Great South Channel, if there was a particularly high level of USCG activity in the area. Given the low frequency of emergency responses and the control that can be maintained over standard operations to decrease such effects, the effects on prey of endangered and threatened marine mammals and sea turtles would be minimal.

(4) Increased pollution

USCG vessels could introduce pollutants and debris into the marine environment. However, as the Coast Guard leads the cleanup of environmental pollution events (i.e. oil spill response), and is responsible for policing the oceans for violators of marine pollution laws, they are likely responsible for preventing or cleaning far more pollution from the ocean than they could contribute by accidents, failed equipment, or normal operations.

Coast Guard units with responsibility for responding to oil spills have already consulted regionally on the potential impacts of oil spill response procedures and technologies. These consultations have helped to ensure that the specific conduct of oil spill response activities does not negatively impact protected species. While this biological opinion considers the potential impacts of the operation of USCG vessels and aircraft, the USCG should continue to seek separate Section 7 consultation, when necessary, for hazardous material response technologies and general procedures.

In addition, operation of the SAR and other responses to environmental disasters as mentioned, actually decreases the likelihood that derelict vessels, gear, fuel, or their cargo could become a source of pollution or entanglement debris causing the death of protected species.

Cumulative Effects

"Cumulative effects" are defined in 50 CFR §402.02 as those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. Cumulative impacts from unrelated, non-federal actions occurring in the northwest Atlantic may affect sea turtles, marine mammals, and their habitats. Stranding data indicate marine mammals and sea turtles in Atlantic waters die of various natural causes, including cold stunning (in the case of sea turtles), and other human activities, such as incidental capture in fisheries, ingestion of or entanglement in debris, vessel strikes, and degradation of nesting habitat. The cause of death of most marine mammals and turtles recovered by the stranding network is unknown. In waters of many Atlantic states, state-permitted coastal gillnetting may affect listed sea turtles and marine mammals.

Commercial and private vessels may affect humpback, fin and right whales, and all species of sea turtles. As a point of reference, commercial shipping traffic in Massachusetts Bay is estimated at 1200 ship crossings per year with an average of three per day. About 20 whale watch companies representing 40-50 boats conduct several thousand trips from April to September, with the majority of effort in the summer season. More than 280 commercial vessels fish on Stellwagen Bank. Sportfishing contributes more than 20 vessels per day from May to September. In addition, an unknown number of private recreational boaters frequent Massachusetts and Cape Cod Bays. Massachusetts waters occupy only a small portion of the range of these species, so the potential traffic they are subjected to over their entire range along the western N. Atlantic is substantial. It is possible that the combination of these activities may cause sublethal effects to protected species that could prevent or slow a species' recovery. USCG vessels operations are a small fraction of this activity.

Recent work done in the mid-Atlantic area (between Chesapeake Bay, Virginia, and Cape Hatteras, North Carolina) on causes of mortality in humpback whales (Wiley et al., 1995) showed that 30% of the stranded individuals, where the cause of death was determinable, was attributed to vessel strikes; 25% had injuries consistent with entanglement in fishing gear. This indicates that vessel interactions are also having an impact along this portion of the coast. Because most of the whales involved in these interactions are juveniles, it adds to the perception that areas of concentration for young or newborn animals are particularly important to protect.

In the southeastern United States, annual dredging to accommodate commercial shipping occurs in the nearshore approaches to most of the major ports.

Generally, right whales and humpback whales do not use southeastern waters for feeding. Therefore, most of the effects from pollution would be expected in the northern summer feeding areas for these species. However, sea turtles nest primarily in the southeastern United States, and early life stages and breeding individuals of these species are likely to be impacted by pollution. Necropsies of hatchlings and juveniles show that young turtles commonly consume tar balls (SSTN stranding data base).

In feeding areas of the northeast such as the Massachusetts Bay area, the dominant circulation patterns make it probable that pollutant inputs into Massachusetts Bay will affect Cape Cod Bay's right whale critical habitat. Disposal operations at the Massachusetts Bay Disposal Site (MBDS) are currently being monitored for ecosystem effects and another site in Cape Cod Bay is in the preliminary stages of Section 7 consultation for designation as a disposal site. Barrels at the historic Industrial Waste Site containing low level radioactive waste, located two nautical miles west of the Massachusetts Bay Disposal Site, may affect water quality. Impacts of barrel seepage or release of chemicals due to severe weather conditions or impacts by fishing gear are unquantified.

