UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930

DEC 13 1993

They support the MOU. [initials]

	CO	XO	ADMIN	OPS	PSO	PLNG	SUP	ET	FAC	WMO	ENG	VSL	PRO	VTS	CEA
DATE	12/23	12-16													
ACTION															
INFO	✓	✓			✓								✓		
		[initials]													

Captain Thomas Gilmour
Captain of the Port, New York
United States Coast Guard
Building 108
Governors Island, NY 10004-5098

Dear Captain Gilmour:

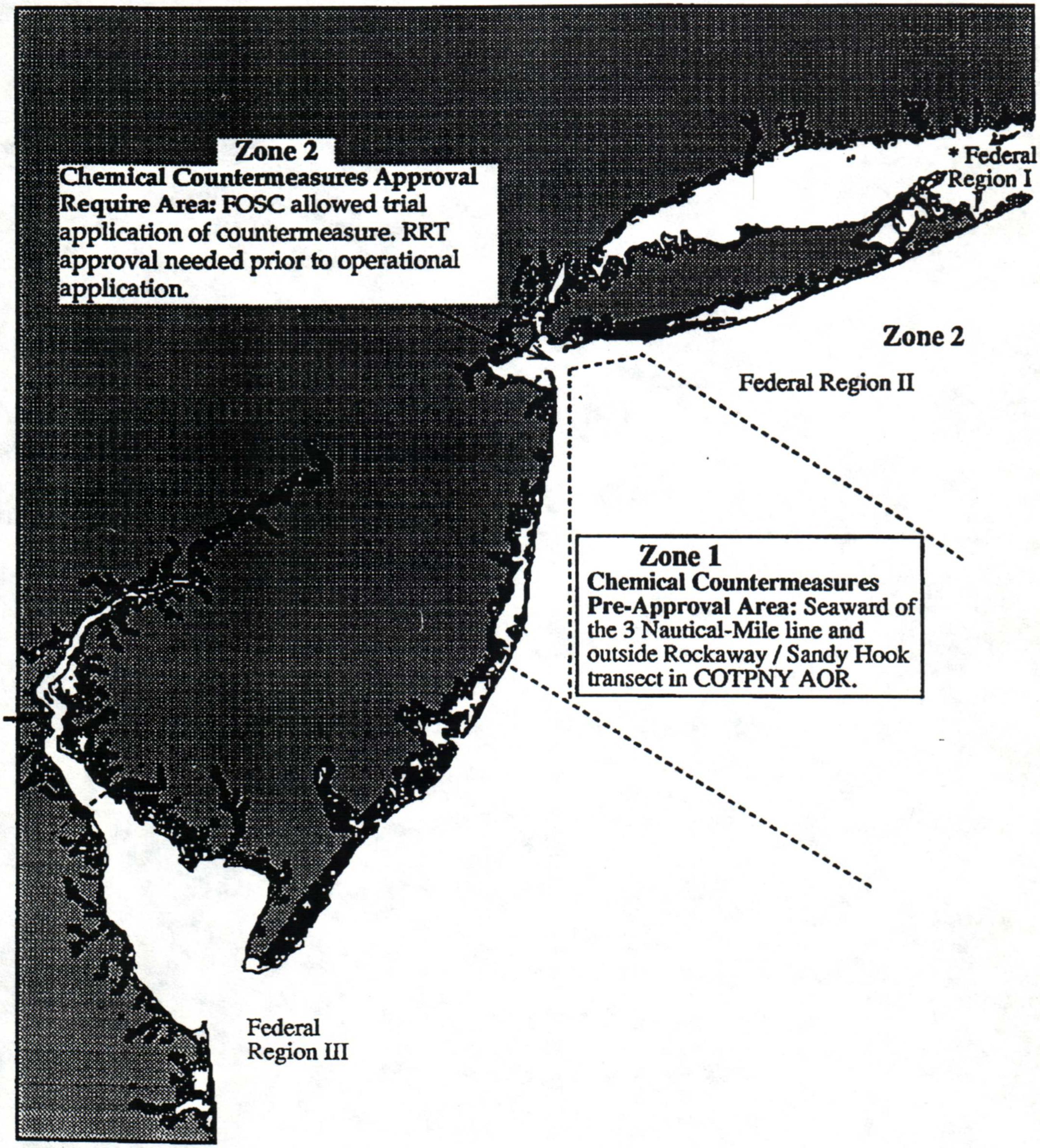
A Memorandum of Understanding (MOU) was drafted between the United States Coast Guard (USCG), the Environmental Protection Agency (EPA), the U.S. Department of the Interior, and the U.S. Department of Commerce to implement sections of Subpart J of the National Oil and Hazardous Substances Contingency Plan and the requirements under the Oil Pollution Act of 1990. Section 4202 (a) of the Oil Pollution Act mandates that the Area Contingency Plan shall "describe the procedures to be followed for obtaining an expedited decision regarding the use of dispersants, other chemicals, and other spill mitigating devices and substances." The MOU grants the Federal On-Scene Coordinator (OSC), with the concurrence of the EPA representative to the Regional Response Team and either New Jersey or New York Governor, pre-authorization for the use of EPA-listed chemical countermeasures (i.e., dispersants) by the USCG within two zones of the New York Bight. These zones (Zones 1 and 2) are depicted in Figure 1. The USCG Captain of the Port of New York would have the authority to respond to an oil spill by chemical dispersant means without first consulting with the NMFS on the biological impact to listed species from the use of dispersants.

Informal consultation between the USCG, the lead federal agency for this consultation, and the National Marine Fisheries Service (NMFS) began in June 1992 concerning whether the USCG's pre-authorized Area Contingency Plan for oil dispersion may affect endangered and threatened species. By letter dated November 25, 1993, the NMFS notified the USCG that endangered whales and sea turtles occur in the New York Bight and may be affected by use of chemical dispersants in that region.

A prior consultation was conducted in 1987 for a similar MOU in the same geographic area. However, it was agreed that a new consultation was necessary to assess new information which has become available. The USCG submitted a Biological Assessment on February 8, 1993, that concluded that pre-approval for the use of dispersants in Zone 1 and Zone 2 of the New York Bight (Figure 1), is not likely to affect any endangered or threatened species.

DRAFT

Region II Chemical Countermeasures Application Zones



* This Zone is covered by MOU with RRT 1.

Figure 1

We have reviewed the USCG Biological Assessment and all available scientific and commercial information, and are able to concur with your conclusion that the procedures and actions proposed under the MOU are not likely to adversely affect those species listed. The detailed description for each species' abundance and distribution in Zones 1 and 2, and the basis for our determination are contained in the enclosed Discussion Paper. An analysis of potential impacts of oil dispersants on marine mammals can only be inferred using the information that is known. The primary information used for inference includes the types of dispersants used and their characteristics when dispersed compared to the characteristics of an untouched spill, transposed against charted activities of marine mammals and endangered species in the area.

