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

STOCK DEFINITION AND GEOGRAPHIC RANGE

Minke whales have a cosmopolitan distribution 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 four population divisions were defined by examining segregation by sex and length, catch distributions, sightings, marking data and pre-existing ICES boundaries; however, there are 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 out to 45°W and south to the Gulf of Mexico. The relationship between this 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 USA 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 during this time they are most abundant in New England waters. During fall in New England waters, there are fewer minke whales, while during winter, the species appears to be largely absent. Like most other baleen whales, the minke whale generally occupies 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 mid-ocean south and east of Bermuda. As with several other cetacean species, the possibility of a deep-ocean component to distribution exists but remains unconfirmed.

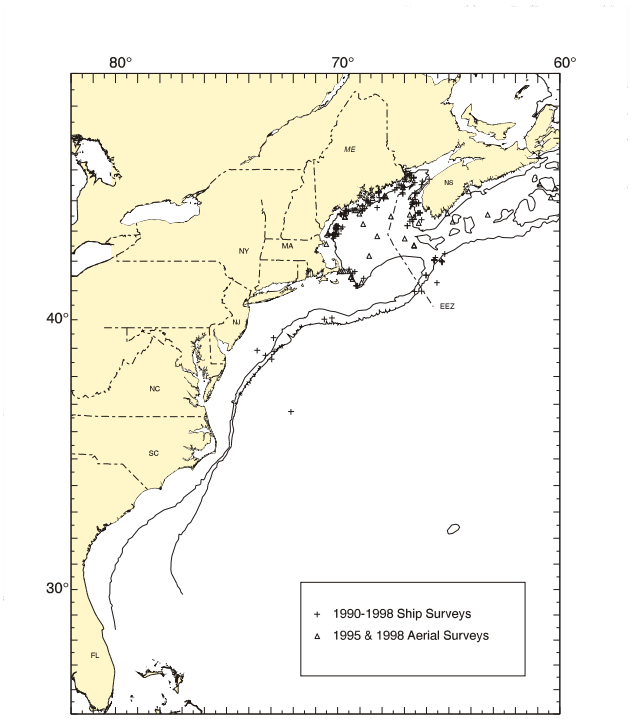

Figure 1. *Distribution of minke whale sightings from NEFSC and SEFSC shipboard and aerial surveys during the summer in 1990-1998. Isobaths are at 100 m and 1,000 m.*

POPULATION SIZE

The total number of minke whales in the Canadian East Coast population is unknown. However, six 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 a 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, and an aerial survey estimate from the northern Gulf of St. Lawrence conducted during July and August 1996 (Table 1; Figure 1).

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 (Table 1; CETAP 1982).

An abundance of 2,650 (CV=0.31) minke whales was estimated 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 (Table 1). This population size 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 of 330 minke whales (CV=0.66) was estimated 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 (Table 1; Anon. 1993).

An abundance of 2,790 (CV=0.32) minke whales was estimated 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 (Table 1; Palka *et al.* in review). Total track line length was 32,600 km . The ships covered waters between the 50 and 1000 fathom depth contour lines, 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 line, the southern Gulf of Maine, and shelf waters off Nova Scotia from the coastline to the 1000 fathom depth contour line. Data collection and analysis methods used were 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 1995 survey, 8427 km of track lines were flown in an area of 221,949 km^2 during August and September. During the 1996 survey, 3,993 km of track lines were flown in an area of 94,665 km^2 during July and August. Data were analyzed using Quenouille's jackknife bias reduction procedure on line transect methods that model the left truncated sighting curve. These estimates were uncorrected for visibility biases, such as g(0).

The best available current abundance estimate for minke whales is the sum of the 1995 USA and Canadian surveys: 3,810 (CV=0.25) because these surveys are recent and provided the most complete coverage of the known habitat.

Table 1. Summary of abundance estimates for Canadian East Coast minke whales. Month, year, and area covered during each abundance survey, and resulting abundance estimate (N_{best}) and coefficient of variation (CV).

Month/Year	Area	N_{best}	CV
Jul -Sep 1991-92	N. Gulf of Maine and Bay of Fundy	2,650	0.31
Jun-Jul 1993	Georges Bank to Scotian shelf, shelf edge only	330	0.66
Jul-Sep 1995	Virginia to mouth of Gulf of St. Lawrence	2,790	0.32
Aug-Sep 1995	Gulf of St. Lawrence	1,020	0.27
Jul-Sep 1995	Virginia to Gulf of St. Lawrence (SUM OF ABOVE 2 ROWS)	3,810	0.25
Jul-Aug 1996	northern Gulf of St. Lawrence	620	0.52

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 3,810 (CV=0.25). The minimum population estimate for the Canadian East Coast minke whale is 3,097 (CV=0.25).

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 include: females mature when 6-8 years old; pregnancy rates are approximately 0.86 to 0.93; thus, the calving interval is between 1 and 2 years; calves are probably born during October to March, after 10 to 11 months gestation; nursing lasts for less than 6 months; maximum ages are not known, but for Southern Hemisphere minke whales the 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 3,097 (CV=0.25). 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 31.

ANNUAL HUMAN-CAUSED MORTALITY AND INJURY

Data to estimate the mortality and serious injury of minke whales come from the USA Sea Sampling Program and from records of strandings and entanglements in USA waters. Estimates using the Sea Sampling Program data are discussed by fishery under the Fishery Information section below (Tables 2 and 3). Strandings and entanglement records are discussed under the lobster trap fishery, mid-Atlantic coastal gill net fishery, and "Unknown Fisheries" within the Fishery Information section and under the Other Mortality section (Tables 4 and 5). For the purposes of this report, only those strandings and entanglement records considered confirmed human-caused mortalities or serious injuries are discussed.

