MINKE WHALE (*Balaenoptera acutorostrata*): Canadian East Coast Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Minke whales have a cosmopolitan distribution, being distributed in polar, temperate and tropical waters. In the North Atlantic, there are four recognized populations — Canadian East Coast, west Greenland, central North Atlantic, and northeastern North Atlantic (Donovan 1991). These divisions were defined by examining segregation by sex and length, catch distributions, sightings, marking data, and pre-existing ICES boundaries. However, there were very few data from the Canadian East Coast population.

Minke whales off the eastern coast of the United States are considered to be part of the Canadian East Coast stock, which inhabits the area from the eastern half of the Davis Strait (45ºW) to the Gulf of Mexico. The relationship between this stock and the other three stocks is uncertain. It is also uncertain if there are separate stocks within the Canadian East Coast stock.

The minke whale is common and widely distributed within the U.S. Atlantic Exclusive Economic Zone (EEZ) (CETAP 1982). There appears to be a strong seasonal component to minke whale distribution. Spring and summer are times of relatively widespread and common occurrence, and when the whales are most abundant in New England waters. During fall in New England waters, there are fewer whales, while during winter, the species appears to be largely absent. Like most other baleen whales, minke whales generally occupy the continental shelf proper, rather than the continental shelf edge region. Records summarized by Mitchell (1991) hint at a possible winter distribution in the West Indies, and in the mid-ocean south and east of Bermuda. As with several other cetacean species, the possibility of a deep-ocean component to the distribution of minke whales exists but remains unconfirmed.

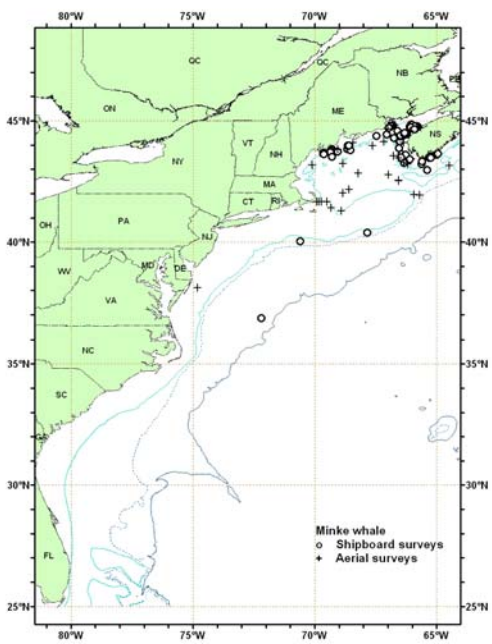

Figure 1. *Distribution of minke whale sightings from NEFSC and SEFSC shipboard and aerial surveys during the summers of 1998, 1999, and 2004. Isobaths are the 100m, 1000m and 4000m depth contours.*

POPULATION SIZE

The total number of minke whales in the Canadian East Coast population is unknown. However, seven estimates are available for portions of the habitat: a 1978-1982 estimate; a shipboard survey estimate from the summers of 1991 and 1992; a shipboard estimate from June-July 1993; an estimate made from a combination of shipboard and aerial surveys conducted during July to September 1995; an aerial survey estimate of the entire Gulf of St. Lawrence conducted in August to September 1995; an aerial survey estimate from the northern Gulf of St. Lawrence conducted during July and August 1996; and an aerial/shipboard survey conducted from Georges Bank to the mouth of the Gulf of St. Lawrence during July and August 1999.

An abundance of 320 minke whales (CV=0.23) was estimated from an aerial survey program conducted from 1978 to 1982 on the continental shelf and shelf edge waters between Cape Hatteras, North Carolina and Nova Scotia (CETAP 1982).

An abundance estimate of 2,650 (CV=0.31) minke whales was obtained from two shipboard line-transect surveys conducted during July to September 1991 and 1992 in the northern Gulf of Maine-lower Bay of Fundy region. This estimate is a weighted-average of the 1991 and 1992 estimates, where each annual estimate was weighted by the inverse of its variance, using methods as described in Palka (1995).

An abundance estimate of 330 minke whales (CV=0.66) was calculated from a June and July 1993 shipboard line-transect sighting survey conducted principally between the 200 and 2,000m isobaths from the southern edge of Georges Bank, across the Northeast Channel, to the southeastern edge of the Scotian Shelf (NMFS 1993).