Whales and porpoise are generally believed to be susceptible to oil in two ways. Through inhalation of oil and oil gas fractions at the surface, or through ingestion in their food. Right whales would only be expected to be moving through the New York Bight in late winter, although individual foraging excursions may occur in any season. It appears likely that reducing the amount of oil at the surface would be less threatening to right whales in Zones 1 and 2, due to the unlikelihood of their feeding in the area. Humpback and fin whales are the major piscivorous baleen whales that may be found in the New York Bight. Harbor porpoise are only known to reside in the New York Bight in late winter, and feed on the same pelagic fishes as the large baleen whales. The potential affects of dispersed oil to their major prey species (small schooling fishes such as herring, mackerel and sand lance) makes it unlikely that the whales or porpoise would concentrate in water containing dispersed oil. Therefore, dispersed oil may be less threatening than surface oil to the humpback and fin whales, or the harbor porpoise.

Juvenile hard-shelled sea turtles (ridley, green, and loggerhead) are known to utilize the coastal embayments and nearshore regions of Zones 1 and 2 for limited periods in the summer months. These juveniles are only known to spend one season in these waters before moving south toward Florida and the Gulf of Mexico. Sea turtles are known to be most susceptible to oil at the surface or in tar ball form on the bottom. Dispersed oil in the water column is not likely to be available for ingestion by these species. One of the major reasons for pre-approved authorization to use chemical dispersants is to prevent oil from reaching these productive nearshore environments.

Adult loggerheads and leatherback sea turtles are found in the deeper offshore shelf waters of Zones 1 and 2. Bio-availability of dispersed oil in their prey species (benthic crustaceans and jellyfish respectfully) is unknown but believed low. Therefore, it is likely that implementation of the MOU will provide maximum protection for the juveniles of these species, and be not likely to adversely affect the adult or sub-adult sea turtles more than the potential affects of the spill itself.

The blue and sei whale, hawksbill sea turtle, and shortnose sturgeon are rarely, if ever, found in the New York Bight. Therefore, they are unlikely to inhabit the area affected by the MOU and will not be adversely affected by activities carried out under the MOU.

The determinations made in this consultation are specific to the species and their known use of the New York Bight mentioned above and listed in the enclosed Discussion Paper. These determinations cannot be applied to other areas within the Northeast Region without further consultation. Until such time as the effects of dispersants to the endangered species or their food resources is better known, the pre-approved use of dispersants must be assessed for the specific area in which it is intended to be used.

Consultation should be reinitiated if new information reveals effects to listed species or critical habitat (when designated) not previously considered, a species is listed or critical habitat designated that may be affected by the identified action, or the MOU is changed in a manner that changes the basis for this determination.

We clearly recognize that little or no data has been gathered on the effects of oil and dispersants on marine mammals and sea turtles. Similarly, no studies have been conducted relative to the effects of oil and the oil/dispersant mix on the prey species of these endangered species. Therefore, any conclusions regarding potential impacts to these species cannot be accurately assessed, and must be postulated. This leaves all government agencies involved in oil spill response in a potentially precarious position relative to the scientific data supporting use of dispersants in areas where endangered species remain for extended periods.

Ideally, more research is necessary to quantify the toxicity levels, standing time of threshold levels, and location of those levels for oil-dispersant mixtures against the same levels for oil alone. In this way, we would be able to more accurately identify the scenarios which could present the greatest danger to marine life. We encourage that these studies be conducted both at the regional level to determine certain area-specific issues, and nationally where the toxic effects of a dispersant versus the effects of spilled oil are relevant to all regions.

If you have any further questions regarding the determinations made in this consultation or any other matters related to this issue, please contact Douglas Beach of my staff at (508)-281-9254.

Sincerely,

Richard B. Roe
Regional Director

Enclosure

DISCUSSION PAPER

POTENTIAL IMPACTS OF THE USE OF DISPERSANTS ON OIL SPILLS IN THE NEW YORK BIGHT

Background

A Memorandum of Understanding (MOU) was drafted between the United States Coast Guard (USCG), the Environmental Protection Agency (EPA), the U.S. Department of the Interior, and the U.S. Department of Commerce to implement sections of Subpart J of the National Oil and Hazardous Substances Contingency Plan and the requirements under the Oil Pollution Act of 1990. Section 4202 (a) of the Oil Pollution Act mandates that the Area Contingency Plan shall "describe the procedures to be followed for obtaining an expedited decision regarding the use of dispersants, other chemicals, and other spill mitigating devices and substances." The MOU grants the Federal On-Scene Coordinator (OSC), with the concurrence of the EPA representative to the Regional Response Team and either New Jersey or New York Governor, pre-authorization for the use of EPA-listed chemical countermeasures (i.e., dispersants) by the USCG within two zones of the New York Bight. These zones (Zones 1 and 2) are depicted in Figure 1. The USCG Captain of the Port of New York would have the authority to respond to an oil spill by chemical dispersant means without first consulting with the NMFS on the biological impact to listed species from the use of dispersants.

NMFS has consulted with the USCG and other agencies involved in the MOU, and has determined that pre-approved use of dispersants, as specified in the MOU for Zones 1 and 2 of the New York Bight would either not be likely to adversely affect, or would have less of an affect than undispersed oil on endangered or threatened species under the jurisdiction of the NMFS. The determinations made in that consultation are specific to the species listed and their known use of the New York Bight, and are not directly applicable to other areas within the Northeast Region without further consultation. Until such time as the effects of dispersants to the endangered species or their food resources is better known, the pre-approved use of dispersants must be assessed for the specific area in which it is intended to be used.

Proposed Activity

The MOU grants the OSC pre-approval to employ approved dispersants (Corexit 9257 is the preferred one at this time) in Zone 1 and Zone 2 (Figure 1) in the event of an oil spill, provided that risk to human life is not a factor. Zone 1 is an area within the New York Bight seaward of the Territorial Sea, bounded to the south by a line that runs southeast from Tom's River, NJ and bounded to the north by a line that runs southeast from East Rockaway Inlet, NY. Zone 2 is that area in the New York bight that is east of Zone 1.

In the event of an oil spill in Zone 1, the USCG has the authority to spread any other US EPA-listed chemical countermeasure to accelerate assimilation of oil into the water column. In Zone 2, the OSC may conduct a trial application without additional approval from federal or state agencies at sites where spills do not exceed 1,000 gallons of oil. The NOAA Scientific Support Coordinator will be involved in all decisions by the OSC regarding dispersant use.

