Appendix 3-G

Marine Protected Species Descriptions

Appendix 3-G
Marine Protected Species Descriptions

1.0 INTRODUCTION

The following information describes the general seasonal distribution and mortality factors for the federally-listed marine protected species, state-listed marine protected species, and other protected marine mammals that could occur in the three offshore alternative sites. The information below is generally applicable to each of the offshore alternative sites - Nantucket Sound offshore alternative (NS), South of Tuckernuck offshore alternative (STI), and New Bedford/Horseshoe Shoal combination offshore alternative (NB). When available, information on specific occurrence, sightings, or key habitat in each of the offshore alternative sites is discussed briefly in this Appendix and also in Section 3.4.3.2.4 of the Alternatives Analysis.

2.0 FEDERALLY-LISTED SPECIES PROTECTED UNDER THE ESA

2.1 Humpback whale (*Megaptera novaeangliae*)

Seasonal Distribution in North Atlantic Waters

The humpback whale is a migratory species, and spends the summer in northern latitude feeding grounds (40° to 75° N latitude) in areas of high productivity (NMFS 1991a). Because of the patchy distribution of their prey, humpback whales must target places where prey abundance is high. Humpbacks are found most often in areas of upwelling, along the edges of banks, and over rapidly changing bathymetry along the continental shelf, and along frontal zones between well-mixed and stratified water masses. Movements of humpback whales along these features probably are controlled by the distribution of their prey (Brodie *et al*. 1978; Gaskin 1982; Kenney and Winn 1986; Dolphin 1987a,b; Mayo *et al*. 1988; Payne *et al*. 1990).

The seasonal distribution of humpback whales in New England waters suggests that most of the humpbacks sighted are part of the Gulf of Maine feeding aggregation (Wiley *et al.* 1995). Humpback whales regularly visit the southern New England area, where they are present in greatest abundance between June and September (Payne and Heinemann 1990; Sadove and Cardinale 1993). All age classes, including mother/calf pairs, are present during the summer. Smaller numbers, nearly exclusively solitary juveniles, frequently are observed in December and January. One of the primary feeding grounds is Stellwagen Bank. On November 4, 1992, this area was designated as a National Marine Sanctuary under Title III of the Marine Protection, Research, and Sanctuaries Act. Since 1988, a dramatic decline in the use of Stellwagen Bank by adult humpback whales has occurred, apparently due to the decline in sand lance populations in the area, a primary food source (Weinrich *et al.* 1993).

Very few whales are sighted within Nantucket Sound itself, in the South of Tuckernuck area, or in Buzzards Bay (Figure 1). Most whales are found in areas where their primary food source can be easily located. The offshore alternative sites do contain some of the bathymetric and oceanographic features that favor dense aggregations of humpback whale prey species but they are not developed to the extent that they are farther north around Stellwagen Bank, Jeffreys Ledge, Browns and Bacaro Banks, and in the Great South Channel (Kenney and Winn 1986). Therefore, the preferred foods of humpback whales and the whales themselves occur in the three offshore alternative sites with far less abundance and frequency than in high-use areas farther north. Most references show humpback whales moving from the eastern shores of Long Island Sound, out around the southern shores of Martha's Vineyard and Nantucket towards Nantucket Shoals and the Great South Channel. Historically and at present, none of the three offshore alternative sites appear to be an important area for humpback whales.

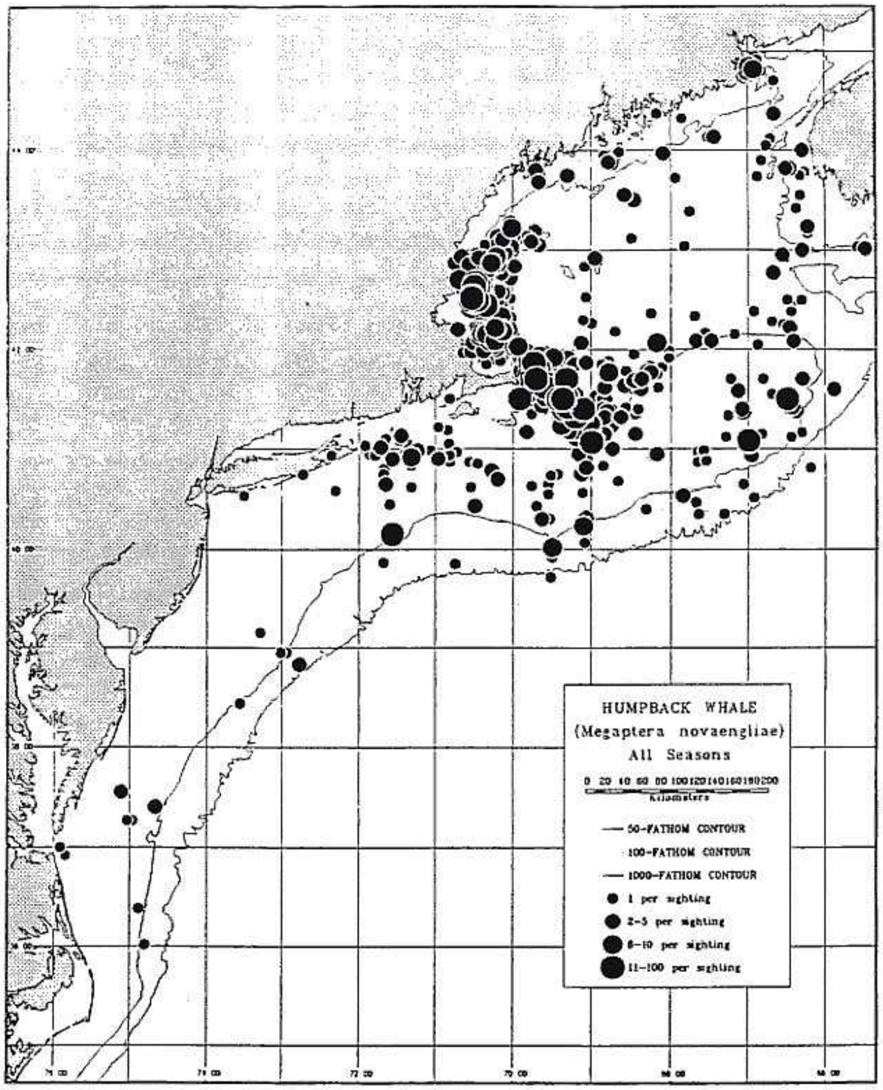

Figure 1. Humpback whale sightings in the Western North Atlantic (NMFS Northeast Fisheries Science Center, unpublished data).

Known Disturbance and Mortality Factors

The most common anthropogenic source of mortality for humpback whales in the western North Atlantic is entanglement in commercial fishing gear, particularly off Newfoundland (O'Hara *et al*. 1986; Lien *et al*. 1989a,b; Hofman 1990; Volgenau and Kraus 1990; NMFS 1991a). For the Gulf of Maine populations, the total annual mortality and serious injury rate attributable to human impacts for the period of 1996 to 2000 is estimated at 3.0 (NMFS 2002). A review of mortalities and serious injuries for the years 1996 to 2000 reveal that two mortalities and twelve serious injuries in the Gulf of Maine stock were attributable to fishery interactions (NMFS 2002).

Humpback whales are relatively tolerant of boats (Pett and McKay 1990) and are seen frequently in the Great South Channel and Stellwagen Bank in the vicinity of commercial and recreational fishing vessels and whale watch boats. Humpbacks in the western North Atlantic are more habituated to vessel approach than any other cetacean in the area (Watkins 1986). As whales become more habituated to whale-watch and other vessel traffic, the chance of collision increases (Beach and Weinrich 1989). There is some evidence of increased incidents of ship collisions in the Gulf of Maine (NMFS 1991a). In a recent study of stranded humpback whales along the Middle-Atlantic and southeast United States, 30% (n=20) had injuries potentially associated with a ship strike (Wiley *et al*. 1995).

Little is known about natural mortality in humpback whales. Parasites, ice entrapment, predation by killer whales, and fluctuating prey populations due to events such as El Niño may contribute to natural humpback mortality rates (NMFS 1991a). Young or sick humpbacks seem to be particularly vulnerable to attacks by killer whales (*Orcinus orca*) and occasionally by larger predatory sharks (NMFS 1991a). There has been one documented event of a large kill of humpbacks thought to be attributable to ingestion of prey contaminated with phytoplankton toxins. Although not well documented, humpback whales also have the potential to bioaccumulate and biomagnify contaminants through the marine food web.

2.2 Fin whale (*Balaenoptera physalus*)

Seasonal Distribution in North Atlantic Waters

Fin whales are the most common of the large whales in the temperate waters of the western North Atlantic, and are found all along the continental shelf between Cape Hatteras and southeastern Canada in all seasons (Hain *et al.* 1992) (Figure 2). Fin whales are commonly seen on the continental shelf in waters less than 100m deep, and rarely on the continental slope or beyond.

In spring and summer, approximately 5,000 fin whales occupy the continental shelf between Cape Hatteras and the Canadian border; numbers decrease to about 1,500 during the fall and winter each year (Hain *et al.* 1992). They are common in waters out to the shelf edge at 200 m, but rarely are sighted in waters deeper than 2,000 m. Sixty-five percent of sightings are in water depths of 21 to 100 m.