An abundance estmate of 2,790 (CV=0.32) minke whales was derived from a July to September 1995 sighting survey conducted by two ships and an airplane that covered waters from Virginia to the mouth of the Gulf of St.

Lawrence (NMFS unpublished data). Total track line length was 32,600 km. The ships covered waters between the 50 and 1000 fathom isobaths, the northern edge of the Gulf Stream, and the northern Gulf of Maine/Bay of Fundy region. The airplane covered waters in the mid-Atlantic from the coastline to the 50 fathom depth contour, the southern Gulf of Maine, and shelf waters off Nova Scotia from the coastline to the 1000 fathom depth contour. Data collection and analysis methods are described in Palka (1996).

Kingsley and Reeves (1998) estimated there were 1,020 (CV=0.27) minke whales in the entire Gulf of St. Lawrence in 1995 and 620 (CV=0.52) in the northern Gulf of St. Lawrence in 1996. During the August-September 1995 survey, 8,427 km of track lines were flown in an area encompassing 221,949 km^2. During the July-August 1996 survey, 3,993 km of track lines were flown in an area encompassing 94,665 km^2. These estimates were uncorrected for visibility biases such as *g(0)*, the probability of detecting a group on the track line.

An abundance estimate of 2,998 (CV=0.19) minke whales was obtained from a July to August 1999 sighting survey conducted by a ship and airplane covering waters from Georges Bank to the mouth of the Gulf of St. Lawrence (Table 1; NMFS unpublished data; Palka 2006). Total track line length was 8,212 km. Using methods similar the 1995 Virginia to Gulf of St. Lawrence survey, shipboard data were analyzed using the modified direct duplicate method that accounts for school size bias and *g(0)*. Aerial data were not corrected for *g(0)* (Palka 2000).

The best available current abundance estimate for minke whales is 2,998 animals (CV=0.19), because the 1999 survey is the most recent.

Table 1. Summary of abundance estimates for minke whales.

Month/Year	Area	N_{best}	CV
July-Aug 1999	Georges Bank to mouth of Gulf of St. Lawrence	2,998	0.19

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for minke whales is 2,998 animals (CV=0.19). The minimum population estimate for the Canadian East Coast minke whale is 2,559 animals.

Current Population Trend

There are insufficient data to determine population trends for this species.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. Life history parameters that could be used to estimate net productivity are that females mature between 6-8 years old, and pregnancy rates are approximately 0.86 to 0.93. Based on these parameters, the calving interval is between 1 and 2 years. Calves are probably born during October to March after 10 to 11 months gestation, and nursing lasts for less than 6 months. Maximum ages are not known, but for Southern Hemisphere minke whales maximum age appears to be about 50 years (Katona *et al.* 1993; IWC 1991).

For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow *et al.* 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 2,559 animals. The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened, or stocks of unknown status, relative to optimum sustainable population (OSP) is assumed to be 0.5 because this stock is of unknown status. PBR for the Canadian east coast minke whale is 26.

ANNUAL HUMAN-CAUSED MORTALITY AND INJURY

Recent minke whale takes have been observed in - or attributed to - the Northeast bottom trawl, Northeast/Mid-Atlantic American lobster trap/pot, and unknown fisheries, although not all takes have resulted in mortalities (Tables 2 to 6).

Data to estimate the mortality and serious injury of minke whales come from the Northeast Fisheries Science Center Observer Program and from records of strandings and entanglements in U.S. waters. For the purposes of this report, only those strandings and entanglement records considered confirmed human-caused mortalities or serious injuries are shown in Tables 3 through 5.

During 2000 to 2004, the U.S. total annual estimated average human-caused mortality was 2.8 minke whales per year (CV=unknown), plus an unknown bycatch estimate from the Northeast bottom trawl fishery. This is derived from three components: an unknown number of minke whales per year from U.S. fisheries using observer data, 2.6 minke whales per year (unknown CV) from U.S. fisheries using strandings and entanglement data, and 0.2 minke whales per year from ship strikes. During 1997 to 2001, there were no confirmed mortalities or serious injuries in Canadian waters as reported by the various, small-scale stranding and observer data collection programs in Atlantic Canada. No additional information is available on Canadian mortalities from 2002 to present.

Fishery Information

Detailed fishery information is reported in Appendix III.