Other contributors of pollutants in the Massachusetts and Cape Cod Bays include atmospheric loading of pollutants such as PCBs, storm water runoff from Massachusetts coastal towns, cities and villages, runoff into rivers emptying into the bays, groundwater discharges and river input and runoff from Gulf of Maine waters. The Massachusetts Water Resources Authority will be conducting an extensive monitoring program of their proposed outfall to evaluate the future contribution of that source to ecological effects on Cape Cod and Massachusetts Bays. Nutrient loadings from Cape Cod and Plymouth communities stimulate nearshore spring blooms similar to those observed near Boston Harbor.

Large commercial vessels, fixed fishing gear, and dredging activities are prevalent along the entire western Atlantic coastline. All the protected species considered in this consultation have been impacted by vessel traffic and fishing gear. These are probably the two most significant impacts on right whales and humpback whales, while fishery interactions and dredging activities are the most problematic for sea turtles.

The combination of all these activities may cause effects to protected species that could prevent or slow a species' recovery. Designation of critical habitat, proactive approaches by other federal agencies (i.e. the COE has limited dredging in southeastern channels to periods when turtles are not concentrated in the channels), participation by federal agencies in recovery plan implementation activities and the section 7 process all contribute to mitigating these potential cumulative effects.

Critical Habitat

The assessment of impacts to critical habitat must include an analysis of the effects to the essential features of critical habitat, regardless of the presence of the species at the time of impacts. Essential features are those essential for the conservation of the species and which may require special management considerations. Essential habitat for right whales is used for foraging, breeding and nursing.

USCG vessel operations are expected to have little effect on right whale critical habitat (see discussions (3) Prey Dispersal and (4) Increased Pollution, above). These areas were designated because they are known high-density and high-use areas during certain seasons of the year. Certain USCG activities (aerial surveys, enforcement, Notice to Mariners, oil spill response) actually contribute to the success of right whales in using those habitats without human induced impacts. Specific measures are in place to heighten awareness of right whale critical habitat and provide timely information on the presence and use of the area by the whales. NMFS concludes that the proposed actions are not likely to result in the destruction or adverse modification of designated critical habitat.

Conclusion

NMFS concludes that long-term continuation of USCG activities may adversely affect, but is not likely to jeopardize the continued existence of populations of the endangered right whale. This conclusion is based on current and proposed programs, conducted in close coordination with NMFS, that minimize the possibility of severe impacts. In the southeastern U.S. waters, improved implementation and coordination of, and cooperation with, the right whale Early Warning System is particularly important.

NMFS concludes that long-term continuation of USCG activities may adversely affect, but is not likely to jeopardize the continued existence of populations of endangered humpback and fin whales, endangered Kemp's ridley leatherback and hawksbill sea turtles, endangered/threatened green sea turtles and threatened loggerhead sea turtles.

As discussed in the impacts section above, there are two documented cases of USCG operations harming right whales, one in 1991 and one in 1993. In addition, ship strikes are known to harm other endangered and threatened marine mammals and sea turtles, although none have been specifically attributed to Coast Guard vessels. Significantly, these right whale mortalities occurred before the Coast Guard began implementing procedures that substantially reduce the probability that they will impact endangered and threatened whales and sea turtles.

Also as noted in the assessment of impacts section, a number of preventive and mitigating measures proposed by the USCG are already in place, reducing the likelihood of ship-strikes on any protected species from occurring in the future. Not all of the measures are in place in all Atlantic districts, and implementation has not been viewed the same by commanders in all districts. To further reduce the likelihood of impacts to protected species in the future, all Atlantic Districts should adopt the listed preventive and mitigating measures and pursue the conservation recommendations provided in this consultation. These programs should be expanded and improved in order to further decrease the probability that these operations will adversely affect protected species, particularly the northern right whale. In this regard, NMFS has provided Conservation Recommendations below.

In summary, implementation of the programs outlined above significantly reduce the potential for impacts of vessel operations on protected species. Continued use of directives and programs by the district commands form the basis of the NMFS conclusion that USCG vessel and aircraft operations will not jeopardize any endangered or threatened species. In addition, USCG vessel operations provide the following significant benefits:

1) timely response and clean-up of human induced environmental disasters such as oil spills that could have severe impacts on critical habitats;
2) enforcement capability to prosecute violators of marine laws;
3) reduction of marine debris and pollution through SAR efforts that prevent vessel and gear loss at sea; and
4) directed reconnaissance, casual sighting, and information networks.