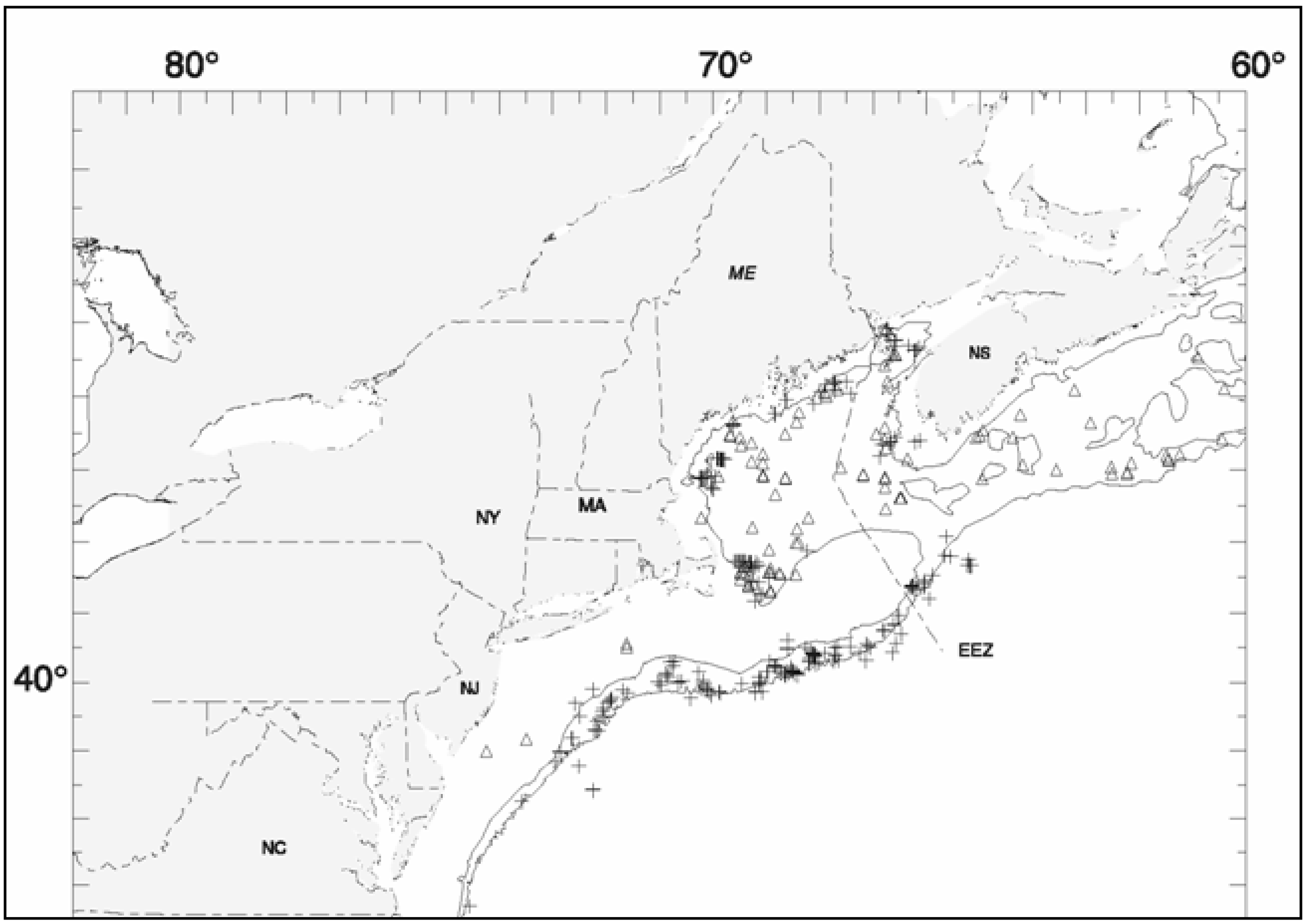

Figure 2. Distribution of fin whale sightings from summer NEFSC and SEFSC shipboard and aerial surveys for the period 1990 to 1998.

New England waters are important feeding grounds for fin whales. Jeffreys Ledge, Stellwagen Bank, and Cape Cod Bay experience a spring influx of fin whales, reaching maximum numbers during the summer (CeTAP 1982). They are most abundant along the 40 to 50-m depth contour, particularly in the Great South Channel, across Stellwagen Bank and northeastward to Jeffreys Ledge (Hain *et al.* 1992). The summer distribution of fin whales is similar to that of humpback whales, and the two species are considered sympatric throughout much of their range in United States waters of the Atlantic during the summer feeding season.

During the fall and winter, three quarters of these whales leave the area, and the distribution of the remaining whales contracts to the mid-shelf east of New Jersey and to Stellwagen and Georges Banks. The majority move south and offshore, starting in October, to wintering grounds off the Delmarva Peninsula and the Outer Banks of North Carolina (CeTAP 1982; EPA Region 1 1988), and perhaps further south. Hain *et al*. (1992) speculate that the large numbers of fin whales sometimes sighted in waters off Cape Hatteras in spring and fall are moving between northern summer feeding grounds and southern over-wintering grounds in the Charleston Bight off South Carolina. However, very few surveys have been performed in this area, so it is uncertain if fin whales actually occur there in large numbers during the winter. Acoustic data indicate that fin whales are present far offshore during the winter months (Clark *et al.* 1993).

Fin whale calves arrive in the summer feeding areas in Rhode Island Sound, off New England, and in eastern Canada with their mothers. Even after separation from their mothers, which usually takes place after about a year, most juveniles return to the same feeding areas they first visited with their mothers, suggesting that migratory behavior and preferred feeding locations are maternally derived (Seipt *et al*. 1990; Clapham and Seipt 1991).

Very few whales are found in Nantucket Sound, in the South of Tuckernuck area, or in Buzzards Bay (Figure 2) even though the Stellwagen Bank feeding grounds are nearby or in adjacent waters. Most whales are found in areas where their primary food source can be easily located. The offshore alternative sites do contain some of the bathymetric and oceanographic features that favor dense aggregations of fin whale prey species but they are not developed to the extent that they are farther north around Stellwagen Bank, Jeffreys Ledge, Browns and Bacaro Banks, and in the Great South Channel (Kenney and Winn 1986). Therefore, the preferred foods of fin whales and the whales themselves occur in the three offshore alternative sites with far less abundance and frequency than in high-use areas farther north. Most references show fin whales moving from the eastern shores of Long Island Sound, out around the southern shores of Nantucket and Martha's Vineyard towards Nantucket Shoals and the Great South Channel. Historically and at present, none of the three offshore alternative sites appear to be an important area for fin whales.

Known Disturbance and Mortality Factors

There is very little published information about natural and anthropogenic causes of death and disease in fin whales. It is probable that the hazards that affect humpback whales also affect fin whales. Fin whales often are caught in fish traps deployed in offshore Canadian waters and there have been reports of fin whales being entangled in groundfish gill nets in inshore waters of Newfoundland (Hofman 1990). Fin whales were also observed entangled in lobster gear in the Gulf of Maine (Volgenau and Kraus 1990).

Fin whales seem to be the most wary of the great whales when approached by whale watch boats and other vessels in Massachusetts Bay (Watkins 1986). Fin whales react strongly to low-frequency ship sounds which are near the frequency of their own vocalizations (Cummings *et al*. 1986; Watkins *et al*. 1987). In the early 1970s, they actively avoided approaching vessels and would often dive if approached. In recent years, however, they have either ignored small vessels or actually approached to investigate them. Although they have become accustomed to small vessel activity in recent years, they apparently are not often harmed by it.

There have been 72 verified strandings and nine “floaters” of fin whales along the U.S. Atlantic coast during this century (Hain *et al*. 1992). Strandings have occurred most frequently on Cape Cod, Cape Hatteras, and Long Island. All strandings of neonates (less than eight meters long) occurred south of New Jersey. The cause of death of most of these whales is unknown. However, a yearling female fin whale stranded in New England in 1977 apparently died of a massive infection of giant nematode parasites (*Crassicauda boopis*) in the kidneys (Lambertsen 1986).

Because fin whales are the fastest swimmers of the baleen whales, it is unlikely that predation by killer whales and large sharks is an important cause of natural injury and death, except possibly among the very young or sick. Nevertheless, the literature contains some records of attacks by killer whales on fin whales (Tomlin 1957). Other natural mortality factors may include accumulation of biological toxins from prey species to whale tissues through trophic transfer and biomagnification.

2.3 Northern right whale (*Eubalaena glacialis*)

Seasonal Distribution in North Atlantic Waters

Right whales, like other large whales, are migratory animals (Gaskin 1982). Right whale seasonal movements occur among the following six "high use" areas in the North Atlantic: (1) Cape Cod and Massachusetts Bays, (2) the Great South Channel, (3) the Bay of Fundy, (4) the Scotian Shelf, (5) the coastal waters of the southeastern United States, and (6) Georges Bank/Gulf of Maine.

Three areas have been designated as critical habitat for the northern right whale: the Great South Channel, Cape Cod Bay, and Southeastern U.S. waters fifteen miles offshore from the Alameda River in Georgia to Sebastian Inlet in Florida. These regions are considered to be essential for the reproduction, rest and refuge, health, continued survival, conservation, and recovery of the northern right whale population. This designation does not restrict human activities within the critical habitat, but instead serves as a means of alerting interested parties, including Federal agencies, to the importance of the area, and helps to focus conservation efforts.

New England waters are important feeding and nursery grounds for right whales (Figure 3). In February through April, an average of 40 animals arrive and feed in Cape Cod Bay (Marx and Mayo 1992). Between 1978 and 1987, more than one half of all photographically identified animals were seen in this area. Peak abundance, including cow-calf pairs, is in April (Hamilton and Mayo 1990). Feeding, nursing, and mating behavior have all been observed in Cape Cod Bay (Schevill *et al.* 1986; Hamilton and Mayo 1990; Marx and Mayo 1992). In the spring, many animals (6 to 22% of the population, and 0 to 57% of all calves), also use the Great South Channel as feeding and nursery grounds (Kraus and Kenney 1991). Utilization peaks in May, when up to 179 animals have been observed in the area. Individuals are usually in temperature-stratified waters north of a persistent thermal front and in water deeper than 100 m.

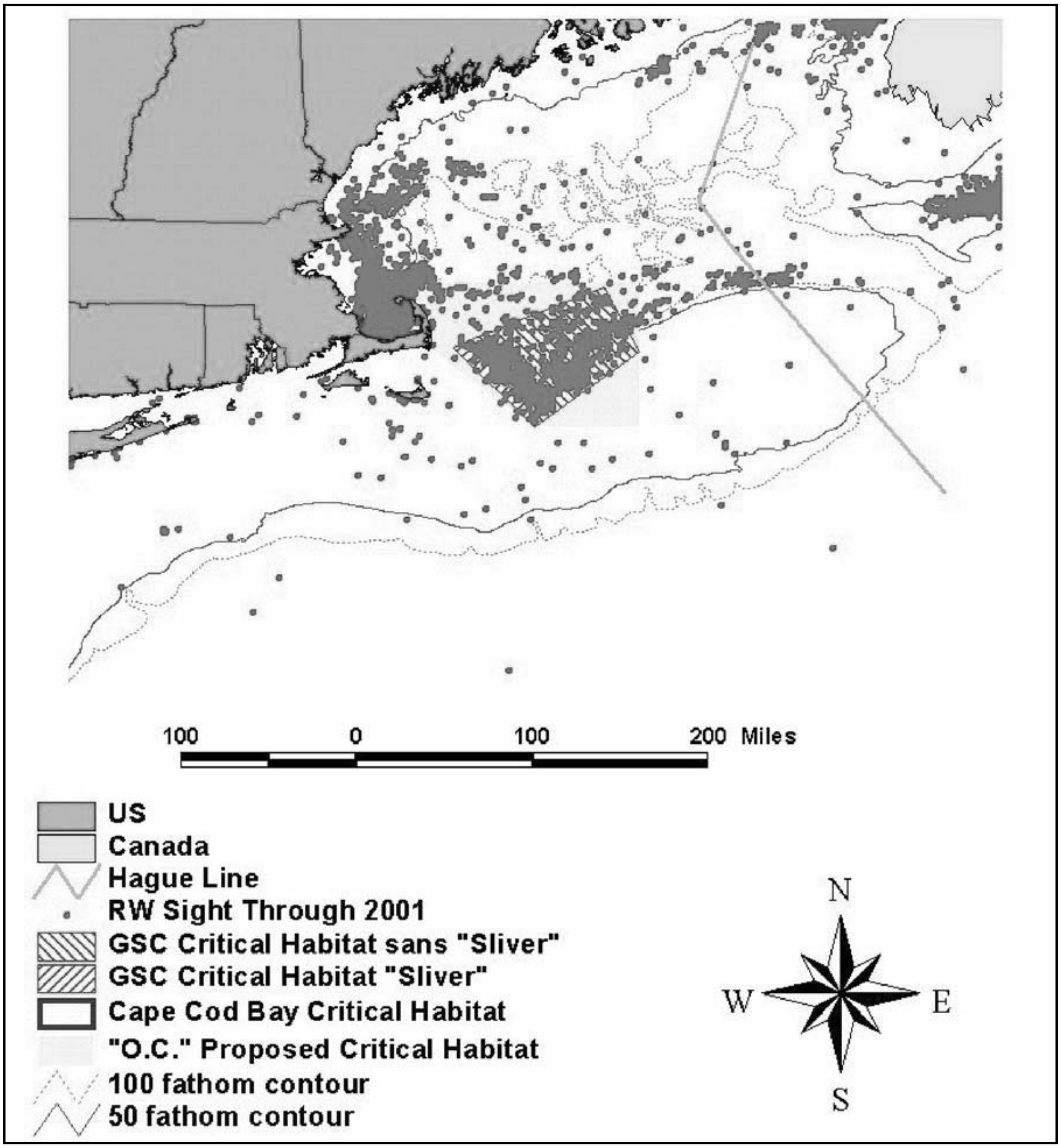

Figure 3. North Atlantic Right Whale Sightings through 2001 (NMFS Northeast Fisheries Science Center, unpublished data).