Earlier Interactions

Little information is available about fishery interactions that took place before the 1990s. Read (1994) reported that a minke whale was found dead in a Rhode Island fish trap in 1976. A minke whale was caught and released alive in the Japanese tuna longline fishery in 3,000 m of water, south of Lydonia Canyon on Georges Bank, in September 1986 (Waring *et al.* 1990).

Two minke whales were observed taken in the Northeast sink gillnet fishery between 1989 and the present. The take in July 1991, south of Penobscot Bay, Maine resulted in a mortality and the take in October 1992, off the coast of New Hampshire near Jeffreys Ledge, was released alive.

A minke whale was trapped and released alive from a herring weir off northern Maine in 1990.

Four minke whale mortalities were observed in the Atlantic pelagic drift gillnet fishery during 1995.

One minke whale was reported caught in an Atlantic tuna purse seine off Stellwagen Bank in 1991(D. Beach, NMFS NE Regional Office, pers. comm.) and another in 1996. The minke caught during 1991 was released uninjured after a crew member cut the rope wrapped around the tail. The minke whale caught during 1996 escaped by diving beneath the net.

One minke whale, reported in the strandings and entanglement database maintained by the New England Aquarium and the Northeast Regional Office/NMFS, was taken in a 6-inch gill net on 6 July 1998 off Long Island, New York. This take was assigned to the mid-Atlantic gillnet fishery. No other minke whales have been taken in this fishery during observed trips in 1993 to 2004.

U.S.

Northeast Bottom Trawl

The fishery is active in New England waters in all seasons. Detailed fishery information is reported in Appendix III. One freshly dead minke whale was caught in 2004 on the northeast tip of Georges Bank in US waters (Table 2).

Northeast/Mid-Atlantic American lobster trap/pot fishery

The strandings and entanglement database, maintained by the New England Aquarium and the Northeast Regional Office/NMFS, reported 7 minke whale mortalities and serious injuries that were attributed to the lobster fishery during 1990 to 1994; 1 in 1990 (may be serious injury), 2 in 1991 (1 mortality and 1 serious injury), 2 in 1992 (both mortalities), 1 in 1993 (serious injury) and 1 in 1994 (mortality) (1997 List of Fisheries 62FR33, January 2, 1997). The one confirmed minke whale mortality during 1995 was attributed to the lobster fishery. No confirmed mortalities or serious injuries of minke whales occurred in 1996. From the four confirmed 1997 records, 1 minke whale mortality was attributed to the lobster trap fishery. One minke whale was disentangled and released alive from lobster gear on 21 August 2002 (Table 4). One minke whale mortality was attributed to the lobster fishery in 2002 (Tables 3 and 5). Annual mortalities due to this fishery, as determined from strandings and entanglement records that have been audited, were 1 in 1991, 2 in 1992, 1 in 1994, 1 in 1995, 0 in 1996, 1 in 1997, 0 in 1998 to 2001, 1 in 2002, and 0 in 2003 to 2004. Estimated average annual mortality related to this fishery during 2000 to 2004 was 0.2 minke whales per year (Table 3; 10/15/02 animal in Table 5).

Unknown Fisheries

The strandings and entanglement database, maintained by the New England Aquarium and the Northeast Regional Office/NMFS, include 36 records of minke whales within U.S. waters for 1975-1992. The gear include unspecified fishing nets, unspecified cables or lines, fish traps, weirs, seines, gillnets, and lobster gear. A review of these records is not complete. One confirmed entanglement was an immature female minke whale, entangled with line around the tail stock, that came ashore on the Jacksonville, Florida jetty on 31 January 1990 (R. Bonde, USFWS, Gainesville, FL, pers. comm.).

The audited NE Regional Office/NMFS entanglement/stranding database contains records of minke whales, of which the confirmed mortalities and serious injuries from the last five years are reported in Table 5. Mortalities (and serious injuries) that were likely a result of a fishery interaction with an unknown fishery include 3 (0) in 1997, 3 (0) in 1999, 1 (1) in 2000, 2 (0) in 2001, 1 (0) in 2002, 5 (0) in 2003, 2 (0) in 2004 and 0 (0) in other years. Examination of the minke entanglement records from 1997 indicate that 4 out of 4 confirmed records of mortality were likely a result of fishery interactions, one was attributed to the lobster pot fishery (see above), and three were not attributed to any particular fishery because the information from the entanglement event did not contain the necessary details. Of the 5 mortalities in 1999, 2 were attributed to an unknown trawl fishery and 3 to some other fishery. Of the two interactions from an unknown fishery in 2000, one was a mortality and one was a serious injury. In 2001, of the two confirmed fishery interactions, both were with an unknown fishery. In 2002, there was one mortality in an unknown fishery. In 2003, 5 confirmed mortalities were due to interactions with an unknown fishery. In 2004, of the three confirmed mortalities, two were due to an interaction with an unknown fishery (Tables 3 and 5).