The USCG prepared a Biological Assessment (USCG 1993) that described the following endangered species that may occur in Zones 1 and 2: right whale (Eubalaena glacialis), humpback whale (Novaeangliae megaptera), fin whale (Balaenoptera physalus), sei whale (Balaenoptera borealis), blue whale (Balaenoptera musculus), sperm whale (Physeter macrocephalus), Kemp's ridley sea turtle (Lepidochelys kempi), leatherback sea turtle (Dermochelys coriacea), green sea turtle (Chelonia mydas), hawksbill sea turtle (Eretmochelys imbricata), and shortnose sturgeon (Acipenser brevirostrum). The following threatened species was also described as occurring in Zones 1 and 2: Loggerhead sea turtle (Caretta caretta). The USCG (1993) also identified the harbor porpoise (Phocoena phocoena) and the bottlenosed dolphin (Tursiops truncatus) as proposed to be listed as threatened. We find this list to be complete with the exception of the bottlenosed dolphin which is designated as depleted under the Marine Mammal Protection Act of 1972, but has not been proposed for listing under the ESA.

Right Whale

Right whales are the most endangered of all the large whales. The northwestern Atlantic stock is thought to number approximately 350 animals (NMFS, 1991a). The species was hunted extensively well into the 20th century for its oil and baleen plates. Although whaling no longer threatens right whales, certain human activities continue to impede species recovery. Currently, the principal threats to right whales include ship collisions, entanglement in fishing gear and habitat degradation (NMFS, 1991a).

Researchers have identified five known northern right whale "high-use" areas: coastal Florida and Georgia, the Great South Channel east of Cape Cod, Massachusetts, the Bay of Fundy off New Brunswick, Canada, and Browns and Baccaro Banks off Nova Scotia, Canada. Right whale seasonal migration patterns are generally described as movement from winter (December to March) calving grounds off Florida, to late winter and spring (March to June) feeding in the Cape Cod-Massachusetts Bay and Great South Channel areas and on to late summer and fall (July to November) feeding in the lower Bay of Fundy or in the region bordered by the Browns and Baccaro Banks. Breeding activity, identified by "rowdy" social groups, has been noted in all high-use areas in all seasons. Right whales primarily feed on dense patches of copepods, with Calanus finmarchicus identified as the principal prey species most often reported. Feeding right whales are consistently observed in Cape Cod Bay, the Great South Channel, the lower Bay of Fundy and the Scotian shelf (NMFS, 1991a; URI, 1982; Watkins and Schevill, 1982). There are no known records of right whales feeding or spending any significant amount of time in the New York Bight Apex.

Right whales may occur in the New York Bight during early spring (March - May) while migrating from winter habitat off Florida to feeding habitat off Massachusetts (NMFS, 1991a; Winn et al., 1986). Nineteenth century data indicates that right whales were consistently hunted off the New Jersey coast and southern coast of Long Island from late January to mid-April (Reeves et al., 1978). Whaling records show that some right whales wintered along the coasts of New Jersey and southern Long Island and that whale abundance peaked between February and May. The right whale was reported to be nearly absent in New York coastal waters by the second half of the nineteenth century.

More recently, sightings in the New York Bight have been sparse. During the 1970's right whale sightings were reported from northern New Jersey to eastern Long Island between late July and mid-October 1974, off Westhampton, New York in late March and early April 1975, and off Malibu, New York in early August 1975 (Reeves et al., 1978). Only 28 sightings of right whales were reported off New York between 1900 and 1982.

The Cetacean and Turtle Assessment Program (CeTAP) surveys conducted between November 1978 and January 1982 revealed little or no sightings of right whales in the New York Bight, although there were occasional sightings of whales along the southern coast of New Jersey (URI, 1982). Similarly, Payne and Heinemann (in review) reported limited sightings of right whales in New York waters based on aerial and shipboard surveys from 1978 - 1988. A few observations were reported east of 73°W off Long Island, NY and south of 40°N off New Jersey; outside of the New York Bight Apex (see Figure 1). Fall and winter sighting data indicates occasional occurrences of right whales along the coast from New Jersey to North Carolina.

Whale watch operations in New York waters provide increased sighting effort for right whales. Scattered reports of right whales off Shinnecock Inlet occur from March to June as whales appear to move northward to summer feeding grounds. A cow and calf were satellite tracked in September 1990, from the Bay of Fundy to New York and New Jersey coastal waters (Mate, 1992). The whales remained in the area for several days but it is not known if the animals were feeding.

Humpback Whale

North Atlantic humpback whales range from breeding grounds in the Caribbean to summer feeding areas extending from Cape Cod to Iceland (Katona et al., 1980). The western North Atlantic population of humpback whales is estimated to be about 5,505 animals (NMFS, 1991b). The largest winter concentration of humpback whales occurs north of the Dominican Republic near the Antillean Island arc. During the spring, summer and fall seasons, humpback whales migrate to at least three feeding regions occurring off Greenland, Newfoundland-Labrador, and the

Gulf of Maine (NMFS, 1991b). Whale distributions appear to be related to seasonal abundances of the sand lance, *Ammodytes americanus*. However, humpbacks may also prey on Atlantic herring, mackerel, pollack, haddock and krill when available (NMFS, 1991b).

Sightings of humpback whales in the New York Bight between 1978 and 1988 show occurrences on Cox's Ledge and east and south of Montauk Point between May and December, and near Fire Island in September and October (URI, 1982). Current sighting effort in the area is limited to seasonal whale watches. Vessel operators from Montauk, Long Island observe humpbacks during summer and fall (S. Sadove, pers. comm.). Juvenile humpback whales show up just east of Long Island between July and September and may remain in the region for up to three weeks. Humpback whale abundance may be related to prey density, although it is uncertain which prey species the whales feed on during a given year. URI (1982) reported that the majority of humpback whale feeding sightings along the east coast occurred from the northern tip of the Great South Channel, stretching east along the 100m contour line to Nantucket Shoals, and then north to Jeffrey's Ledge.

Shifts in humpback whale abundance in the southwest Gulf of Maine are closely related to densities of sand lance (*Ammodytes americanus*). During the summer of 1986, humpback whale sightings on Stellwagen Bank dropped considerably, apparently coinciding with low sand lance density (NMFS, 1991b). Sand lance occur over offshore banks from Canada to Virginia and spawn along the inner half of the continental shelf from November through March. In addition to sand lance, Atlantic herring (*Clupea harengus*) and mackerel (*Scomber scombrus*) comprise a forage base for humpbacks (Bigelow and Schroeder, 1953).