The movement of whales into the Great South Channel is apparently in response to extremely dense aggregations of zooplankton. It is likely that this is the primary feeding ground for the northern right whale (Kenney *et al.* 1995). In the summer and fall, the lower Bay of Fundy is used as a feeding and nursery area for some animals, including nearly all mother/calf pairs. An additional summer/fall feeding ground, on the southern Nova Scotian shelf, is used almost exclusively by mature right whales (NMFS 1994).

The coastal waters of Georgia and Florida are the only known calving ground and winter nursery area for the northern right whale. Typically, the majority of animals seen in this area are females about to give birth, females with their newborn calves, and some juveniles.

Very few whales are found in Nantucket Sound, in the South of Tuckernuck area, or in Buzzards Bay (Figure 3) even though important seasonal feeding and nursery grounds for right whales are located adjacent or in nearby waters in the Great South Channel and Stellwagen Bank. Out of the three offshore alternative sites, the South of Tuckernuck Alternative has the most sightings of right whales in the immediate vicinity (Figure 3). Most whales are found in areas where their primary food sources can be easily located. The offshore alternative sites do contain some of the bathymetric and oceanographic features that favor dense aggregations of prey species but they are not developed to the extent that they are farther north around Stellwagen Bank, Jeffreys Ledge, Browns and Bacaro Banks, and in the Great South Channel (Kenney and Winn 1986). Therefore, the preferred foods of right whales and the whales themselves occur in the three offshore alternative sites with far less abundance and frequency than in high-use areas farther north. Most references show right whales moving from the eastern shores of Long Island Sound, out around the southern shores of Martha's Vineyard and Nantucket towards Nantucket Shoals and the Great South Channel. Historically and at present, none of the three offshore alternative sites appear to be an important area for right whales, although more sightings have been recorded at the South of Tuckernuck alternative area than the other two offshore alternative sites.

Known Disturbance and Mortality Factors
Many investigators consider habitat change to be the key environmental factor affecting the rate of recovery of the right whale (NMFS 1991b; Gaskin 1982). Of primary concern are the anthropogenic sources of change such as pollution, oil and gas exploration, sea-bed mining, and a general increase in coastal activities due to an increase in human population along the east coast (NMFS 1994; EPA 1993). Pollution resulting from intentional or accidental releases of chemicals to coastal waters has also been suggested as an important factor in the apparent poor recovery of North Atlantic right whale populations (Gaskin 1982). Although trace concentrations of several chemicals have been found in tissue samples from right whales (Woodley *et al.* 1991), there is no direct evidence to date that right whales have been adversely affected by pollutants, either through a pollution-induced increase in mortality rates of decrease in reproductive rate or success (EPA 1993).

The most significant impacts to right whales not attributable to habitat change are ship strikes and entanglement in fishing gear. A total of 45 right whale moralities are on record for the period of 1970 to 1999 (IWC 1999 and Knowlton and Kraus 2001 in NMFS 2001). Of these deaths, 41.3% were human-induced, from ship strikes (35.6%) and fishing gear entanglement (6.7%). Neonatal and juvenile right whales appear to be the most vulnerable and impacted part of the population.

Predation by killer whales may be a source of natural mortality for right whales. At least 3% (NMFS 1991b) to 9% (Kraus 1990; Kenney and Kraus 1993) of cataloged right whales bear scars, primarily on the flukes, from killer whale attacks (Kraus *et al.* 1986; Kraus 1990). Killer whales are relatively uncommon in the North Atlantic, but have been observed in the coastal waters of Georgia and Florida (Layne 1965), and in the Gulf of Maine (Katona *et al.* 1988). Deaths due to killer whale attacks have been documented for other species of baleen whales (Hancock 1965; Baldridge 1972; Silber *et al.* 1990).

2.4 Loggerhead turtle (*Caretta caretta*)

The loggerhead sea turtle (*Caretta caretta*) is listed as threatened under the Endangered Species Act. It is the most common and seasonally abundant turtle in inshore coastal waters of the western North Atlantic. At least five genetically distinct nesting assemblages exist in the western North Atlantic: the Florida Panhandle subpopulation, the South Florida subpopulation, the northern subpopulation (Amelia Island, Volusia County, FL and northward), the Yucatan Peninsula subpopulation, and the Dry Tortugas subpopulation (TEWG 1998, 2000; NMFS-SEFSC 2001).

Seasonal Distribution in North Atlantic Waters
Loggerhead turtles are abundant during spring and summer months in coastal waters off New York and the mid-Atlantic states, and a small number of individuals may reach as far north as New England. Loggerhead turtles first appear in waters around New York and New England in early June, where they remain in New York waters, mostly in coastal for the entire summer (Morreale and Standora 1989). Loggerhead turtles begin to leave northern waters, swimming first eastward and offshore and then southward, in late September through mid-October each year. Nearly all loggerheads remaining in northern waters after the beginning of November are cold-stunned and were likely caught by rapidly declining water temperatures during their southward migration (Morreale and Standora 1989). Loggerheads migrate southward to coastal waters off the south Atlantic states, particularly from Cape Hatteras, North Carolina, to Florida, with peak numbers passing Cape Hatteras in November (Morreale and Standora 1989; Musick *et al*. 1994). Some juvenile loggerheads remain through the winter in nearshore waters of North Carolina south of Cape Hatteras where water temperatures remain at or

above 11ºC (Epperly *et al*. 1995b). During the winter, the turtles tend to aggregate in warmer waters along the western boundary of the Gulf Stream off Florida (Thompson 1988). They also may hibernate in bottom waters and soft sediments of channels and inlets along the Florida coast (Ogren and McVea 1981; Butler *et al*. 1987). In the winter and spring, they congregate off southern Florida before migrating northward to their summer feeding ranges (CeTAP 1982). Peak numbers of northward-migrating sub-adult loggerheads occur off Cape Hatteras in April and May each year (Musick *et al*. 1994).

Following their juvenile pelagic phase, benthic immature loggerheads begin appearing in coastal waters along the United States Atlantic coast. The abundance of loggerhead turtles is much lower north of Cape Hatteras and nearly all the turtles that visit northern waters during the summer are juveniles with carapace lengths less than about 60 cm (Morreale and Standora 1989).

The center of distribution of juvenile loggerheads along the United States Atlantic coast is in central Florida off Cape Canaveral (Schmid 1995). Many of the young turtles migrate north during the spring and early summer to nearshore feeding areas, such as Core Sound, North Carolina (Epperly *et al*. 1995a,b), southern Chesapeake Bay (Keinath *et al*. 1987; Schmid 1995), and Gardners Bay and Long Island Sound, New York (Morreale *et al*. 1989; Shoop and Kenney 1992; Morreale and Standora 1989). Between 2,000 and 10,000 sub-adult loggerhead turtles use Chesapeake Bay south of the Potomac River for feeding during the summer (Keinath *et al*. 1987). Smaller numbers are encountered, particularly in July, in Delaware Bay (Eggers 1989). Loggerheads also are encountered frequently in Long Island Sound, New York Harbor-Raritan Bay, and along the south coast of Long Island during the summer (Morreale *et al*. 1989). Loggerheads frequently strand due to cold stunning between November and January each year along the north shore of Long Island Sound and in the Bays of eastern Long Island (Morreale *et al*. 1992). Loggerheads rarely occur north of Long Island around Cape Cod and in the Gulf of Maine (Shoop and Kenney 1992), but several sub-adults strand along the south shore of Cape Cod Bay each winter (Matassa *et al*. 1994).

Information from strandings, entanglements, mariner reports, and the U.S. Coast Guard suggest that loggerheads can be expected to occur rarely in Nantucket Sound as well, in the summer and fall months, though no systematic surveys have been conducted in the Nantucket Sound area (Cheryl Ryder 2002, personal communication). According to Crocker (2003), loggerhead turtles are occasionally found in Buzzards Bay every year. There may be greater use of Buzzards Bay by sea turtles than shown in the sightings and strandings reports given the difficulty of observing sea turtles at sea, and the restriction against net fishing within Buzzards Bay, which is a major source of sightings in other regions (Howes and Goehringer, 1996).

Known Disturbance and Mortality Factors

Strandings are a major source of mortality for loggerhead sea turtles; however, natural causes of these strandings are not well understood. Between four and seventeen loggerheads stranded each year in Massachusetts and Rhode Island waters during the period from 1990 to 2000, though atypically high numbers of 72 and 56 loggerhead strandings were reported in Massachusetts in 1995 and 1999, respectively (Sea Turtle Stranding and Salvage Network, unpublished data). For the period of 1980 to 1997, seven loggerhead strandings were recorded on the shorelines in Nantucket Sound, and four strandings were reported on the southern shorelines of Martha's Vineyard and Nantucket (NMFS, unpublished data). Strandings occur most frequently in the fall and winter; these strandings may be caused by cold stunning (Morreale *et al*. 1992; Matassa *et al*. 1994). As with most marine turtles, prolonged exposure of loggerheads to low water temperatures, below about 8ºC, may result in dormancy, shock, and death.

The major sources of mortality of sea turtles, including loggerheads, caused by human activities include incidental take in bottom trawls, particularly shrimp trawls (Henwood and Stuntz 1987; Thompson 1988; NRC 1990; Anonymous 1992), coastal gill net fisheries, marine debris, and channel dredging (Thompson 1988; NMFS 1992). Loss of nesting habitat along the south Atlantic coast caused by coastal development has also likely slowed recruitment of sea turtles. Ingestion of or entanglement in plastic debris also contributes to the death of many loggerhead turtles each year, though the magnitude of this mortality is difficult to estimate (NRC 1990).

2.5 Kemp's ridley turtle (*Lepidpchelys kempii*)

The Kemp's ridley turtle is the most endangered sea turtle in the world. The entire Atlantic population, consisting almost exclusively of juveniles, probably does not exceed 500 individuals (Carr and Mortimer 1980). The total world population of adult ridleys, mostly in the Gulf of Mexico, is approximately 2,200 individuals, down from an estimated 162,400 adult individuals in 1947 (Márquez 1989).

Seasonal Distribution in North Atlantic Waters

The Kemp's ridley sea turtle is found mainly in the Gulf of Mexico (Hildebrand 1982), but juveniles also occur during the summer along the Atlantic seaboard from Florida to Long Island Sound, Martha's Vineyard, and occasionally north of Cape Cod, in Cape Cod Bay, Massachusetts Bay, the Gulf of Maine, and as far north as the Canadian Maritime Provinces (Lazell 1980). Groups of dozens of young ridleys are observed frequently during the summer feeding in shallow coastal waters of Vineyard Sound, Buzzards Bay, MA, and in the eastern Bays of Long Island, NY (Carr 1967; Lazell 1980; Morreale and Standora 1989). Most of the Kemp's ridley turtles observed in the Buzzards Bay area are observed adjacent to the Bay and not within the Bay itself (Buzzards Bay National Estuary Program, 1991).