In general, an entangled or stranded cetacean could be an animal that is part of an expanded bycatch estimate from an observed fishery and thus it is not possible to know if an entangled or stranded animal is an additional mortality. During 1997 to 2003, no minke whales were observed taken in any fishery observed by the NEFSC Fisheries Observer Program, therefore, the strandings from 1997 to 2003 in which mortalities were attributable to a fishery interaction can be added to the human-caused mortality estimate. During 2000 to 2004, as determined from strandings and entanglement records, the estimated average annual mortality is 2.4 minke whales per year in unknown fisheries (Table 3).

CANADA

In Canadian waters, minke whale interactions with fishing gear are not well quantified or recorded, though some records are available. Read (1994) reported interactions between minke whales and gillnets in Newfoundland and Labrador, in cod traps in Newfoundland, and in herring weirs in the Bay of Fundy. Hooker *et al.* (1997) summarized bycatch data from a Canadian fisheries observer program that placed observers on all foreign fishing vessels operating in Canadian waters, on between 25% and 40% of large Canadian fishing vessels (greater than 100 feet long), and on approximately 5% of smaller Canadian fishing vessels. During 1991 through 1996, no minke whales were observed taken.

Herring Weirs

During 1980 to 1990, 15 of 17 minke whales were released alive from herring weirs in the Bay of Fundy. During January 1991 to September 2002, 26 minke whales were trapped in herring weirs in the Bay of Fundy. Of these 26, 1 died (H. Koopman, pers. comm.) and several (number unknown) were released alive and unharmed (A. Westgate, pers. comm.).

Other Fisheries

Six minke whales were reported entangled during 1989 in the now non-operational groundfish gillnet fishery in Newfoundland and Labrador (Read 1994). One of these animals escaped and was still towing gear, the remaining 5 animals died.

Salmon gillnets in Canada, now no longer used, had taken a few minke whales. In Newfoundland in 1979, one minke whale died in a salmon net. In Newfoundland and Labrador, between 1979 and 1990, it was estimated that 15% of the Canadian minke whale takes were in salmon gillnets. A total of 124 minke whale interactions were documented in cod traps, groundfish gillnets, salmon gillnets, other gillnets and other traps. The salmon gillnet fishery ended in 1993 as a result of an agreement between the fishermen and North Atlantic Salmon Fund (Read 1994).

Five minke whales were entrapped and died in Newfoundland cod traps during 1989. The cod trap fishery closed in Newfoundland in 1993 due to the depleted groundfish resources (Read 1994).

Table 2. Summary of the incidental mortality of minke whales (*Balaenoptera acutorostrata*) by commercial fishery including the years sampled (Years), the number of vessels active within the fishery (Vessels), the type of data used (Data Type), the annual observer coverage (Observer Coverage), the mortalities recorded by on-board observers (Observed Mortality), the estimated annual mortality (Estimated Mortality), the estimated CV of the annual mortality (Estimated CVs) and the mean annual mortality (CV in parentheses).

Fishery	Years			Observer Coverage [b]	Observed Mortality			Mean Annual Mortality
Northeast Bottom Trawl	00-04	unk	Obs. Data	.004, .004, .021, .028, .045	0, 0, 0, 0, 1	unk [c]	unk [c]	unk [c]
Total								unk [c]

a) Observer data (Obs. Data), used to measure bycatch rates, are collected within the Northeast Fisheries Science Center (NEFSC) Fisheries Observer Program.
b) Observer coverage for trawl fishery is measured in trips.
c) Analysis of bycatch mortality attributed to the Northeast bottom trawl fishery has not been generated.