Otter-trawl surveys conducted by NMFS between 1980 and 1986 show that highest sand lance and mackerel density in the New York Bight occurs in spring. Increased abundance is most likely correlated with spawning periods. Sand lance are caught inshore to midshelf in spring while mackerel are found further offshore along midshelf to the shelf edge. Herring migrate to the southern New England - Mid Atlantic region during winter months (Sinclair and Iles, 1985). Both the mackerel and herring stocks have increased in recent years as a result of relatively low catches during 1980-1990 (NOAA, 1991). Conversely, sand lance abundance decreased since the early 1980's. Sand lance populations in the southern New England-Mid-Atlantic region may be affected by predation from overwintering herring and mackerel. Sand lance abundance is known to affect cetacean distribution in the Gulf of Maine and Mid-Atlantic Bight areas. If humpback whales are selectively feeding on sand lance, as in the Gulf of Maine, we would expect to see fewer sightings of humpbacks in the New York Bight since preferred prey abundance is low.

Fin Whale

Fin whales are the most abundant and widely distributed of the baleen whales along the Middle and North Atlantic Coast. The species' principal high-use areas include lower Bay of Fundy, the southern Gulf of Maine (Jeffrey's Ledge and Stellwagen Bank), Great South Channel and the Cox's Ledge region (URI, 1982). Fin whale feeding activity occurs from the Bay of Fundy south to the Delmarva Peninsula. Prey species include euphausids, copepods and schooling fishes (e.g., sand lance, Atlantic herring). In areas where whales were sighted within the New York Bight, sand lance and calanoid copepods were observed at the surface.

CeTAP and Manomet Bird Observatory surveys described high concentrations of fin whales within the New York Bight Apex during mid-winter months (January - February). Fewer sightings of whales occur in the Bight beginning in March. By late spring, fin whales appear to move northward and farther offshore toward spring and summer feeding grounds in the Gulf of Maine and east of Montauk Point (URI, 1982). This northerly movement is believed to correspond with seasonal abundance of sand lance (Ammodytes americanus) (Overholtz and Nicolas, 1979). Sadove (pers comm) reviewed whale sightings during a nine-year period (1981-1989) and found that 87 percent of all fin whale sightings occurred off the eastern end of Long Island from April through October. In September and October, fin whale abundance increases in the New York Bight as whales move inshore off the continental slope. Inshore fin whale movement to the New York Bight during January and February may correspond to increased densities of herring and mackerel during winter months.

Sei, Blue, and Sperm Whales

Sei and blue whales are rarely observed over the continental shelf south of Georges Bank. They are seen occasionally in the Gulf of Maine, but favor the colder waters influenced by the Labrador Current. Sperm whales are common along the continental shelf edge from Georges Bank south to Cape Hatteras. They feed on large squid that live in the deep abyssal waters. Although they are found inshore near Block canyon, they have not been seen inshore in the Hudson canyon area (URI 1982). These three species would not be affected by the activities of the MOU.

Kemp's Ridley Sea Turtle

Of the seven extant species of sea turtles of the world, the Kemp's ridley is the most severely depleted. The only major nesting area for this species is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr, 1963). Virtually the entire world population of adult females nest annually in this single locality. When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals. By the early 1970's, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The 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 (Byles, pers comm. 1991.).

The majority of ridleys identified along the Atlantic Coast of the U.S. have been juveniles and subadults. Sources of mortality in this area include incidental take in fishing gear, pollution and marine habitat degradation, and other man-induced and natural causes. Loss of animals in the Atlantic, then, may be impeding the recovery of this population.

While adult Kemp's ridleys may occur almost exclusively in the Gulf of Mexico, a significant number of hatchlings are transported north along the Atlantic coast of the U.S. Young turtles feed and grow rapidly during passive transportation until they are large enough to actively swim into embayments as far north as New England. These embayments apparently serve as important foraging habitats for single year classes of ridleys. Morreale et al. (1989) reported increases in weight of over 500 grams per month for juvenile ridleys tracked in the Long Island Sound. Reported prey includes benthic crustaceans (i.e., genera Polyonchus, Hepatus, Callinectes, Panopeus, Mineppe, Ovalipes, Calappa, Portunus, Arenaeus, Limulus, Libinia, Cancer), fish (i.e., genera Lutjanus, Leiostomus) and mollusks (i.e., genera Noculana, Corbula, Mulinia, Ilyanassus) (Burke et al., 1990). All of these prey are common along the eastern coast of the United States.

Juvenile ridleys (carapace length equal to 20-30 cm) commonly enter northeast coastal embayments when water temperatures approach 20°C (Burke et al., 1989) where they forage on benthic organisms. An analysis of the turtle's diets revealed that spider crabs (Libinia spp.) and Atlantic rock crabs (Cancer irroratus) are the preferred prey (Burke et al., 1990). Kemp's ridleys sea turtles leave northern embayments in the fall, when water temperatures cool (Burke et al., 1990). Morreale et al. (1989) suggests that directed movements of Kemp's ridleys southward, occur generally in late October (Morreale, pers comm., 1992). Sea turtle emigration occurs from the Chesapeake Bay when waters drop below 18°C, usually in November. They move into coastal waters at this stage and become benthic feeders until falling water temperatures provoke them to travel south toward the Gulf of Mexico. Additional information is being compiled in the embayments of New York and Virginia to support this theory (Morreale et al., 1989).

Kemp's ridleys are present seasonally in the New York Bight. Sea turtles arrive in late June and early July and linger in New York and New Jersey waters until as late as December and January. During this period they become casualties to dropping water temperatures and cold-stun stranding in Long Island Sound and Peconic Bay. Ongoing investigations seem to indicate that Long Island Sound and Peconic Bay are important habitats for this species.

Leatherback Sea Turtle

The leatherback turtle is found throughout the waters of the Atlantic, Pacific, Caribbean and the Gulf of Mexico. Nesting takes place almost entirely in tropical waters. In the eastern Caribbean, nesting occurs in the Dominican Republic and on islands near Puerto Rico.

The distribution pattern of this species from Cape Hatteras to Long Island resembles that of the loggerhead sea turtle. They are commonly seen in the northeast, and routinely occupy the waters between Long Island, New York and New Jersey's inshore waters (Shoop and Kenney, 1992; URI, 1982).

Leatherbacks are the most pelagically distributed sea turtles feeding primarily on jellyfish such as Stomolophus, Chryaora, and Aurelia. Leatherbacks may also be found in inshore waters of less than 60 meters (200 feet) during the summer, feeding on soft-bodied invertebrates. 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 prey of jellyfish, Cyanea spp. (Shoop and Kenney, 1992). Large jellyfish concentrations in New York Bight may attract leatherback sea turtles.