Hatchlings and young juveniles from the western Gulf of Mexico are thought to drift east in the Gulf gyres and become caught in the eastern Gulf Loop Current. They are then carried by the Florida Current through the Straits of Florida into the Gulf Stream, which transports them up the eastern seaboard of the United States (Collard 1987; Márquez 1994). When they move into coastal waters of New England, the juvenile ridleys are 24 to 30 cm long. All the ridley turtles in New England waters are two- to five-year old juveniles (Burke *et al*. 1989; Morreale and Standora 1989). They begin arriving in northern waters in July or August each year and remain in shallow nearshore waters, particularly in the bays on eastern Long Island, during the summer (Burke *et al*. 1989; Morreale and Standora 1989). They forage in shallow coastal waters of New England, New York, and New Jersey during the spring and summer and then migrate to southern waters in the fall. They begin leaving the area in mid-September and most have left for warmer southern waters by the beginning of November. Some ridleys may hibernate over the winter in nearshore sediments (Carminati *et al*. 1994). Most of the ridleys observed after the beginning of November are cold-stunned. Ridleys become sluggish and have labored breathing when the temperature falls below 13ºC; feeding ceases below 10ºC, and they die when water temperatures reach between 6.5 to 5.0ºC (Schwartz 1978).

Known Disturbance and Mortality Factors

Several stages in the life cycle of Kemp's ridley turtles are sensitive to natural and anthropogenic disturbance. Each year between November and January when ocean water temperatures are falling, small numbers of ridley turtles become stranded and die on beaches of the north and east shores of Long Island and Cape Cod Bay, due to cold stunning (NOAA 1991; Morreale and Standora 1992). A total of 115 ridley turtles stranded on Cape Cod beaches between 1977 and 1987 (Danton and Prescott 1988). For the period of 1990 to 2000, between nine and 216 ridleys strandings were reported in Massachusetts waters, and one ridley stranding was reported in Rhode Island waters (Sea Turtle Stranding and Salvage Network, unpublished data).

A major cause of sea turtle mortality attributable to humans is entanglement in fishing gear, particularly shrimp nets (NRC 1990). Of all the turtles killed each year by U.S. commercial shrimping, 500 to 5,000 are juvenile and adult Kemp's ridley turtles. Most of the mortalities attributable to entanglement in shrimp nets are in the Gulf of Mexico. Other fishing-related deaths, caused by entanglement in lobster gear (O'Hara *et al*. 1986) and pound nets (Morreale and Standora 1989), may result in an additional 50 to 500 deaths of Kemp's ridley turtles each year.

Large numbers of sea turtles, including some Kemp's ridley turtles, die from eating or becoming entangled in plastic debris (O'Hara 1989; NRC 1990). Plastic bags and plastic particles are the most common forms ingested which are typically mistaken for food. Sea turtles are also particularly prone to becoming entangled in monofilament fishing line and phantom fishing nets (Balazs 1985).

Under some circumstances, chemical pollution may be a threat to ridley turtles. Because early pelagic stage ridleys are thought to congregate and feed in rafts of *Sargassum*, they may be vulnerable, as juvenile loggerhead turtles are (Carr 1987), to floating oil and nondegradable debris that tends to collect in driftlines of *Sargassum*.

Ridleys feeding in *Sargassum* rafts or on benthic prey may accumulate metal and organic contaminants from their prey.

2.6 Leatherback turtle (*Dermochelys coriacea*)

The leatherback sea turtle is listed as endangered throughout its range (USFWS 1986). Between 100 and 900 leatherbacks visit coastal and continental shelf waters of the western North Atlantic ocean between Canada and North Carolina each year, with peak abundance in summer (Shoop and Kenney 1992). Only a small fraction of the North Atlantic population nests on beaches of the continental United States, mostly in Florida (National Research Council 1990; Meylan *et al.* 1994) and the U.S. Virgin Islands (Boulon *et al.* 1994).

Seasonal Distribution in North Atlantic Waters

Leatherback turtles are common during the summer in North Atlantic waters from Florida to Massachusetts, the Canadian Maritime Provinces, and occasionally as far north as Baffin Island, Canada (Goff and Lien 1988). New England and Long Island Sound waters support the largest populations on the Atlantic coast during the summer and early fall (Lazell 1980; Prescott 1988; Shoop and Kenney 1992). Leatherbacks are observed frequently in lower Chesapeake Bay and off the mouth of the Bay during the summer, where they probably are feeding on locally abundant jellyfish (Barnard *et al.* 1989). They are rarely sighted north of Cape Hatteras during the winter.

Leatherback turtles nest on tropical beaches, after which the adults move into temperate waters to feed. Most leatherbacks that visit New England waters are adult males, usually >150 cm and weighing >450 kg (NOAA 1991). Adults migrate extensively throughout the Atlantic basin in search of food. There are numerous records of leatherback turtles in New England, and as far north as Nova Scotia and Newfoundland (Goff and Lien 1988). Sightings off Massachusetts are most frequent in the late summer months (Shoop *et al.* 1981; CeTAP 1982; Shoop and Kenney 1992). Sightings, strandings, or entanglements have been observed along the Cape Cod shoreline, in Nantucket Sound, and in Buzzards Bay.

In the spring, following breeding and nesting in the tropical Caribbean and Florida, and aided by the northward flow of the Gulf Stream, leatherback turtles move northward beyond the shelf break. For this reason, there are few sightings of leatherbacks in coastal and outer continental shelf waters in the spring months (CeTAP 1982). They appear in offshore waters of the mid-Atlantic states and in the Gulf of Maine in late May and June, and in shelf waters from June through October (Shoop *et al.* 1981; Shoop and Kenney 1992). In New England waters, they are seen most frequently in the southern Gulf of Maine, including Cape Cod and Massachusetts Bays. Leatherbacks occur most frequently in coastal waters of Newfoundland in August and September when water temperatures are at their highest (Goff and Lien 1988).

During summer months, leatherbacks move into fairly shallow coastal waters, apparently following their preferred jellyfish prey. In the fall, they move offshore and begin their migration south to the winter breading grounds in the Caribbean (Payne *et al.* 1984). Leatherbacks may travel great distances between nesting and feeding areas. Tagging studies have shown that some of the leatherbacks that visit New England waters nested in the U.S. Virgin Islands and along the southern coast of the Caribbean or in the Guianas (Boulon 1989; National Research Council 1990).

Known Disturbance and Mortality Factors

Many of the same natural and anthropogenic factors that affect survival of loggerhead and Kemps ridley turtles also affect leatherbacks. In 1987 and 1988, 119 and 63 leatherbacks, respectively, stranded along the United States coast (National Research Council 1990). Most of the strandings occurred along the coasts of Delaware, New Jersey, and New York. There was only one stranding in New England. The cause of death of most of these turtles was not known. Being a temperate water species, leatherbacks do not seem to be sensitive to cold temperatures, and strandings can not be attributed to cold stunning.

Between 1986 and 1999, 42 to 170 leatherback turtles were reported stranded on the U.S. Atlantic coast each year. Most strandings were in Florida and New York. Between four and 39 leatherbacks stranded each year in Massachusetts and Rhode Island waters during the period of 1990 to 2000 (Sea Turtle Stranding and Salvage Network, unpublished data). For the period of 1980 to 1997, twelve leatherback strandings were recorded in Nantucket Sound (NMFS, unpublished data). The causes of these strandings are not known, but entanglement in fishing gear may be a major factor. In 2001, there were seven leatherback strandings within Buzzards Bay and two entanglements along the Elizabeth Islands (Crocker, 2003). From 1984 to 1987, 14 leatherback sea turtles were stranded around Buzzards Bay (Howes and Goehringer, 1996).

Approximately 650 leatherbacks are entangled in commercial shrimp nets each year (NMFS 2001). Leatherbacks are also very susceptible to entanglement in other fishing gear and in plastic debris (Mager 1985; Witzell and Teas 1994). Because they are adapted to a pelagic existence, leatherbacks have trouble swimming backwards, maneuvering in tight places and, avoiding obstructions in shallow waters (Payne and Selzer 1986; NOAA 1991). Leatherbacks have been entangled in lobster gear (O'Hara *et al.* 1986; Sadove and Morreale 1990) and long-lines (Balazs 1985) in New York Bight and New England waters.

Because of their preferred diet of gelatinous zooplankton, particularly jellyfish, leatherback turtles often ingest floating plastic debris, mistaking it for food (Wallace 1985; O'Hara 1989). Plastic bags blocked the stomach openings of 11 of 15 leatherbacks that washed ashore on Long Island during a two-week period (Balazs 1985). The largest leatherback ever recorded washed ashore on the coast of Wales, dead in tangled fishing gear and with a large piece of plastic blocking the entrance to its small intestine (Eckert and Eckert 1988). Subsistence harvesting in the tropical nesting range also places pressure on leatherback populations.

3.0 STATE PROTECTED SPECIES

3.1 Gray seal (*Halichoerus grypus*)

Gray seals (*Halichoerus grypus*) inhabit temperate and sub-arctic waters and, in the United States, are found from Maine to Long Island Sound, N.Y. Gray seals live on remote, exposed islands, shoals, and unstable sandbars, and are the second most common pinniped along the Atlantic coast of the United States, living as long as 30 to 40 years. These seals are generally gregarious, but live in loose colonies while breeding. Males reach sexual maturity between six and seven years of age and females at three years. Pupping occurs on land or ice from late December through mid-February, and peaks around mid-January. There are no regular seasonal migrations, but young individuals wander extensively during their first two years of life. Movement is largely a general dispersal in all directions after the breeding season (NHESP, 2002).

Seasonal Distribution in North Atlantic Waters

Two year round breeding colonies have been identified in the United States: at Monomoy and Muskeget Islands in Nantucket Sound and on isolated islands off the coast of Maine (Waring *et al.* 2001); however, winter and spring use of these areas is highest (NHESP 2002). Gray seals presently use Muskeget Island (relatively close to the South of Tuckernuck alternative) and Monomoy National Wildlife Refuge within Nantucket Sound as an area to give birth and raise their pups. Since there is no defined migratory behavior, a large portion of the population may be present in the Sound year-round, although the actual numbers are not as plentiful as harbor seals. According to the Massachusetts Division of Fisheries and Wildlife, the herd in Massachusetts waters represents the southernmost breeding gray seal colony in the world, and the only one known in the United States south of the Gulf of Maine (NHESP 2002). Generally, there is some adult seal movement north during spring and summer out of Nantucket Sound to the waters of Maine and Canada for pupping, as seen with harbor seals.

Gray seals are also occasionally observed on rock ledges in Buzzards Bay, but not in large numbers (NBHTC, 1998; Buzzards Bay Project National Estuary Program, 1991). Some gray seals have been observed using haul out sites along the Elizabeth Islands, south of the New Bedford alternative site. According to Crocker (2004), suitable habitat and human activity likely restricts significant gray seal utilization within Buzzards Bay.