Table 3. From strandings and entanglement data, summary of confirmed incidental mortalities and serious injuries of minke whales (*Balaenoptera acutorostrata*) by commercial fishery: includes years sampled (Years), number of vessels active within the fishery (Vessels), type of data used (Data Type), mortalities and serious injuries assigned to this fishery (Assigned Mortality), and mean annual mortality and serious injuries. See Table 4 for details. (NA=Not Available)

Fishery	Years			Assigned Mortality	Mean Annual Mortality
Northeast/Mid-Atlantic American lobster trap/pot	00-04	1997=6880 2000=7539 licenses	Entanglement & Strandings	0, 0, 1, 0, 0	0.2
Unknown Fisheries	00-04	NA	Entanglement & Strandings	2, 2, 1, 5, 2	2.4
TOTAL					2.6 (unk)

a. Data from records in the entanglement and strandings data base maintained by the New England Aquarium and the Northeast Regional Office/NMFS (Entanglement and Strandings).

Table 4. Summary of minke whales (*Balaenoptera acutorostrata*) released alive, by commercial fishery, years sampled (Years), ratio of observed mortalities recorded by on-board observers to the estimated mortality (Ratio), the number of observed animals released alive and injured (Injured), and the number of observed animals released alive and uninjured (Uninjured). (N/A = Not Available)

Fishery	Years	Ratio	Injured	Uninjured
Lobster trap pot	None	unk [a]	1[a]	0

a. Minke whale disentangled and released alive from lobster gear by owner of gear on 21 August 2002 near Mount Desert Island, ME.

Table 5. Summarized records of mortality and serious injury likely to result in mortality. Canadian East Coast stock of minke whales, January 2000 - December 2004. This listing includes only confirmed records related to U.S. commercial fisheries and/or ship strikes in U.S. waters. Causes of mortality or injury, assigned as primary or secondary, are based on records maintained by NMFS/NER and NMFS/SER.

Date[a]	Report Type[b]	Sex, age, ID	Location[a]	Assigned Cause[c]: P=primary, S=secondary		Notes
				Ship strike	Entang./ Fsh.inter	
8/11/00	serious injury	unk sex and size	Port Clyde, ME (43º55'N 69º11'W)		P	Unknown fishery. Dark line with several bullet buoys. Unusual minke behavior - whale probably anchored. No gear recovered.
10/03/00	mortality	unk sex and size	Rockland ME (44º05'N 69º01'W)		P	Unknown fishery. Very fresh carcass with fresh entanglement wounds on tail stock. No gear recovered.
8/17/01	mortality	male, 3.9m	Middletown, RI (41º28'N 71º15'W)		P	Unknown fishery. Severe rope entanglement around mouth and rostrum caused malnutrition and infection. No gear recovered.
12/13/01	mortality	unk sex, 7m (est)	Massachusetts Bay, MA (42º21'N 70º43'W)		P	Unknown fishery. Pictures show evidence of fairly fresh entanglement marks on tail stock and across tail flukes. No gear recovered.
7/17/02	mortality	female, 4.6m (est)	Bar Harbor, ME (44º18.22'N 68º07.43'W)		P	Unknown fishery. Carcass had a rope scar on the peduncle with associated hemorrhaging. Additional bruising around the epiglottis and larynx. No gear recovered.
10/15/02	mortality	female, 5.1m	Gloucester, MA (42º36'N 70º39W)		P	Whale was entangled through the mouth and around the pectoral flippers. Gear from state water lobster fishery was still on the whale.

5/24/03	mortality	male, 7.6m	Gloucester, MA (42º40.8'N 70º39.6'W)		P	Unknown fishery. Line marks on head and dorsal fin, no line present. Cut across back anterior to dorsal fin. No gear recovered.
5/31/03	mortality	female 3.6m (est)	Martha's Vineyard, MA (41º21.0'N 70º47.5'W)		P	Unknown fishery. Whale stranded live wrapped in about 15 feet of 2-3 inch mesh netting, probably trawl gear.
6/28/03	mortality	male, 9.1m	Chatham, MA (41º40'N 69º55'W)		P	Lobster fishery. Wrapped in lobster gear.
8/9/03	mortality	sub-adult female, 3.5m (est)	Harwich, MA (41º37.3'N 70º03.0'W)		P	Unknown fishery. Hemorrhaging in areas with net marks on whale. No gear recovered.
9/13/03	mortality	Sub-adult female, 6m (est)	Casco Bay, ME (43º42'N 69º58'W)		P	Unknown fishery. Fresh dead. External chaffing marks and belly slit open. No gear recovered.
5/06/04	mortality	female, 7.7m	Martha's Vinyard, MA (41º21'N 70º40'W)		P	Unknown fishery. Constricting line marks on peduncle. Indications of drowning from internal exam. No gear recovered.
6/01/04	mortality	female, 6.5m	Chatham, MA (41º 41'N 69º56'W)	P		Ship strike. Large area of subdermal hemorrhaging.
7/19/04	mortality	female, 7.9m	Eastham, MA (41º54'N 69º58'W)		P	Unknown fishery. Extensive entanglement markings. No gear recovered.