Green Sea Turtle

Green turtles are distributed circumglobally mainly in waters between the northern and southern 20°C isotherms. In the western Atlantic, several major nesting assemblages have been identified and studied. However, most green turtle nesting in the continental U.S. occurs on the Atlantic coast of Florida.

Green sea turtles appear in the Northeast once they have reached a length of 20 to 25 cm. In New York waters, the Long Island Sound region is considered to be an important habitat in the early lifestages of the green sea turtle. Typically, juvenile green turtles are first sighted near Orient Point, New York, in June or July when they are first captured in pound nets (Morreale et al. 1989). Turtles are found foraging in Long Island Sound among seagrasses and/or algae. A study of the diet of 11 green turtles from New York waters revealed that 90 percent of the green turtles with a carapace length measuring between 25 and 40 cm had consumed the seagrass (Zostera marina) (Burke et al., 1990). In addition, green turtles also consume various genera of algae, including Fucus, Sargassum, Codium, Ulva, and Enteromorpha. Like the loggerhead and Kemp's ridley sea turtles, green turtles move southward in late fall as water temperatures decline in Long Island Sound.

Hawksbill Sea Turtle

The hawksbill sea turtle has been rarely found in New York and New Jersey waters. It prefers the warmer waters of the Caribbean

Ocean, and is not considered to be an inhabitant of Northeast waters. Hawksbill sea turtles will not be affected by the activities of the MOU.

Shortnose Sturgeon

The shortnose sturgeon is an anadromous fish present in many large rivers in the Northeast, and a population is known to exist in the Hudson River (Dadswell et al., 1984). Shortnose sturgeon are known to inhabit their natal rivers, estuaries, and the nearshore marine environment. However, they typically forage within the middle and upper reaches of the estuaries and rivers that they inhabit (Dadswell 1984). Therefore, the shortnose sturgeon is not likely to inhabit waters to be affected by this MOU.

Loggerhead Sea Turtle

The threatened loggerhead is the most abundant species of sea turtle occurring in U.S. waters. Due to the inability to count subadults, it is impossible to estimate the size of the U.S. loggerhead population. An estimated 14,150 females nest per year in the southeastern United States. This estimate is generally agreed upon as the best approximation and provides a useful index to population size and stability (NMFS and USFWS, 1991). Loggerheads inhabit coastal areas of the continental shelf where they forage around coral reefs, rocky bottoms, shellfish beds, and boat wrecks; they commonly enter bays, lagoons and estuaries. Aerial surveys indicate that loggerhead turtles are most common in waters less than 50 meters in depth, but they occur further offshore as well (Shoop and Kenney, 1992).

Populations of loggerheads have been under stress for a number of years, mostly due to mortalities caused by the incidental drowning in shrimp trawls. An estimated 9,874 individuals were killed annually by shrimp trawlers in the Gulf of Mexico and southern North Atlantic (Henwood and Stuntz, 1987). In addition, several researchers suggest that loggerhead turtle nesting populations in the U.S. are declining at rates of up to 5 percent annually (NMFS and USFWS, 1991).

The primary food sources of the loggerhead turtle are benthic invertebrates including crustaceans, mollusks, and sponges. Crabs and conchs were identified as the most common items, although loggerheads often eat fish, clams, oysters, sponges and jellyfish. Spider crabs (Libinia spp.) and rock crabs (Cancer irroratus) have been identified as the primary components of loggerhead diet in the Long Island Sound (Burke et al., 1990). Substantial portions of shelf waters off of the northeast United States serve as important foraging grounds for loggerheads.

Although most commonly in depths of 22 to 49 meters (72 to 161 feet), loggerheads have been observed at the surface in water depths of 0 to 4,481 meters (14,790 feet). No substantial information exists, however, regarding the offshore activity or the depths beyond which these offshore turtles will not feed on the bottom. These turtles may be travelling to and from inshore foraging habitats, or may be feeding on resources available in the water column. The latter behavior is unquantified, although there are documented takes of loggerheads on longline hooks baited with squid, indicating that they are certainly willing to feed while in the pelagic environment.

Harbor Porpoise

Harbor porpoise that may occur in Zones 1 or 2 are considered part of the Gulf of Maine population. NMFS has proposed listing Gulf of Maine harbor porpoise as a threatened species under the ESA (58 FR 3108; Jan. 7, 1993). Surveys conducted in 1991 estimate this population to number approximately 37,500 animals (Palka 1993). More recent surveys conducted in 1992 produced a higher point estimate of 67,500 (Smith et al. 1993). However, since both estimates fall within the 95 percent confidence level of the two surveys, NMFS believes that a point estimate of 47,200, derived from pooling the 1991 and 1992 survey data, is the best available population estimate at this time (Smith et al. 1993).

The population appears to be highly mobile, with strong seasonal north/south movements throughout shelf waters of the Bay of Fundy and the northeastern United States (CeTAP 1982; Payne et al. 1990). Porpoise are found in southern New England waters in the winter, and in Massachusetts and Cape Cod Bays in the spring beginning in March, and again in the fall. They appear to summer in the northern Gulf of Maine from Nova Scotia, through the lower Bay of Fundy, and extending west to the Penobscot Bay in Maine. The winter distribution of the Gulf of Maine population of harbor porpoise is poorly known. There are records of winter strandings from New England to Cape Hatteras, and rarely to Florida (Polacheck and Wenzel 1990). Recent surveys demonstrate the scattered presence of harbor porpoise in the Georges Bank area in the winter. Stranding data from February to May 1993 (Haley and Read 1993) indicate harbor porpoise extend over the continental shelf region from North Carolina to New Jersey during that time.

Atlantic herring appears to be the most important prey species for this population (Smith and Gaskin, 1974; Recchia and Read, 1989). Therefore, it would be expected that harbor porpoise may occur in Zones 1 or 2 during the winter when schools of herring or mackerel may also be found there.

Assessment of Impacts

In response to increasing public concern regarding oil spills and the impacts on the marine environment, government agencies have increased their role in planning for prevention and mitigation of such discharge events. The MOU created to implement recent oil spill prevention and clean-up legislation within the New York Bight provides the USCG On-Scene Coordinator (Captain of the Port - New York) with pre-approved authority to use chemical dispersants in oil spill mitigation in a defined zone as part of the Area Contingency Plan. The MOU acknowledges that the primary method of controlling discharged oil is through physical removal of the oil from the environment. Under certain circumstances, however, this may not be possible and the use of chemical agents may be the best means to reduce the threat to the public and the environment.

An accurate assessment of the impacts of oil dispersants on whales and sea turtles is not possible under the present regime of scientific understanding. Little research has been conducted to assess the direct and indirect effects of oil dispersants to whales and sea turtles. Whether an accurate scientific method could even be formulated for such research due to difficulties in viewing migratory marine species and tracking their movements and interactions is dubious.