Mortality Factors

Little is known about the natural causes of mortality for gray seals. Major causes of human-induced gray seal mortality include marine pollution and habitat destruction, but mortality mainly stems from drowning in active or abandoned fishing nets. For the period of 1995 to 1999, the average annual estimated human caused mortality and serious injury to gray seals in U.S. waters was estimated at 110 seals per year; 103 of these 110 mortalities per year were attributable to the Northeast multispecies sink gillnet fishery, which covers the Gulf of Maine and southern New England (Waring *et al.* 2001). Between 1997 and 1998, 28 gray seals were stranded in Massachusetts, thirteen of which showed human causes (*i.e.*, fishery interactions, power plant entrainment, oil spill, shootings, etc.) (Waring *et al.* 2001). Gray seals were hunted for bounty until the late 1960s, likely resulting in severe stock depletion in New England waters (Rough 1995). At present, mortality levels attributable to deliberate shooting of seals by fishermen and aquaculture farmers, who view seals as pests as they compete for the same valuable fish stocks or farmed fish, is unknown (Waring *et al.* 2001).

4.0 OTHER MARINE MAMMALS

4.1 Harbor seal (*Phoca vitulina concolor*)

The harbor seal (*Phoca vitulina concolor*), or the common seal, is found throughout coastal waters of the Atlantic Ocean and adjoining seas (Waring *et al.* 2001), and is the most abundant pinniped on the east coast of the United States. Harbor seals commonly occur in coastal waters and on coastal islands, ledges, and sandbars above 30° N latitude. Harbor seals have been known to live as long as 30 to 40 years (Katona *et al*. 1993).

Seasonal Distribution in North Atlantic Waters

Harbor seals range seasonally from the Arctic to as far south as Cape Cod and Nantucket Sound. Harbor seals spend the late spring, summer, and early fall between New Hampshire and the Arctic where they breed and care for newly born pups. A general southward movement from the Bay of Fundy to southern New England waters occurs in fall and early winter, mostly consisting of juveniles and sub-adults. Whitman and Payne (1990) have suggested that this age-related dispersal may reflect the higher energy requirements of younger individuals.

After overwintering in southern New England waters, including the Nantucket Sound area and Buzzards Bay, the vast majority of the population migrates in the spring to the northern waters of New Hampshire, Maine, and Canada for pupping season. No pupping areas have been identified in southern New England.

The greatest summer concentrations of harbor seals are along the coast islands and ledges of Maine, but they can occur year round in waters adjacent to Cape Cod and Nantucket Island (Payne and Selzer 1989). Extensive sand spits on Muskeget, Tuckernuck, and Skiff Islands (west side of Muskeget Channel off Martha's Vineyard) have been identified by the U.S. Fish and Wildlife Service (USFWS) as preferred haul-out points for large numbers of harbor seals. The Muskeget and Tuckernuck haul out sites are located in fairly close proximity to the South of Tuckernuck alternative site. This outer-Sound area may support larger numbers of fish for seals to prey on, since many species of finfish migrate to deeper waters during their overwintering periods. Harbor seals are also commonly found in Buzzards Bay and utilize multiple haul out sites on the outer portions of the Bay along the Elizabeth Islands. These sites include Woods Hole Passage, Lackeys Bay, Tarpaulin Cove, Robinsons Hole, Quicks Hole, Gull Island, and Cuttyhunk outer harbor. Occasionally, harbor seals are observed on the Weepecket Islands (Crocker, 2004). All of these areas are located south of the proposed alternative site in New Bedford.

Mortality Factors

Despite its abundance throughout New England, little is known about natural mortality in this species (Katona *et al.* 1993). Major causes of human-induced harbor seal mortality include marine pollution and habitat destruction, but mortality mainly stems from drowning in active or abandoned fishing nets. In recent years, harbor seal mortality has been related to the Northeast multispecies sink gillnet fishery, which covers the Gulf of Maine and southern New England, and the Mid-Atlantic coastal gillnet fishery. The total estimated average fishery-related mortality or serious injury in the Northeast multispecies sink gillnet fishery for the period of 1995 to 1999 was 893 harbor seals. The estimated annual mortality attributed to the mid-Atlantic coastal gillnet fishery for the period of 1995 to 1999 is two harbor seals (Waring *et al.* 2001).

Harbor seal strandings occur in southern New England during the winter period, and have been attributed to vessel strikes, fishing gear entanglement, entrainment in power plant intakes, oils spills, storms, abandonment, and disease (Waring *et al.* 2001). In 1980, more than 350 harbor seals stranded on Cape Cod due to an influenza outbreak (Geraci *et al.* 1981). Harbor seals were hunted for bounty until the mid 1960s, likely resulting in stock depletion in New England waters (Katona *et al.* 1993). At present, mortality levels attributable to deliberate shooting of seals by fishermen and aquaculture farmers, who view seals as pests as they compete for the same valuable fish stocks or farmed fish, is unknown (Waring *et al.* 2001).

4.2 Harp seal (*Phoca groenlandica*)

The harp seal (*Phoca groenlandica*) occurs throughout much of the north Atlantic and Arctic Oceans, and in recent years, has been sighted in winter and spring months at the extreme southernmost reaches of its range from mid-Atlantic waters through New England (Waring et al., 2001). The largest of three stocks of harp seals is the eastern Canadian stock, with breeding herds off the coasts of Newfoundland and Labrador, and in the Gulf of St. Lawrence. The other two stocks occur off the coasts of the former Soviet Union and Greenland. Abundance of harp seals in Canadian waters is estimated at 5.2 million. Existing data are insufficient to estimate harp seal abundance in U.S. waters (Waring et al., 2001). Therefore, it could be assumed that harp seals have the potential to occur in any of the three offshore alternative sites.

The total human-related mortality estimate for the period of 1995 to 1999 is 321,356 harp seals, derived from annual catches by Canada and Greenland, and from incidental bycatch of the Newfoundland lumpfish fishery and the Northeast multispecies sink gillnet fishery (Waring et al., 2001). The most recent values for total allowable catch and actual catch in the Canadian Atlantic are 275,000 and 261,000, respectively, in 1997. Annual catches in Greenland approach 100,000 seals. Canadian Arctic catches ranged from 1,200 to 6,500 seals annually in the late 1970's; no recent catch data are available for this area. Annual harp seal strandings are increasing, and several (51 of 224) harp seals stranded in Massachusetts in 1997 and 1998 (Waring et al., 2001). The harp seal is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock by NMFS.

4.3 Hooded seal (*Cystophora cristata*)

The hooded seal (*Cystophora cristata*) occurs throughout much of the north Atlantic and Arctic Oceans, in deeper water than harp seals are typically found. Hooded seals are highly migratory, and have been sighted as far south as Puerto Rico. In recent years, they have been sighted with increasing frequency in waters from Maine to Florida, in the winter and spring months (Waring et al., 2001). The three stocks of hooded seals in the world are identified by their breeding locations. Two stocks occur in the northwest Atlantic. One stock has breeding grounds in the Davis Strait off of Newfoundland. A second eastern Canadian stock has breeding herds off the coasts of Newfoundland and in the Gulf of St. Lawrence. The third hooded seal stock occurs off of eastern Greenland. Abundance of hooded seals in Canadian waters is estimated at 400,000. Existing data are insufficient to estimate hooded seal numbers in U.S. waters (Waring et al., 2001). Therefore, it could be assumed that hooded seals have the potential to occur in any of the three offshore alternative sites.

The total annual fishery-related mortality estimate for the period of 1993 to 1997 is 5.6 hooded seals. Incidental bycatch of hooded seals has been observed in the Northeast multispecies sink gillnet fishery (Waring et al., 2001). Hooded seals are also taken in the Canadian lumpfish fishery and groundfish gillnet and trawl fisheries, but removal estimates are not available. The most recent values for total allowable catch and actual catch in the Canadian Atlantic are 8,000 and 7,058, respectively, for 1997. Commercial harvest of hooded seals is not allowed in the Gulf of St. Lawrence (below 50°N) and in the Davis Strait (Waring et al., 2001). Approximately 50 hooded seals have stranded each year during the period of 1994 to 1997 (Waring et al., 2001). Some of these strandings occurred in Massachusetts. The hooded seal is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock by NMFS.

4.4 White-sided dolphin (*Lagenorhynchus acutus*)

The white-sided dolphin (*Lagenorhynchus acutus*) occurs in temperate and polar waters in the North Atlantic, typically over the continental shelf to the 100-meter isobath. In the western North Atlantic, white-sided dolphins are believed to form three stocks, the Gulf of Maine Stock, the Gulf of St. Lawrence stock, and the Labrador Sea stock. The Gulf of Maine stock ranges from Hudson Canyon to Georges Bank, and in the Gulf of Maine to the Bay of Fundy (Waring et al., 2001). The best available estimate for the abundance of the Gulf of Maine stock of white-sided dolphins is 51,640, with a minimum population estimate of 37,904 (Waring et al., 2001). There is insufficient data to estimate white-sided dolphin numbers in the vicinity of the proposed offshore alternative sites. Therefore, it could be assumed that white-sided dolphins have the potential to occur in any of the three offshore alternative sites.

The total annual fisheries-related mortality estimate for the period of 1995 to 1999 is 136 white-sided dolphins (Waring et al., 2001). Incidental bycatch has been observed in the Northeast sink gillnet fishery, the mid-Atlantic coastal gillnet fishery, the pelagic drift gillnet fishery, the North Atlantic bottom trawl fishery, and the Atlantic squid, mackerel, and butterfish trawl fisheries (Waring et al., 2001). Mass strandings of white-sided dolphins are common. A stranding event may involve over 100 animals, and several have occurred in Massachusetts waters (Waring et al., 2001). Causes of these strandings are not known. The white-sided dolphin is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock by NMFS.

4.5 Striped dolphin (*Stenella coeruleoalba*)

The striped dolphin (*Stenella coeruleoalba*) is distributed worldwide in temperate, tropical, and subtropical seas. In the western North Atlantic, striped dolphins occur from Nova Scotia south into the Caribbean and the Gulf of Mexico, frequently in continental shelf waters along the 1,000-meter isobath (Waring et al., 2001). The best available estimate for the abundance of the western Atlantic striped dolphin is 61,546, with a minimum population estimate of 44,500 (Waring et al., 2001). There is insufficient data to estimate striped dolphin numbers in the vicinity of the proposed offshore alternative sites. Therefore, it could be assumed that striped dolphins have the potential to occur in any of the three offshore alternative sites.

The total annual fisheries-related mortality estimate for the period of 1994 to 1998 is 7.3 striped dolphins (Waring et al., 2001). Incidental bycatch has been observed in the pelagic drift gillnet fishery and the North Atlantic bottom trawl fishery (Waring et al., 2001). During the period of 1995 to 1998, seven striped dolphins stranded in U.S. waters from Massachusetts to Florida. The striped dolphin is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock by NMFS.

4.6 Common dolphin (*Delphinus delphis*)

The common dolphin (*Delphinus delphis*) is distributed worldwide in temperate, tropical, and subtropical seas. In waters off the northeastern United States, common dolphins are associated with Gulf Stream features and are widespread from Cape Hatteras to Georges Bank over the 200-300 meter isobaths or prominent underwater topographic features (Waring et al., 2001). The common dolphin migrates onto Georges Bank, the Scotian Shelf, and the continental shelf off Newfoundland in summer and autumn months. The best estimate for the abundance of the common dolphin off the U.S. and Canadian Atlantic coasts is 30,768, with a minimum population estimate of 23,655 (Waring et al., 2001). There is insufficient data to estimate common dolphin numbers in the vicinity of the proposed offshore alternative sites. Therefore, it could be assumed that common dolphins have the potential to occur in any of the three offshore alternative sites.