a. The date sighted and location provided in the table are not necessarily when or where the serious injury or mortality occurred; rather, this information indicates when and where the whale was first reported beached, entangled, or injured.
b. National guidelines for determining what constitutes a serious injury have not been finalized. Interim criteria as established by NERO/NMFS (Cole *et al.* 2005) have been used here. Some assignments may change as new information becomes available and/or when national standards are established.
c. Assigned cause based on best judgement of available data. Additional information may result in revisions.

Other Mortality

Minke whales have been and continue to be hunted in the North Atlantic. From the Canadian East Coast population, documented whaling occurred from 1948 to 1972 with a total kill of 1,103 animals (IWC 1992). Animals from other North Atlantic minke populations are presently still being harvested at low levels.

U.S.

Minke whales inhabit coastal waters during much of the year and are subject to collision with vessels. According to the NMFS/NER marine mammal entanglement and stranding database, on 7 July 1974, a necropsy of a minke whale suggested a vessel collision; on 15 March 1992, a juvenile female minke whale with propeller scars was found floating east of the St. Johns Channel entrance (R. Bonde, USFWS, Gainesville, FL, pers. comm.); and on 15 July 1996 the captain of a vessel reported hitting a minke whale offshore of Massachusetts. After reviewing this record, it was concluded the animal struck was not a serious injury or mortality. On 12 December 1998, a minke whale was struck and presumed killed by a whale watching vessel in Cape Cod Bay off Massachusetts.

During 1999 to 2003, no minke whale was confirmed struck by a ship. During 2004, one minke whale mortality was contributed to a ship strike (Table 5). Thus, during 2000 to 2004, as determined from stranding and entanglement records, the estimated annual average was 0.2 minke whales per year struck by ships.

In October 2003, an Unusual Mortality Event was declared involving minke whales and harbor seals along the coast of Maine. Two of the seven criteria established to designate such an event were met by these species. Specifically, there was a marked increase in mortalities when compared with historical records, and the mortalities were occurring in a localized area of the Maine coast. From September 11-30, 2003, nine minke whales were reported along the mid-coast to southern Maine. Results from analyses for biotoxins failed to show the presence of either saxitoxin or domoic acid (by ELISA and Receptor Binding Assay). Most whale carcasses that were examined appeared to be in good body condition immediately prior to death. Since October 2003, the number of minke whale stranding reports has returned to normal.

CANADA

The Nova Scotia Stranding Network documented whales and dolphins stranded on the coast of Nova Scotia between 1991 and 1996 (Hooker *et al.* 1997). Researchers with the Dept. of Fisheries and Oceans, Canada documented strandings on the beaches of Sable Island (Lucas and Hooker 2000). Sable Island is approximately 170 km southeast of mainland Nova Scotia. Lucas and Hooker (2000) reported 4 minke whales stranded on Sable Island between 1970 and 1998, 1 in spring 1982, 1 in January 1992, and a mother/calf in December 1998. On the mainland of Nova Scotia, a total of 7 reported minke whales stranded during 1991 to 1996. The 1996 stranded minke whale was released alive off Cape Breton on the Atlantic Ocean side, the rest were found dead. All the minke whales stranded between July and October. One was from the Atlantic Ocean side of Cape Breton, 1 from Minas Basin, 1 was at an unknown location, and the rest stranded in the vicinity of Halifax, Nova Scotia. It is unknown how many of the strandings resulted from fishery interactions.

Whales and dolphins stranded between 1997 and 2004 on the coast of Nova Scotia as recorded by the Marine Animal Response Society (MARS) and the Nova Scotia Stranding Network are as follows (Table 6): 4 minke whales stranded in 1997 (1 in June and 3 in July), 0 documented strandings in 1998 to 2000, 1 in September 2001, 4 in 2002 (1 in July, 1 in August, and 2 in November), 2 in 2003 (1 in August and 1 in October) and 0 in 2004.

Table 6. Documented number of stranded minke whales along the coast of Nova Scotia during 2000 to 2004 by year, according to records maintained by the Canadian Marine Animal Response Society.