Under these conditions, an analysis of potential impacts of oil dispersants on marine mammals can only be inferred using the information that is known. The primary information used for inference includes the types of dispersants used and their characteristics when dispersed compared to the characteristics of an untouched spill, transposed against charted activities of marine mammals and endangered species in the area. The effects of a dispersant-oil mixture on a variety of other marine life has been studied and these effects can provide insight into potential impacts.

Most experts agree that the toxicity of dispersants has decreased while the effectiveness of dispersal has increased since their first use in 1967. However, no general conclusion has been reached as to whether the toxicity level is low enough so as to not pose a significant hazard to marine and human life. In addition, the toxicity and threat of an oil spill without the use of chemical countermeasures needs to be compared with the toxicity and threat of surfactants containing a mixture of both oil and chemical dispersants. Some experts state that oil and dispersant mixtures are less toxic (Wells, 1982) while others believe that an oil slick alone cannot be any more toxic than a mixture of oil and dispersant (Rogerson and Berger, 1981).

There are several types of dispersants that have been developed and are available for use in oil spill mitigation. They are often discussed as a group because of their similar characteristics as dispersing agents. Corexit 9257 is a self-mixing dispersant that was developed to mitigate oil spill damage to the marine environment (Rogerson and Berger, 1981). This dispersant is the current preferred chemical oil spill treatment for the New York Bight and will be the focus of this review.

As a group, surfactants act to break down oil slicks by converting a uniformed spill into individual oil droplets. When the droplets are further acted upon by wave action, assimilation of the oil into the water column is accomplished more quickly as opposed to a spill that has not been influenced by chemicals. Rather than oil being moved horizontally across the ocean surface, oil is pulled down into the water column with some components dissolving into the water and others settling out to the ocean bottom. Based on laboratory experiments, these dispersants will biodegrade at a rate equal to or greater than that of non-dispersed oil (Wells, 1982).

Dispersants are considered an effective measure in mitigating oil spills. The major concern with a spill is that it wash ashore, posing a greater risk to human health and productive marine life systems. Under most conditions, dispersants are very effective in reducing the time that the oil resides on the ocean surface thereby reducing the chances that it will be pushed ashore by wave energy. However, dispersants will not remove an entire spill. There is a correlation between the amount of dispersant used and its effectiveness in that the more dispersant used, the more effective the dispersing action (Wells, 1982). Canadian and Norwegian studies have shown that there is even a link between toxicity and effectiveness even though toxicity thresholds have come down substantially since the production of the first dispersants.

The main issue remains as to whether oil is more threatening to species when concentrated at the surface, dispersed in the water column, or allowed to reach the benthic regions. Obviously, the importance of the impact will depend upon the species of concern and how they utilize the habitat in which the oil or oil/dispersant mix is introduced. Seabirds, for example, will be more highly impacted by non-dispersed oil because the toxicity levels will remain high on the ocean surface (Peakell, 1986), while benthic organisms may be more highly impacted when oil is pushed into the water column and down to the benthos by the dispersant. This has been shown in several research papers that have compared susceptibility of various species to dispersants. In general, most have shown that bottom dwellers, more specifically abalone (Martin, 1990) and little neck clams (Hartwick, 1982), have been more adversely impacted by chemically treated spills than pelagic species.

In addition to spatial factors which determine the species at highest risk of exposure, species physiology also may dictate which species are better equipped to handle potentially lethal exposures. Ordzie (1981) showed that scallops were quite sensitive to the toxicity induced dispersants, while the oyster drill, also a benthic species, was not. Starfish, however, were sensitive only to the dispersant and not to the oil. Macrocystis gametophytes have a exposure threshold of 2.5 ppm of the dispersant Corexit 9527 where gametophyte die-off rapidly increases (Martin, 1990). In the same study, abalone were shown to be 7 times more sensitive to Corexit 9527 than smelt.

Other studies have further demonstrated the variety of responses by species from exposure to oil and oil-dispersant mixtures. Rogerson showed that the mixture posed a greater impact on ciliate protozoan. He attributed the results to increased oil droplets issuing increased toxicity, although he also contends that impacts on zooplankton are decreased by chemically dispersing oil.

Another fundamental question concerns the conditions that increase or decrease toxicity. Some experts contend that once oil is dispersed, it interacts with larger quantities of water, thus decreasing the level of toxicity. However, some also believe that dispersants which contain one level of toxicity, when added to the oil slick with it's own inherent toxicity, may synergistically produce a short-term higher toxicity. This issue needs further study.

The level of toxicity can also vary depending on a number of external factors. Physical break-down of a spill is accelerated in waters of warmer temperatures and higher salinity. The level of wave and other water-related energy also influences the effectiveness of physical oil break-down and alters both the toxicity levels and the location where they will occur. Toxicity thresholds can change from one to three orders of magnitude when such external factors are altered (Wells, 1984).

Marine mammal and sea turtle exposure to dispersants is an issue of particular concern. Such species must spend significant amounts of time near the surface for gas exchange. Whether dispersed oil will increase exposure by increasing the area containing some levels of toxins, or decrease exposure by accelerating assimilation of toxins into the water column is still debated. Some studies have shown that sea turtles alter their surfacing behavior to avoid spill areas, but how they accomplish this is not known, nor are the circumstances which might make the turtles response mechanisms ineffective (Lutz, 1986).

The right whale is the most critically depleted species known to exist in Zones 1 and 2. However, it is likely to be only migrating through the New York Bight and is not expected to remain in the area. Whales are generally believed to be susceptible to oil in two ways. Through inhalation of oil and oil gas fractions at the surface, or through ingestion in their food. Right whales would only be expected to be moving through the New York Bight in late winter, although individual foraging movements may occur at any season (Mate 1992). They are also known to be very selective in the density of zooplankton blooms before feeding is attempted (Mayo and Marx, 1990). Dense concentrations of their known zooplankton prey species have never been recorded in the Bight. Therefore, it appears likely that reducing the amount of oil at the surface would be less threatening to right whales in Zones 1 and 2. The potential toxicity of dispersed oil to plankton would further reduce the possibility of dense blooms existing in a environment containing dispersed oil. Given that the species is a rare visitor to the New York Bight and that dispersed oil may be less threatening to right whales in this region than surface oil, the potential use of dispersants in Zones 1 and 2 is not likely to adversely affect the species.