The total annual fisheries-related mortality estimate for the period of 1995 to 1999 is 406 common dolphins (Waring et al., 2001). Incidental bycatch has been observed in the pelagic drift gillnet fishery, the pelagic pair trawl, the pelagic longline fishery, the mid-Atlantic coastal gillnet fishery, the North Atlantic bottom trawl fishery, the Northeast multi-species sink gillnet fishery, and the Atlantic squid, mackerel, and butterfish trawl fisheries (Waring et al., 2001). During the period of 1992 to 1998, 94 common dolphin strandings were reported in U.S. waters from Massachusetts to North Carolina. The majority of these strandings occurred in Massachusetts. Two mass strandings on Cape Cod in 1997 and 1998 involved ten and nine dolphins, respectively. The common dolphin is not listed as threatened or endangered under the ESA, but is considered a strategic stock by NMFS.

4.7 Harbor porpoise (*Phocoena phocoena*)

The harbor porpoise (*Phocoena phocoena*) is primarily an inshore species. During the summer, harbor porpoises are concentrated in the northern Gulf of Maine and the southern Bay of Fundy region, generally in waters less than 150 meters deep. This stock of harbor porpoises, which migrates south into the mid-Atlantic region, is considered one population, separate from three other distinct populations in the Gulf of St. Lawrence, Newfoundland, and Greenland areas (Waring et al., 2001). During fall and spring months, harbor porpoises are widely distributed from New Jersey to Maine. Low densities of harbor porpoises are found in waters off New York and north to Canada in the winter. No specific migratory routes to the Gulf of Maine/Bay of Fundy region have been identified. The best estimate for the abundance of the Gulf of Maine/Bay of Fundy population is 89,700, with a minimum population estimate of 74,695 (Waring et al., 2001). There is insufficient data to estimate harbor porpoise numbers in the vicinity of the proposed offshore alternative sites. Therefore, it could be assumed that harbor porpoises have the potential to occur in any of the three offshore alternative sites.

The average annual mortality estimate of harbor porpoises for the year 1999 attributable to U.S. fisheries was 381 porpoises, down significantly from previous years following the implementation of a take reduction plan for the U.S. Atlantic gillnet fishery (Waring et al., 2001). Recent mortality has occurred in the U.S. Northeast sink gillnet fishery, the mid-Atlantic coastal gillnet fishery, and in the Canadian Bay of Fundy groundfish sink gillnet and herring weir fisheries. Other human-induced mortality may occur from hunting in some areas of the western North Atlantic. During the period of 1994 to 1999, 691 harbor porpoise strandings were reported from Maine to North Carolina. Many of these strandings occurred in Massachusetts. NMFS considers the Gulf of Maine/Bay of Fundy harbor porpoise stock as a strategic stock, though the stock has preliminarily been removed from the ESA candidate species list by the NMFS (Waring et al., 2001).

4.8 Long-finned pilot whale (*Globicephala melas*)

The long-finned pilot whale (*Globicephala melas*) occurs along the edge of the U.S. continental shelf in the winter and early spring. A second species of pilot whale, the short-finned pilot whale, also occurs in the western North Atlantic. Difficulty distinguishing the two species in the field prevents separate abundance and mortality estimates. The long-finned pilot whale primarily occurs north of mid-Atlantic waters. Distribution of this species is widespread, ranging from North Carolina to Africa and north to Iceland, Greenland, and the Barents Sea (Waring et al., 2001). Further stock definition is under development. The best available estimate for the abundance of both pilot whale species in U.S. waters is 14,524, with a minimum estimate of 11,343 (Waring et al., 2001). There is insufficient data to estimate pilot whale numbers in the vicinity of the proposed offshore alternative sites. Therefore, it could be assumed that pilot whales have the potential to occur in any of the three offshore alternative sites.

The total annual fisheries-related mortality estimate for the period of 1995 to 1999 is 245 pilot whales, including both species (Waring et al., 2001). Incidental bycatch has recently been observed in the pelagic drift gillnet fishery, the pelagic longline fishery, the pelagic pair trawl fishery, the North Atlantic bottom trawl fishery, the squid, mackerel, and butterfish trawl fisheries, and the Nova Scotia trawl fisheries. Mass strandings are common in pilot whales. During the period of 1992 to 1998, 71 long-finned pilot whales stranded between Maine and South Carolina, including a mass stranding involving 22 animals in Massachusetts in 1992. Causes of these strandings are not known. Mortality of pilot whales may also be influenced by bioaccumulation of PCBs, chlorinated pesticides such as DDT, and toxic metals (Waring et al., 2001). The long-finned pilot whale is not listed as threatened or endangered under the ESA, but is considered a strategic stock by NMFS.

4.9 Minke whale (*Balaenoptera acutorostrata*)

Minke whales (*Balaenoptera acutorostrata*) occur throughout polar, temperate, and tropical waters. The minke whale is the third most abundant great whale in the U.S. Atlantic Exclusive Economic Zone (EEZ) (CeTAP, 1982). Minke whales off the east coast of the U.S. are part of the Canadian east coast population, one of four minke populations recognized in the North Atlantic. The range of this population extends south from Canada to the Gulf of Mexico, but distribution is primarily concentrated in New England waters, with most sightings occurring during spring and summer months. The best available current abundance estimate for minke whales in the western North Atlantic is 4,018, from surveys conducted in 1999 and 1995, with a minimum estimate of 3,515 whales (Waring et al., 2001). This species is found in open seas primarily over continental shelf waters, but occasionally enters bays, inlets, and estuaries. Minke whales may occasionally visit Nantucket Sound, but in general, very few whales are found in Nantucket Sound, even though the Stellwagen Bank feeding grounds are in adjacent waters. Most whales are found in areas where their primary food source can be easily located. Nantucket Sound does not support these food sources because of its shallow nature and sandy bottom. There is also no indication that minke whales occur in Buzzards Bay. Buzzards Bay is not considered a high-use habitat for whales, dolphins, or porpoises (Buzzards Bay Project National Estuary Program, 1991).

Minke whale incidental catches have been observed in U.S. waters in the mid-Atlantic coastal gillnet fishery, the Gulf of Maine and mid-Atlantic lobster trap/pot fishery, and the Atlantic tuna purse seine fishery. Not all incidental catches have resulted in mortality. The annual mortality estimate from these fisheries for the period of

1995 to 1998 is 2.4 minke whales (Waring et al., 2001). Other human-induced mortality occurs from hunting in some areas of the North Atlantic, and from collisions with vessels. Minke whales inhabit coastal waters during much of the year and thus are frequently in the vicinity of a variety of vessel traffic. The minke whale is not listed as threatened or endangered under the ESA, depleted under the MMPA, or as a strategic stock by NMFS.

References

Anonymous. 1992. Interactions between sea turtles and the summer flounder trawl fishery, November, 1991 - February, 1992. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo., National Marine Fisheries Service, Southeast Fisheries Center, NMFS-SEFSC-307. 58 pp.

Balazs, G.H. 1985. Impact of ocean debris on marine turtles: entanglement and ingestion. Pages 387-429 In: R.S. Shomura and H.O. Yoshida, Eds., Proceedings of the Workshop on the Fate and Impact of marine Debris, 26-29 November 1984. Honolulu, HI. NOAA Tech. Memo. NMFS-SWFC-54.

Baldridge, A. 1972. Killer whales attack and eat a gray whale. *Journal of Mammalogy* 53(4):888-900.

Barnard, D.E., J.A. Keinath, and J.A. Mucick. 1989. Distribution of ridley, green, and leatherback turtles in Chesapeake Bay and adjacent waters. Pages 201-203 *in* S.A. Eckert, K.L. Eckert, and T.H. Richardson, Eds., Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology. NOAA Tech. Memo. NMFS-SEFC-232.

Beach, D.W., and M.T. Weinrich. 1989. Watching the whales: is an educational adventure for humans turning out to be another threat for endangered species. *Oceanus* 32(1):84-88.

Boulon, R.H., Jr. 1989. Virgin Island turtle tag recoveries outside the U.S. Virgin Islands. Pages 207-208 In: S.A. Eckert, K.L. Eckert, and T.H. Richardson, Eds., Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology. NOAA Tech. Memo. NMFS-SEFC-232.

Boulon, R.H., Jr., D.L. McDonald, and P.H. Dutton. 1994. Leatherback turtle (*Dermochelys coriacea*) nesting biology, Sandy Point, St. Croix, U.S. Virgin Islands: 1981-1993. Pages 190-193 *in* K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar. Eds., Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS-SEFC-351. 323 pp.

Brodie P.F., D.D. Sameoto, and R.W. Sheldon. 1978. Population densities of euphausiids off Nova Scotia as indicated by net samples, whale stomach contents and sonar. *Limnol. Oceanog*. 23(6):1264-1267.

Burke, V.J., E.A. Standora, and S.J. Morreale. 1989. Environmental factors and seasonal occurrence of sea turtles in Long Island, New York. Pp. 21-23 *in* S.A. Eckert, K.L. Eckert, and T.H. Richardson, Eds., Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo., National Marine Fisheries Service, NMFS-SEFC-232.

Butler, R.W., W.A. Nelson, and T.A. Henwood. 1987. A trawl survey method for estimating loggerhead turtle, *Caretta caretta*, abundance in five eastern Florida channels and inlets. *Fish. Bull*. 85:447-453.

Buzzards Bay Project National Estuary Program. 1991. Comprehensive Conservation and Management Plan. Chapter 3 - The Buzzards Bay Setting: The Bay, Its Drainage Basin and Living Resources. [http://www.buzzardsbay.org/ccmp/setting2.htm]

Carminati, C.E., E. Gerle, L.L. Kleihn, and R.P. Pisciotta. 1994. Blood chemistry comparison of healthy vs. hypothermic juvenile Kemp's Ridley sea turtles (*Lepidochelys kempi*) in the New York Bight. Pp. 203-205 *in* K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, Eds., Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo., National Marine Fisheries Service, Southeast Fisheries Science Center, NMFS-SEFC-351.

Carr, A. 1967. So Excellent a Fish. A Natural History of Sea Turtles. Natural History Press, Garden City, NY.

Carr, A. 1987. Impact of nondegradable marine debris on the ecology and survival outlook of sea turtles. *Mar. Pollut. Bull.* 18:352-356.

Carr, A.F., and J. Mortimer. 1980. Survey and Preliminary Census of Marine Turtle Populations in the Western Atlantic. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Final Report, Contract No. 03-79-DO8-0025.

CeTAP. 1982. A Characterization of Marine Mammals and Turtles in the Mid- and North-Atlantic Areas of the U.S. Outer Continental Shelf. Final Report of the Cetacean and Turtle Assessment Program, University of Rhode Island, Kingston, Rhode Island. U.S. Dept. of the Interior, Bureau of Land Management, Washington, D.C. Contract AA551-CT-48. 450 pp.

Clark, C.W., C.J. Gagnon, D.K. Mellinger. 1993. Whales '93: The application of the navy IUSS for low-frequency marine mammal research. Tenth Biennial conference on the Biology of Marine Mammals, Galveston, Texas. p. 3.

Clapham, P.J., and *I.E.* Seipt. 1991. Resightings of independent fin whales, *Balaenoptera physalus*, on maternal summer ranges. *J. Mammal.* 72(4):788-790.