The Coast Guard also serves as a platform for dissemination of public information on conservation and protection of protected species in conjunction with resource agencies (notices, boardings, public meetings). Therefore, preventing the Coast Guard from fulfilling their mission in many areas may have greater impacts on recovery of threatened and endangered species than allowing them to continue with mitigated activities.

Reinitiation of Consultation

Reinitiation of formal consultation is required if (1) the amount or extent of taking specified in the incidental take statement is exceeded (e.g. an endangered whale is struck or injured by a USCG vessel); (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion (e.g., if the measures outlined in the proposed activity are not implemented or are modified in a manner that results in increased risks to endangered or threatened species); or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

Conservation Recommendations

Pursuant to section 7(a)(1) of the Endangered Species Act (ESA), the following conservation recommendations are made to assist the USCG in reducing/eliminating adverse impacts to listed and proposed species and promoting their conservation and recovery. Many of these recommendations have been discussed at a number of Right Whale Implementation Team meetings and in other correspondence between NMFS and the USCG. Some of these recommendation apply only to particular districts that may have unique habitat considerations, namely, the breeding and calving grounds in the Seventh District. Because NMFS is not authorizing an incidental take of endangered whales, we strongly encourage the USCG to fully implement these recommendations to minimize any potential for injuring or killing a listed species.

1. Between January 1 and March 31, when humpback and fin whales are concentrated in shallow waters between Cape Henry and Cape Hatteras, all USCG vessels operating in this area should post dedicated lookouts to spot endangered species. This lookout should watch for whales at all times, and the vessel operator should take necessary precautions to avoid whales. The USCG should maintain regular contact with the Virginia Marine Science Museum (Mark Swingle at (804) 437-4949) and the NMFS Beaufort Laboratory (Vicky Thayer at (919) 728-8762) to obtain reports of whale sightings in the area which will used as a guideline to determine when extra precautions may be necessary. Sightings of endangered whales in the area should be broadcast over NAVTEX, with a warning to mariners in the vicinity to exercise caution.

2. In addition to posting dedicated observers on vessels in the southeastern critical habitat area over the calving season, it is recommended that dedicated observers also be posted on all USCG vessels operating in the general area between Savannah Georgia and Palm Beach, Florida, to watch for whales. Critical months in Savannah are November - December and March - April, when the whales are transiting to and from the calving grounds, and January to March in the extended area to the south of designated critical habitat. Right whales have been sighted as far south as Ft. Lauderdale (Mead, 1986).

3. The terms "maximum safe speed" for emergency operations and "proportional to the mission" for standard operations currently convey that the mission goals supersede the safety of protected species. In certain operations, such as emergency SAR and drug interdiction missions, maximum safe speed may be the only choice. The USCG's standard operating procedures should be revised, with the assistance of NMFS, to incorporate protection for endangered and threatened species where they occur in conjunction with USCG operations. This is particularly important for operations when whales are aggregated in known high-use and high-density areas.

4. The USCG should ensure that its lookouts (described in the BA as standard operating procedure) are trained in techniques required to spot marine mammals and sea turtles.

5. In the southeastern United States (Georgia through Florida) from mid-December through March, to protect the calving grounds for the northern right whale, broadcasts reporting right whale sightings by the EWS should be transmitted as quickly as possible over NAVTEX and any other practicable means available to as wide a distribution of vessels possible. The message should advise mariners within 15 nm of the sighting to operate at the slowest safe speed (5 knots if possible), exercise caution, and keep a watch for right whales. This recommendation is based on

observations by researchers that right whales can travel at burst speeds of 5-6 knots; thus speeds of 5 knots could allow a right whale to successfully evade a ship if necessary. Greater vessel speeds may not allow a right whale to escape in time to prevent a collision. Due to the difficulty in spotting this particular species, as well as its unpredictable nature, implementing slow speeds under the conditions described above may be the only method to prevent collisions.

In previous meetings and correspondence with members of the Right Whale Recovery Implementation team, the NMFS Southeast Region has recommended that the protocol for the emergency warning system include advising all large vessels to slow to 5 knots (or the safest speed possible) when they have been alerted that a right whale has been sighted within 15 nm of the vessel or when visibility is limited. This guideline is currently adhered to by the Corps of Engineers for dredging operations in the South Atlantic.

6. The USCG should develop training for personnel that emphasizes not only stranding and enforcement issues, but information on the distribution and behavior of these species that will help the USCG to anticipate where and when conflicts may occur. The USCG should strive to promote a healthy, conservation-oriented climate, as mandated by section 7(a) of the ESA, which tasks federal agencies not only to prevent jeopardy to the species, but to promote recovery.