The humpback and fin whales are the major piscivorous baleen whales that may be found in the New York Bight. As stated above, whales are generally believed to be susceptible to oil through inhalation of oil and oil gas fractions at the surface, or through ingestion in their food. The main prey species of these two species are small schooling fishes such as sand lance, herring and mackerel. Sand lance may be the preferred species in the summer months, but recent increases in stocks of herring and mackerel may provide prey resources in the winter months as well. Sand lance are not normally found in Zone 1, but may be found in Zone 2. Schools of herring and mackerel follow a pelagic existence, and move through the New York Bight region in the late winter or early spring as they move north toward summer feeding grounds in the Gulf of Maine or Gulf of St Lawrence in Canada. Some river herrings may be moving into the Hudson River.

Feeding schools of fish may encounter and ingest plankton that are contaminated by dispersed oil. However, the apparent toxicity of the oil/dispersant mix on plankton may reduce their density in the immediate vicinity of a dispersed spill. It is possible, therefore, that schooling fishes would not be attracted to a dispersed spill area. The possibility of schooling fishes being repelled by water containing dispersed oil is not known and should be studied. Therefore, these prey species may be found in water containing dispersed oil. However, surface oil would have almost no effect on mid-water fish distribution. Therefore, whales could be attracted to and feed on fish under a surface spill, increasing the likelihood of their encountering the oil at the surface. Given the above analysis for fin and humpback whales and their known use of the New York Bight region, dispersed oil may be less threatening than surface oil to these species. Therefore, the potential use of dispersants in Zones 1 and 2 is not likely to adversely affect humpback and fin whales more than the potential affects of the spill itself.

Small juvenile endangered ridley and green sea turtles are known to utilize the coastal embayments and nearshore regions of Zones 1 and 2 for limited periods in the summer months. Adult-sized individuals have not been found in these waters. These juveniles are only known to spend one season in these waters before moving south toward Florida and the Gulf of Mexico. They are known to feed on crabs and other benthic inhabitants of the nearshore regions. One of the major reasons for pre-approved authorization to use chemical dispersants is to prevent oil from reaching these productive nearshore environments. Therefore, it is likely that implementation of the MOU will provide maximum protection for these species. Furthermore, sea turtles are known to be most susceptible to oil at the surface or in tar ball form on the bottom. Dispersed oil in the water column is not likely to be available for ingestion by these species. The ultimate fate of dispersed oil is, however, the sediment, providing a possible path of bio-availability through their food resources. However, these species only inhabit these waters for one summer season, reducing their exposure to dispersed oil through food. Therefore, the potential use of dispersants in Zones 1 and 2 is not likely to adversely affect Kemp's ridley and green sea turtles more than the potential affects of the spill itself.

Small juvenile loggerhead sea turtles have a similar distribution to the ridley and green sea turtles in the New York Bight, and therefore, would be expected to be affected in the same way. However, adult loggerheads are found in the deeper offshore shelf waters of Zones 1 and 2. Their prey species are still believed to be benthic crabs and other similar species. The same scenario of the effects of un-dispersed oil on loggerheads stand for the adults. The only difference would be the higher potential of bio-available dispersed oil in their food resources as they may return from year to year to feed in the area. However, it is still believed likely that the potential use of dispersants in Zones 1 and 2 is not likely to adversely affect adult loggerhead sea turtles more than the potential affects of the spill itself.

Leatherbacks are pelagic feeding sea turtles that are known to feed only on jellyfish. They are only known to move through the New York Bight during the summer and fall. As with other turtles, they are believed to be susceptible to oil at the surface. Bio-availability of dispersed oil through jellyfish is unknown but believed low due to their low lipid content. Therefore, the potential use of dispersants in Zones 1 and 2 is not likely to adversely affect leatherback sea turtles more than the potential affects of the spill itself.

Harbor porpoise are known to feed primarily on herring. They are only known to reside in the New York Bight in the late winter. Since odontocetes are known to be affected by oil in the same way as baleen whales, the above discussions on potential effects of oil versus dispersed oil on humpback and fin whales is true for harbor porpoise. Therefore, the potential use of dispersants in Zones 1 and 2 is not likely to adversely affect harbor porpoise more than the potential affects of the spill itself.

Recommendations

We know how chemical countermeasures work and some of the potential results from their use. We also know the impacts that could result based on scientific laboratory studies conducted on a variety of marine species in combination with known behavioral patterns of endangered species in the proposed area. However, little or no data has been gathered on the effects of oil and dispersants on marine mammals and sea turtles. Similarly, no studies have been conducted on the effects of oil and the oil/dispersant mix on the prey species of these endangered species. Therefore, any conclusions regarding potential impacts to these species cannot be accurately assessed, and must be postulated. This leaves the government agencies signing this MOU in a potentially precarious position relative to the scientific data supporting use of dispersants in areas where endangered species remain for extended periods.

Ideally, more research is necessary to quantify the toxicity levels, standing time of threshold levels, and location of those levels for oil-dispersant mixtures against the same levels for oil alone. In this way, we would be able to more accurately identify the scenarios which could present the greatest danger to marine life. We encourage that these studies be conducted both at the regional level to determine certain area-specific issues, and nationally where the toxic effects of a dispersant versus the effects of spilled oil are relevant to all regions.

Literature Cited

Bigelow, H.B. and W. C. Schroeder. 1953. Fishes of the Gulf of Maine. US Fish and Wildlife Service., Fishery Bulletin, 53. 577 pp.

Burke, V.J., S.J. Morreale and E.A. Standora. 1990. Comparisons of Diet and Growth of Kemp's ridley and loggerhead turtles from the northeastern U.S. In: Richardson, T.H., J.I. Richardson, and M. Donnelly (Compilers). 1990. Proceedings of the Tenth Annual Workshop on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFC-278. p 135

Carr, A. F. 1963. Panspecific reproductive convergence in Lepidochelys kempi. Ergebn. Biol. 26: 298-303.

Dadswell, M.J., Taubert, B.D., Squiers, T.S. Marchette, D. and Buckley, J. 1984. Synopsis of Biological Data on Shortnose Sturgeon, Acipenser brevirostrum, LeSueur, 1818. NOAA Technical Report NMFS 14.

Duke, T.W. ed. 1986. Proceedings of Oil and Dispersant Toxicity Testing. U.S. Department of Interior, Washington, D.C.

Haley N.J. and A.J. Read 1993. Workshop on harbor porpoise mortalities and human interactions. NMFS/NER Workshop Report. Aug. 9, 1993.

Hartwick, E. B. 1982. "Effects of a Crude Oil and an Oil Dispersant (Corexit 9527) on Populations of the Littleneck Clam (Protothaca staminea)." In:Marine Environmental Research Applied Science Publishers, Ltd, London. Vol 6:291-306.