Collard, S.B. 1987. Review of Oceanographic Features Relating to Neonate Sea Turtle distribution and Dispersal in the Pelagic Environment: Kemp's Ridley (*Lepidochelys kempi*) in the Gulf of Mexico. Final report to NOAA-NMFS Contract No. 40-GFNF-5-00193. National Marine Fisheries Service, Galveston, TX. 70 pp.

Crocker, J. 2003. [Email] National Marine Fisheries Service (NMFS) Northeast Regional Office, Protected Resources Division. Correspondence with K. Dwyer and A. Kozuck on December 31, 2003.

Crocker, J. 2004. [Email] National Marine Fisheries Service (NMFS) Northeast Regional Office, Protected Resources Division. Correspondence with G. Waring and A. Kozuck on January 2, 2004.

Cummings, W.C., P.O. Thompson, and S.J. Ha. 1986. Sounds from Bryde, *Balaenoptera edeni*, and finback, *B. physalus*, whales in the Gulf of California. *Fish. Bull. U.S.* 84:359-370.

Danton, C., and R. Prescott. 1988. Kemp's ridley in Cape Cod Bay, Massachusetts - 1987. Pp. 17-18 *in* B.A. Schroeder, Ed., Proceedings of the Eighth Annual Workshop on Sea Turtle Conservation and Biology, Fort Fisher, North Carolina. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo., National Marine Fisheries Service, Southeast Fisheries Center, Miami, FL. NMFS-SEFC-214.

Dolphin, W.F. 1987a. Ventilation and dive patterns of humpback whales, *Megaptera novaeangliae*, on their Alaskan feeding grounds. *Can. J. Zool.* 65:83-90.

Dolphin, W.F. 1987b. Prey densities and foraging of humpback whales, *Megaptera novaeangliae*. *Experientia* 43:468-471.

Eckert, K.L. and S.A. Eckert (eds.). 1988. Death of a giant. Mar. Turl. Newslett.

Eggers, J.M. 1989. Incidental capture of sea turtles at Salem Generating Station, Delaware Bay, New Jersey. Pages 221-224 In: S.A. Eckert, K.L. Eckert, and T.H. Richardson, Eds., Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology. NOAA Tech. Memo. NMFS-SEFC-232.

EPA (Environmental Protection Agency) Region 1. 1988. Boston Harbor Wastewater Conveyance System. Volume 1: Draft Supplemental Environmental Impact Statement and Volume II: Appendices. U.S. Environmental Protection Agency, Region I, JFK Building, Boston, MA.

EPA. 1993. Assessment of potential impact of the MWRA Outfall on endangered species. Biological Assessment prepared pursuant to Section 7 of the Endangered Species Act. U.S. Environmental Protection Agency. Region I. Boston, Massachusetts.

Epperly, S.P., J. Braun, and A.J. Chester. 1995a. Aerial surveys for sea turtles in North Carolina inshore waters. *Fish. Bull.* 93:254-261

Epperly, S.P., J. Braun, A.J. Chester, F.A. Cross, J.V. Merriner, and P.A. Tester. 1995b. Winter distribution of sea turtles in the vicinity of Cape Hatteras and their interactions with the summer flounder trawl fishery. *Bull. Mar. Sci.* 56:547-568.

Gaskin, D.E. 1982. The Ecology of Whales and Dolphins. Heinemann Educational Books, Ltd., London, UK. 459 pp.

Geraci, R ., D. J. St. Aub in and I. K. Barker. 1981. Mass mortality of harbor r seals: pneumonia associated with influenza A virus. *Science* 215: 11 29-113 1.

Goff, G. and J. Lien. 1988. Leatherback turtles (*Dermochelys coriaceae*) in cold water off Newfoundland and Labrador. Can. Field-Nat. 102(1): 1-5.

Hain, J.H.W., M.J. Ratnaswamy, R.D. Kenney, and H.E. Winn. 1992. The fin whale, *Balaenoptera physalus*, in waters of the northeastern United States continental shelf. Rept. Intl. Whal. Comm. 42:653-669.

Hamilton, P.K. and C.A. Mayo. 1990. Population characteristics of right whales, *Eubalaena glacialis*, in Cape Cod Bay and Massachusetts Bay, 1978-1986. *In* Hammond, P.S. *et al.*. Eds., Individual Recognition and Estimation of Cetacean Population Parameters. Rep. Int. Whal. Comm. Special Issue 12:203-208.

Hancock, D. 1965. Killer whales kill and eat a minke whale. *J. Mammal.* 46:341-342.

Henwood, T.A. and W.E. Stuntz. 1987. Analysis of sea turtle captures and mortalities during commercial shrimp trawling. Fish. Bull. 85:813-817.

Hildebrand, H.H. 1982. A historical review of the status of sea turtle populations in the western Gulf of Mexico. Pages 447-453 In:K.A. Bjorndal, ed., Biology and Conservation of Sea Turtles. The Smithsonian Institution Press, Washington, DC.

Hofman, R.J. 1990. Cetacean entanglement in fishing gear. *Mamm. Rev.* 20(1):53-64.

Howes, B.L., and D.D. Goehringer. 1996. Ecology of Buzzards Bay: an estuarine profile. National Biological Service Biological Report 33. vi +141pp.

IWC. 1999. Report of the workshop on the comprehensive assessment of right whales worldwide. *J. Cetacean R es. Manage.* 1 (supplement): 119-120.

Katona, S.K., J.A. Beard, P.E. Girton, and F. Wenzel. 1988. Killer whales (*Orcinus orca*) from the Bay of Fundy to the equator, including the Gulf of Mexico. Rit. Fiskideldar 11:205-224.

Katona, S.K., V.R. Rough, and D. Richardson. 1993. A Field Guide to the Whales and Seals from Cape Cod to Newfoundland. 4th Edition, revised. Smithsonian Institution Press, Washington, D.C. 316 pp.

Keinath, J.A., J.A. Musick, and R.A. Byles. 1987. Aspects of the biology of Virginia's sea turtles: 1979-1986. *VA J. Sci.* 38:329-336.

Kenney, R.D., and H. E. Winn. 1986. Cetacean high-use habitats of the northeast United States continental shelf. *Fish. Bull.* 84(2):345-357.

Kenney, R.D. and S.D. Kraus. 1993. Right whale mortality – a correction and an update. *Mar. Mammal Sci.* 9:445-446.

Kenney, R.D., Winn, H.E. and Macauley, M.C. 1995. Cetaceans in the Great South Channel, 1979-1989: Right whale (*Eubalaena glacialis*). *Cont. Shelf Res.* 15(4/5):385-414.

Kraus, S.D., Prescott, J.H., Knowlton, A.R., and Stone, G.S. 1986. Migration and calving of right whales (*Eubalaena glacialis*) in the western North Atlantic. *In* R.L. Brownell, P.B. Best and J.H. Prescott. Eds., Right Whales: Past and Present Status. IWC Special Issue 10. pp. 139-144.

Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (*Eubalaena glacialis*). *Mar. Mammal Sci.* 6(4): 278-291.

Kraus, S.D., and R.D. Kenney. 1991. Information on right whale (*Eubalaena glacialis*) in three proposed critical habitats in U.S. waters of the western North Atlantic Ocean. Final Report to the U.S. Marine Mammal Commission in fulfillment of contracts T-75133740 and T-75133753. 65 pp.

Lambertsen, R.H. 1986. Disease of the common fin whale (*Balaenoptera physalus*): crassicaudiosis of the urinary system. *J. Mammal.* 67:353-366.

Layne, J.N. 1965. Observations on marine mammals in Florida waters. *Bull. Florida State Mus*. 9(4):131-181.

Lazell, J.D. 1980. New England waters: critical habitat for marine turtles. *Copeia* 1980:290-295.

Lien, J., R. Sears, G.B. Stenson, P.W. Jones and I. Ni. 1989a. Right whale (*Eubalaena glacialis*) sightings in waters off Newfoundland and Labrador, and the Gulf of St. Lawrence (1978-1987). *Can. Field-Nat.* 103:91-93.

Lien, J., G.B. Stenson, and I.H. Ni. 1989b. A review of incidental entrapment of seabirds, seals and whales in inshore fishing gear in Newfoundland and Labrador: a problem for fishermen and fishing gear designers. Pp. 67-71 *in* Proc. World Symposium of Fishing Gear and Fishing Vessel Design. Newfoundland-Labrador Inst. Fish. Mar. Technol. St. Johns, Newfoundland.

Mager, A., Jr. 1985. Five-year status reviews of sea turtles listed under the Endangered Species Act of 1973. National Marine Fisheries Service, St. Petersburg, FL. 90 pp.

Marquez, M.R. 1989. Kemp's ridley turtle (*Lepidochelys kempi*). Pages 159-165 In: L. Ogren et al., eds., Proceedings of the Second Western Atlantic Turtle Symposium. Panama City FL. USDOC/NOAA/NMFS/SEFC.

Marquez, M.R. 1994. Synopsis of Biological Data on the Kemp's Ridley Turtle, *Lepidochelys kempi* (Garman, 1880). NOAA Tech. Memo. NMFS-SEFSC-343. 91 pp.

Marx, M. and C.A. Mayo. 1992. Occurrence and distribution of right whales in Cape Cod and Massachusetts Bays. *In* J. Hain, Ed., the Right Whale in the Western North Atlantic: A Science and Management Workshop, 14-15 April, 1992, Silver Spring, MD. Northeast Fishery Center Ref. Doc. 92-05. National Marine Fisheries Service, Woods Hole, MA.

Matassa, K., G. Early, B. Wyman, R. Prescott, D. Ketton, and H. Krum. 1994. A retrospective study of Kemp's ridley (*Lepidochelys kempi*) and loggerhead (*Caretta caretta*) in the area of the northeast stranding network and associated clinical and postmortem pathologies. Pp. 255-258 *in* K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, Eds., Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo., National Marine Fisheries Service, Southeast Fisheries Center, Miami, FL. NMFS-SEFC-351.

Mayo, C.A., D.K. Matilla, S. Pitman, and L. Baraff. 1988. Abundance, distribution and habitat use of large whales in the southern Gulf of Maine. Final report to National Marine Fisheries Service, Northeast Fisheries Laboratory. Contract No. 50-EANF-5-0059.

Morreale, S.J., A. Meylan, and B. Baumann. 1989. Sea turtles in Long Island Sound, New York: an historical perspective. Pp. 121-123 *in* S.A. Eckert, K.L. Eckert, and T.H. Richardson, Eds., Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo, National Marine Fisheries Service, Southeast Fisheries Center, NMFS-SEFC-232. 306 pp.

Morreale, S.J., A.B. Meylan, S.S. Sadove, and E.A. Standora. 1992. Annual occurrence and winter mortality of marine turtles in New York waters. *J. Herpetol.* 26: 301-308

Morreale, S.J., and E.A. Standora. 1989. Occurrence, movement and behavior of the Kemp's ridley and other sea turtles in New York waters. Okeanos Ocean Research Foundation Annual Report. April 1988 to April 1989. 35 pp.

Morreale, S.J. and E.A. Standora. 1992. Habitat use and feeding activity of juvenile Kemp's ridleys in inshore waters of the northeastern U.S. Pages 75-77 In: Salmon and J. Wyneken, Eds., Proceedings of the Eleventh Annual Workshop on Sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS-SEFC-302. 195 pp.