7. When and where possible, routine transits should avoid those high-use and high-density whale habitat areas during the seasons when whales are concentrated in those areas. For the northern right whale these areas are shown on nautical charts as Critical Habitat. Although implementing some of these precautionary measures may incur extra time, this contribution may be as valuable or even more beneficial to the survival and recovery of these species than directed research or data gathering projects.

8. The USCG should continue its active participation in regional recovery plan implementation teams and task forces.

9. The USCG should continue fulfilling its missions, with modifications as discussed above, which support recovery efforts of protected species.

10. During standard operations, and following a whale sighting, USCG vessels should maintain a minimum distance from the whale (recommended distances are a minimum 100-yards for all large whales).

11. As indicated in the BA to be USCG standard practice, USCG vessels in the vicinity of beaches where sea turtles are actively

nesting, or near whale sightings, should be notified and advised to proceed through the area with caution.

12. The USCG should evaluate the collective impact of all of their vessel activities, including passive activities (e.g., anchorages), within the Florida intracoastal waterways on Johnson's seagrass, a species proposed to be listed as threatened. A summary of anticipated projects and estimates of any potential seagrass take levels should be developed to allow NMFS to provide a comprehensive conference or consultation.

13. As this biological opinion does not consider the effects of USCG activities on endangered/threatened species in the Gulf of Mexico, we recommend that the USCG initiate consultation on those activities in the Gulf.

14. To provide additional cooperative opportunities for conservation and protection of these species in mid-Atlantic and southern portions of their range, an MOU should be developed among NMFS, the Fifth and Seventh USCG Districts, and the National Marine Sanctuaries Program regarding the New England and Southeastern regional Implementation Teams for the Right Whale and Humpback Whale Recovery Plans.

15. Juvenile humpback and fin whales have increased in abundance in coastal waters from Cape Henry to Cape Hatteras between January and March. Concurrent with these recent observations, there have been a number of vessel-related whale mortalities in this region (Barco, pers. comm.). The concentration of vessels in the area, coupled with the shallow water depths found in the area, makes the potential for whale/vessel collisions high (Wiley et al., 1995). NMFS recommends that, with the cooperation and participation of the USCG, the New England Right and Humpback Whale Implementation Team, and the Southeastern Right Whale Implementation Team, should coordinate the development of a Mid-Atlantic Implementation Team that addresses these mortalities. This group should meet and discuss how to organize reports of whale sightings in the area to a central repository, which could provide information on these sightings to the USCG for broadcast over NAVTEX.

In addition to these specific recommendations, the Recovery Plans describe actions that federal agencies and NMFS can take to assist in the recovery of these species in the associated implementation schedules.

Incidental Take Statement

Section 7(b)(4) of the Endangered Species Act (ESA) requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA, and the proposed action may incidentally take individuals of listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. It also states that reasonable and prudent measures, and terms and conditions to implement the measures, be provided that are necessary to minimize such impacts. Only incidental taking resulting from the agency action, including incidental takings caused by activities approved by the agency, that are identified in this statement and that comply with the specified reasonable and prudent alternatives, and terms and conditions, are exempt from the takings prohibition of section 9(a), pursuant to section 7(a) of the ESA.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the Marine Mammal Protection Act of 1972 (MMPA). Since no incidental take has been authorized under section 101(a)(5) of the MMPA, no statement on incidental take of endangered whales is provided and no take is authorized.

Because sea turtles are sometimes killed by vessel strikes and a low level of incidental take occurs, the terms and conditions necessary to minimize and monitor takes are established. The incidental take, by injury or mortality, of one sea turtle (any species) is identified pursuant to section 7(b)(4) of the ESA. This take level represents the total take per year for all USCG vessel and aircraft activities along the Atlantic.

To ensure that the specified levels of take are not exceeded, the USCG should reinitiate consultation when one turtle is injured or killed in any USCG district. The NMFS Northeast or Southeast Region, as appropriate, will cooperate with the USCG in the review of such incidents to determine the need for developing further mitigation measures.

The following reasonable and prudent measure is established to implement the terms and conditions of the incidental take statement and to document an incidental take if it occurs:

NMFS must be advised immediately (within 24 hours) of any take(s) of an endangered whale. A report summarizing any sea turtle or marine mammal take(s) must be submitted to NMFS within 15 working days of completion of any given project or activity. An annual report (based on either calendar or fiscal year) must be submitted to NMFS summarizing USCG projects and activities, documented sea turtle incidental takes, and whale sightings.

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