Henwood, T.A., and W.E. Stuntz. 1987. Analysis of sea turtle captures and mortalities during commercial shrimp trawling. Fishery Bulletin: Vol. 85, No. 4, 1987.

Katona, S.K. and J.A.Beard, 1990. Population Size, migrations and feeding aggregations of the humpback whale (Megaptera novaeangliae) in the western North Atlantic ocean. Rep. Int. Whale Comm (Special Issue 12): 295-306

Lutz, P. Study of the Effects of Oil on Marine Turtles. U.S. Department of the Interior. Washington, D.C., 1986.

Martin, M. A. 1990. Environmental Toxicology and Chemistry. Pergamon Press, Vol. 9:1387-1395.

Mate B.R. 1992. Application of remote sensing methods for tracking large cetaceans: North Atlantic right whales (Eubalaena glacialis). Final Report to Minerals Management Service in fulfillment of Contract No. 14-12-0001-30411.

Mayo, C.A. and M.K. Marx. 1990. Surface foraging behavior of the North Atlantic right whale, Eubalaena glacialis, and associated zooplankton characteristics. Canadian Journal of Zoology, Vol.68:2214-2220

Morreale, S. J., A. Meylan, B. Baumann. 1989. Sea turtles in Long Island Sound, New York: a historical perspective. in; Eckert, S. A., K. L. Eckert and T. H. Richardson (Compilers). 1989. Proceeding of the Ninth Annual Workshop on Sea Turtle Conservation and Biology. NOAA Technical Memorandum NMFS-SEFC-232: 121-124.

Neff, J. M. 1990. "Composition and Fate of Petroleum and Spill, Treating Agents in the Marine Environment." In: Sea Mammals and Oil: Confronting the Risks. Academic Press, Inc.

NMFS, 1991a. Recovery Plan for the Northern right whale (Eubalaena glacialis). Prepared by the Right Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland.

NMFS, 1991b. Recovery Plan for the Humpback Whale (Megaptera novaeangliae). Prepared by the Humpback Whale Recovery Team for NMFS, Silver Spring, Maryland.

NMFS and U.S. Fish and Wildlife Service, 1991. Recovery Plan for the Loggerhead Sea Turtle. NMFS, Washington, DC

NOAA, 1991. Status of Fishery Resources of the Northeastern United States for 1991. NOAA Tech. Memo. NMFS-F/NEC-86. Woods Hole, MA.

Ordzie, C. J. 1981. "Lethal and Sublethal Effects of Short Term Acute Doses of Kuwait Crude Oil and a Dispersant Corexit 9527 on Bay Scallops, Argopecten irradia (Lamarck), and Two Predators at Different Temperatures." Marine Environmental Research. Applied Science Publishers, London. Vol. 5:195-210.

Overholtz, W. J. and J.R. Nicolas. 1979. Apparent feeding by the fin whale (Balaenoptera physalis) and humpback whale (Megaptera novaeangliae) on the american sand lance (Ammodytes americanus) in the northwest Atlantic. Fishery Bulletin: Vol. 77, No. 1 : 1979.

Palka, D. 1993. In press. Abundance estimate of the Gulf of Maine harbor porpoise. Rep. Int. Whal. Comm., 44.

Payne, P. M., G. Power and C. Yustin. 1990. Interactions between the New England sink-gillnet fishery and the harbor porpoise, Phocoena phocoena. Paper SC/090/G25 presented to the IWC Workshop on mortality of cetaceans in passive fishing nets and traps, 22-25 October 1990, LaJolla, California. 33 pp.

Peakell, D.B. 1987. "A Hazard Assessment of Chemically Dispersed Oil Spills and Seabirds." Marine Environmental Research, Elsevier Applied Science Publishers, London. Vol. 22:91-106.

Polacheck, T. and F. Wenzel. 1990. What do stranding data say about harbor porpoise (Phocoena phocoena). Rept. Int. Whal. Commn, Working Paper SC/42/SM39.

Recchia, C. A. and A. J. Read. 1989. Stomach contents of harbour porpoises, Phocoena phocoena (L.), from the Bay of Fundy. Can. J. Zool. 67: 2140-2146.

Reeves, R.R., J.G. Mead. and S. Katona. 1978. The right whale (Eubalaena glacialis) in the Western North Atlantic. Rep. Int. Whal. Commn 28, 1978:303-312.

Rogerson, A. and J. Berger. 1981. "The Toxicity of the Dispersant Corexit 9527 and Oil-Dispersant Mixtures to Ciliate Protozoa." Chemosphere. Pergamon Press, London; Vol 10:33-39.

Scientific and Environmental Associates, Inc. 1992. Technical Seminar on Chemical Countermeasures.

Shoop, C.R. and R.D. Kenney. 1992. Seasonal distributions and abundances of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetological Monographs 6: 43-67.

Sinclair, M. and T.D. Iles. 1985. Atlantic herring (Clupea harengus) distributions in the Gulf of Maine - Scotian Shelf area in relation to oceanographic features. Can. J. Fish. Aquat. Sci. 42:880-887.

Smith, G. J. D. and D. E. Gaskin. 1974. The diet of harbour porpoises (Phocoena phocoena [L.]) in coastal waters of eastern Canada, with special reference to the Bay of Fundy. Can. J. Zool. 52: 777-782.

Smith, T., D. Palka and K. Bisack. 1993. Biological significance of harbor porpoise in the demersal gillnet fishery. NOAA/NMFS/NEFSC: Woods Hole, MA. NEFSC Ref. Doc. 93-23.

URI. 1982. A characterization of marine mammals and turtles in the mid- and North Atlantic areas of the U.S. outer continental shelf, Final Report. U.S. Dept. of Interior, Bureau of Land Management, Contract No. AA551-CT8-48, Washington, D.C. 538 pp.

USCG. 1993. Biological Assessment on the Effects of Pre-Approved Authorization of the Use of Dispersants by the USCG On-Scene Coordinator in the New York Bight on Endangered and Threatened Species. Letter from USCG Captain of the Port, New York to NMFS Regional Director. February 8, 1993.

Watkins, W.A. and W.E. Schevill. 1982. Observations of right whales, Eubalaena glacialis in Cape Cod waters. Fishery Bulletin: Vol. 80, No. 4: 875-880

Wells, P.G. 1984. "The Toxicity of Oil Spill Dispersants to Marine Organisms: a current perspective." In: Oil Spill Chemical Dispersants: Research, Experience, and Recommendations. American Society for Testing and Materials, Philadelphia, p. 177-202.

Winn, H.E., Price, C.A. and Sorensen, P.W. 1986. The distributional biology of the right whale (Eubalaena glacialis) in the western North Atlantic. Rep. Int. Whal. Comm (Special Issue 10):129-138