Musick, J.A., D.E. Barnard, and J.A. Keinath. 1994. Aerial estimates of seasonal distribution and abundance of sea turtles near the Cape Hatteras faunal Barrier. Pp. 121-123 *in* B.A. Schroeder and B.E. Witherington, Eds., Proceedings of the Thirteenth Annual Symposium on Sea Turtle Biology and Conservation. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration Tech. Memo., National Marine Fisheries Service, Southeast Fisheries Center, NMFS-SEFC-341. 281 pp.

NBHTC. 1998. New Bedford Harbor Trustee Council: Final Restoration Plan/Environmental Impact Statement for the New Bedford Harbor Environment. April 28. Gloucester, MA.

NHESP. 2002. Massachusetts Rare and Endangered Wildlife Fact Sheet: Gray Seal. http://www.state.ma.us/dfwele/dfw/nhesp/nhfacts/halgry.prf

National Marine Fisheries Service (NMFS). 1991a. Recovery Plan for the Humpback whale (*Megaptera novaeangliae*). Report prepared by the Humpback Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, MD. 105 pp.

NMFS. 1991b. Recovery Plan for the Northern Right Whale (Eubalaena glacialis). Report prepared by the Right Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 86 pp.

NMFS. 1992. Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). National Marine Fisheries Service, St. Petersburg, FL. 40 pp.

NMFS. 1994. Endangered Species Act Biennial Report to Congress. Status of Recovery Programs, January, 1992 - June, 1994. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD. 92 pp.

NMFS-Northeast Fisheries Science Center (NMFS-NEFSC). 2002. Unpublished data.

NMFS- Southeast Fisheries Science Center (NMFS-SEFSC). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce NOAA Technical Memorandum NMFS-SEFSC-455. 343 pp.

NOAA. 1991. Stellwagen Bank National Marine Sanctuary. Draft Environmental Impact Statement/Management Plan. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Sanctuaries and Reserves Division, Washington, D.C. 238 pp.

NRC (National Research Council). 1990. Decline of the Sea Turtles. Causes and Prevention. National Academy Press, Washington, D.C. 259 pp.

Ogren, L., and C. McVea, Jr. 1981. Apparent hibernation by sea turtles in North American waters. Pp. 127-132 *in* K.A. Bjorndal, Ed., Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington, D.C.

O'Hara, K.J. 1989. Plastic debris and its effects on marine wildlife. Pp. 395-434 *in* W.J. Chandler, Ed., Audubon Wildlife Report 1988/1989. Academic Press, San Diego, CA.

O'Hara, K., N. Atkins, and S. Iudicello. 1986. Marine wildlife entanglement in North America. Center for Marine Conservation, Washington, D.C. 219 pp.

Payne, M.P., and D.W. Heinemann. 1990. A distributional assessment of cetaceans in the shelf and shelf-edge waters of the northeastern United States based on aerial and shipboard surveys, 1978-1988. Final Report to U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Center, Woods Hole, MA.

Payne, M. and L. Selzer. 1986. Marine mammals, seabirds and marine turtles in the Gulf of Maine and Massachusetts Bay with special emphasis on the locations of the foul-area dumpsite (FADS) and the Cape Arundel dumpsite (CADS). Manomet Bird Observatory Interim Report. Manomet, MA. 221 pp.

Payne, P.M., and L.A. Selzer. 1989 The Distribution, Abundance and Selected Prey of the Harbor Seal, *Phoca vitulina concolor*, in Southern New England. *Mar. Mammal Sci*. 5(2):173-192.

Payne, M.P., L.A. Selzer, and A.R. Knowlton. 1984. Distribution and density of cetaceans, marine turtles, and seabirds in the shelf water of the northeastern United States, June 1980 - December 1983, based on shipboard observation. NMFS, Northeast Fishery Center, Contract No. NA-81-FA-C-00023. 246 pp.

Payne, M.P., D.N. Wiley, S.B. Young, S. Pitmann, P.J. Clapham, and J.W. Jossi. 1990. Recent fluctuations in the abundance of baleen whales in the southern Gulf of Maine in relation to changes in selected prey. *Fish. Bull.* 88:687-696.

Pett, S., and C.J. McKay, Eds. 1990. The resources and uses of Stellwagen Bank (Part 1): technical report on the resources and uses of Stellwagen Bank. Final Report, Urban Harbors Institute,U. Massachusetts, Boston, MA. 133 pp.

Prescott, R.L. 1988. Leatherbacks in Cape Cod Bay, Massachusetts, 1977-1987. Pages 83-84 In: B. Schroeder, Ed., Proceedings of the Eighth Annual Workshop on Sea Turtle Conservation and Biology. NOAA Tech. Memo. NMFS-SEFC-214. 136 pp.

Rough, V. 1995. Gray seals in Nantucket Sound, Massachusetts, winter and spring, 1994. Final report to Marine Mammal Commission, Contract T10155615, 28 pp. NTIS Pub. PB95-191391.

Ryder, C. 2002. Personal communication.

Sadove, S.S., and P. Cardinale. 1993. Species Composition and Distribution of Marine Mammals and Sea Turtles in the New York Bight. Final Report to U.S. Dept. of the Interior, Fish and Wildlife Service Southern New England - New York Bight Coastal Fisheries Project. Charlestown, RI.

Sadove, S.S. and S.J. Morreale. 1990. Marine mammal and sea turtle encounters with marine debris in the New York Bight and the northeast Atlantic. Pages 562-570 In: R.S. Shomura and M.L. Godfrey, Eds., Proceedings of the Second International Conference on Marine Debris 2-7 April 1989, Honolulu, Hawaii. NOAA Tech. Memo. 154. 1274 pp.

Schevill, W.E., W.A. Watkins, K.E. Moore. 1986. Status of *Eubalaena glacialis* off Cape Cod. *In* Right Whales: Past and Present Status. *Edited by* R.L. Brownell, P.B. Best and J.H. Prescott. IWC Special Issue 10. pp. 79 - 82.

Schmid, J.R. 1995. Marine turtle populations on the east-central coast of Florida: results of tagging studies at Cape Canaveral, Florida, 1986-1991. *Fish. Bull.* 93:139-151.

Schwartz, F. 1978. Behavioral tolerance responses to cold water temperatures by three species of sea turtles (Reptilia Cheloniidae) in North Carolina. *Fl. Mar. Res Publ.* 33:16-18.

Sea Turtle Stranding and Salvage Network (STSSN). Unpublished data.

Seipt, *I.E.*, P.J. Clapham, C.A. Mayo, and M.P. Hawvermale. 1990. Population characteristics of individually identified fin whales, *Balaenoptera physalus*, in Massachusetts Bay, 1980-1987. *Fish. Bull.* 88:271-278.

Shoop, C.R., T.L Doty, and N.E. Bray. 1981. Sea turtles in the region between Cape Hatteras and Nova Scotia in 1979. Pages 68-71 *in* A Characterization of Marine Mammals and Sea Turtles in the Mid- and North Atlantic Areas of the U.S. Outer Continental Shelf. Executive Summary for 1979. Report to the U.S. Dept. of the Interior, Bureau of Land Management, Washington, DC. Contract No. AA551-CT8-48. Cetacean and Sea Turtle Assessment Program (CeTAP), University of Rhode Island, Kingston, RI.

Shoop, C.R., and R.D. Kenney. 1992. Seasonal distribution and abundances of loggerhead and leatherback sea turtles in waters of the northeastern United States. *Herpetol. Monogr.* 6:43-67.

Silber, G.K., M.W. Newcomer, and H. Perez-Cortez. 1990. Killer whales (*Orcinus orca*) attack and kill a Bryde's whale (*Balaenoptera edeni*). *Can. J. Zool*. 68:1603-1606.

Thompson, N.B. 1988. The status of loggerhead, *Caretta caretta*; Kemp's ridley, *Leptochelys kempi*; and green, *Chelonia mydas*, sea turtles in U.S. waters. *Mar. Fish. Rev.* 50(3):16-23.

Tomlin, A.G. 1957. Cetacea. In Mammals of the U.S.S.R., and Adjacent Countries. Vol. 9. Akademii Nauk SSSR, Moscow. (Translated by the Israel Program for Scientific translations, Jerusalem, 1967). 717 pp.

Turtle Expert Working Group (TEWG). 1998. An assessment of the Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtle populations in the Western North Atlantic. U.S. Department of Commerce NOAA Technical Memorandum NMFS-SEFSC-409, 96 pp.

Turtle Expert Working Group. 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the Western North Atlantic. U.S. Department of Commerce NOAA Technical Memorandum NMFS-SEFSC-444, 115 pp.

USFWS (U.S. Fish and Wildlife Service). 1986. Endangered and Threatened Wildlife and Plants. 50 CFR 17.11 AND 17.12. JANUARY 1, 1986. U.S. Dept. of the Interior, Fish and Wildlife Service, Washington, D.C.

Volgenau, L., and S.D. Kraus. 1990. The impact of entanglements on two substocks of the western North Atlantic humpback whale, *Megaptera novaeangliae*. Report to U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Marine Entanglement Research Program. Contract No. 43ABNF002563.

Wallace, N. 1985. Debris entanglement in the marine environment: a review. Pages 259-277 In: S.A. Eckert, K.L. Eckert, and T.H. Richardson, eds., Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology, Jekyll Island, Georgia. NMFS, Southeast Fisheries Science Center, Miami, FL. NOAA-TM-NMFS-SEFC-232.

Waring, G. T., J. M. Quintal, S. L. Swartz, P. J. Clapham, T. V. N. Cole, C. P. Fairfield, A. Hohn, D. L. Palka, M. C. Rossman, USFWS, and C. Yeung. 2001. U. S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2001. NOAA Tech. Memo. NMFS-NE-168, 318 pp.

Watkins, W.A. 1986. Whale reactions to human activities in Cape Cod waters. *Mar. Mamm. Sci.* 2:251-262.

Watkins, W.A., P. Tyack, and K.E. Moore. 1987. The 20-Hz signals of finback whales (*Balaenoptera physalus*). Journal Acoustical Society of America 82(6):1901-1912.

Weinrich, M.T., J. Bove, and M. Miller. 1993. Return and survival of humpback whale (*Megapatera novaeangliae*) calves born to a single female in three consecutive years. *Mar. Mamm. Sci.* 9:325-328.

Whitman, A. A. and P. M. Payne. 1990. Age of harbour seals, *Phoca vitulina concolor*, wintering in southern New England . *Can. Field-Nat.* 104(4): 579-58 2.

Wiley, D.N., R.A. Asmutis, T.D. Pitchford, and D.P. Gannon. 1995. Stranding and mortality of humpback whales, *Megaptera novaeangliae*, in the mid-Atlantic and southeast United States, 1985-1992. *Fish. Bull*. 93:196-205.

Witzell, W.N. and W.G. Teas. 1994. The impacts of anthropogenic debris on marine turtles in the western North Atlantic Ocean. NOAA Tech. Memo. NMFS-SEFSC-355. NOAA, NMFS, Southeast Fisheries Science Center, Miami, FL. 21 pp.

Woodley, T.H., M.W. Brown, S.D. Kraus, and D.E. Gaskin. 1991. Organochlorine levels in North Atlantic right whale (*Eubalaena glacialis*) blubber. *Arch. Environ. Contam. Toxicol*. 21:141-145.