Area	Year					
	2000	2001	2002	2003	2004	Total
Nova Scotia	0	1	4	3	0	8

STATUS OF STOCK

The status of minke whales, relative to OSP, in the U.S. Atlantic EEZ is unknown. The minke whale is not listed as endangered under the Endangered Species Act (ESA). The total U.S. fishery-related mortality and serious injury for this stock derived from the available records is not less than 10% of the calculated PBR, and therefore cannot be considered insignificant and approaching zero mortality and serious injury rate.

REFERENCES CITED

Barlow, J., S.L. Swartz, T.C. Eagle, and P.R. Wade. 1995. U.S. Marine mammal stock assessments: Guidelines for preparation, background, and a summary of the 1995 assessments. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-6, 73 pp.

CETAP. 1982. A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the U.S. outer continental shelf. Cetacean and Turtle Assessment Program, University of Rhode Island. Final Report, Contract AA51-C78-48, Bureau of Land Management, Washington, DC, 538 pp.

Cole, T.V.N., D.L. Hartly, and R.L. Merrick. 2005. Mortality and serious injury determinations for large whale stocks along the eastern seaboard of the United States, 1999-2003. U. S. Dep. Commer., Northeast Fish. Science Cent. Ref. Doc. 05-08, 20 pp.

Donovan, G.P. 1991. A review of IWC stock boundaries. Rep. int. Whal. Commn (Special Issue) 13:39-68.

Hooker, S.K., R.W. Baird, and M.A. Showell. 1997. Cetacean strandings and bycatches in Nova Scotia, Eastern Canada, 1991-1996. Meeting document SC/49/O5 submitted to the 1997 International Whaling Commission meeting in Bournemouth, UK.

IWC [International Whaling Commission]. 1991. Appendix 11. Biological parameters of North Atlantic minke whales in Annex F Report of the sub-committee on North Atlantic Minke whales. Rep. int Whal. Commn 41:160.

IWC [International Whaling Commission]. 1992. Annex K. Report of the working group on North Atlantic Minke trials. Rep. int Whal. Commn 42:246-251.

Katona, S.K., V. Rough, and D.T. Richardson. 1993. *A* field guide to whales, porpoises, and seals from Cape Cod to Newfoundland. Smithsonian Institution Press. Washington D.C., 316 pp.

Kingsley, M.C.S. and R.R. Reeves. 1998. Aerial surveys of cetaceans in the Gulf of St. Lawrence in 1995 and 1996. Can. J. Zool. 76:1529-1550.

Lucas, Z.N. and S.K. Hooker. 2000. Cetacean strandings on Sable Island, Nova Scotia, 1970-1998. Can. Field Nat. 114(1):46-61.

Mitchell, E.D. 1991. Winter records of the minke whale (*Balaenoptera acutorostrata* Lacepede 1804) in the southern North Atlantic. Rep. int Whal. Commn 41:455-457.

NMFS [National Marine Fisheries Service]. 1993. Cruise results, NOAA ship DELAWARE II, Cruise No. DEL 93-06, Marine Mammal Survey. 5 pp. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026.

Palka, D. 1995. Abundance estimate of the Gulf of Maine harbor porpoise. pp. 27-50. *In*: A. Bjørge and G.P. Donovan (eds.) Biology of the Phocoenids. Rep. int Whal. Commn (Special Issue) 16.

Palka, D. 1996. Update on abundance of Gulf of Maine/Bay of Fundy harbor porpoises. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 96-04, 37 pp.

Palka, D. 2000. Abundance of the Gulf of Maine/Bay of Fundy harbor porpoise based on shipboard and aerial surveys during 1999. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 00-07, 29 pp.

Palka, D.L. 2006. Summer abundance estimates of cetaceans in US North Atlantic Navy Operating Areas. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 06-03, 41 pp.

Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn (Special Issue) 15:133-147.

Wade, P.R. and R.P. Angliss. 1997. Guidelines for assessing marine mammal stocks: Report of the GAMMS workshop April 3-5, 1996, Seattle, Washington. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-12, 93 pp.

Waring, G.T., P. Gerrior, P.M. Payne, B.L. Parry, and J.R. Nicolas. 1990. Incidental take of marine mammals in foreign fishery activities off the northeast United States, 1977-1988. Fish. Bull., U.S. 88(2):347-360.