After USA strandings and entanglement records are completely audited the mortality and serious injury estimate will be updated. Using the data presently available and audited (1994, 1996 to 1998), the USA total annual estimated average human-caused mortality is 3.0 minke whales per year. This is derived from three components: 1.1 minke whales per year (CV=0.0) from USA observed fisheries, 1.6 minke whales per year from USA fisheries using strandings and entanglement data, and 0.3 minke whales per year from ship strikes.

Fishery Information

Recent minke whale takes have been observed or attributed to the Atlantic pelagic drift gillnet, bluefin tuna purse seine, Gulf of Maine and mid-Atlantic lobster trap/pot, mid-Atlantic coastal gill net and unknown fisheries; though all takes have not resulted in a mortality (Tables 2 and 3).

USA

Data on current incidental takes in USA fisheries are available from several sources. In 1986, NMFS established a mandatory self-reported fishery information system for large pelagic fisheries. Data files are maintained at the Southeast Fisheries Science Center (SEFSC). The Northeast Fisheries Science Center (NEFSC) Sea Sampling Observer Program was initiated in 1989, and since that year several fisheries have been covered by the program.

Earlier Interactions

Little information is available about fishery interactions that took place before the 1990's. Read (1994) reported that a minke whale was found dead in a Rhode Island fish trap in 1976.

Prior to 1977, there was no documentation of marine mammal bycatch in distant-water fleet (DWF) activities off the northeast coast of the USA. With implementation of the Magnuson Fisheries Conservation and Management Act in that year, an observer program was established which recorded fishery data and information of incidental bycatch of marine mammals. 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). In 1982, there were 112 different foreign vessels; 16%, or 18, were Japanese tuna longline vessels operating along the USA east coast. This was the first year that the Northeast Regional Observer Program assumed responsibility for observer coverage of the longline vessels. Between 1983 and 1988, the number of Japanese longline vessels operating within the EEZ each year were 3, 5, 7, 6, 8, and 8, respectively. Observer coverage was 100%.

Two minke whales were observed taken in the Northeast multispecies 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. There were approximately 349 vessels (full and part time) in the Northeast multispecies sink gillnet fishery in 1993 (Walden 1996) and 301 full and part time vessels in 1998. Observer coverage as a percentage of trips has been 1%, 6%, 7%, 5%, 7%, 5%, 4%, 6%, and 5% for years 1990 to 1998. Because no mortalities have been observed since 1991, the annual estimated average Northeast multispecies sink gillnet fishery-related mortality for minke whales is zero.

A minke whale was trapped and released alive in a herring weir off northern Maine in 1990. In USA and Canadian waters the herring weir fishery occurred from May to September each year along the southwestern shore of the Bay of Fundy, and scattered along the western Nova Scotia and northern Maine coasts. In 1990 there were 56 active weirs in Maine (Read 1994). According to state of Maine officials, in 1998, the number of weirs in Maine waters dropped to nearly nothing due to the limited herring market (Jean Chenoweth, pers. comm.). The actual number of active weirs in the USA is unknown.

Pelagic Drift Gillnet

In 1996 and 1997, NMFS issued management regulations which prohibited the operation of this fishery in 1997. The fishery was active during 1998. Then, in January 1999 NMFS issued a Final Rule to prohibit the use of drift net gear in the North Atlantic swordfish fishery (50 CFR Part 630). Four minke whale mortalities were observed in the Atlantic pelagic drift gillnet fishery during 1995 (Table 2). The estimated total number of hauls in the Atlantic pelagic drift gillnet fishery increased from 714 in 1989 to 1,144 in 1990; thereafter, with the introduction of quotas, effort was severely reduced. The estimated number of hauls in 1991 to 1996 were 233, 243, 232, 197, 164, and 149 respectively. Fifty-nine different vessels participated in this fishery at one time or another between 1989 and 1993. In 1994 to 1998, there were 12, 11 10, 0, and 11 vessels, respectively, in the fishery (Table 2). Observer coverage, expressed as percent of sets, was 8% in 1989, 6% in 1990, 20% in 1991, 40% in 1992, 42% in 1993, 87% in 1994, 99% in 1995, 64% in 1996, no fishery in 1997, and 99% coverage during 1998 (Table 2). Observer coverage dropped during 1996 because some vessels were deemed too small or unsafe by the contractor that provided observer coverage to NMFS. Fishing effort was concentrated along the southern edge of Georges Bank and off Cape Hatteras. Examination of the species composition of the catch and locations of the fishery throughout the year, suggested that the drift gillnet fishery be stratified into two strata, a southern or winter stratum, and a northern or summer stratum. Estimates of the total bycatch, for each year from 1989 to 1993, were obtained using the aggregated (pooled 1989-1993) catch rates, by strata (Northridge 1996). Total annual bycatch after 1993 was estimated separately for each year by summing the observed caught with the product of the average bycatch per haul and number of unobserved hauls as recorded in SEFSC logbooks. Variances were estimated using bootstrap re-sampling techniques. Estimated annual fishery-related mortality and serious injury (CV in parentheses) was 0 for 1989 to 1994, 4.5 (0) for 1995, 0 for 1996 (Bisack 1997), and 0 for 1998. The fishery was closed during 1997. Estimated average annual mortality and serious injury related to this fishery during 1994 to 1996, and 1998 was 1.1 minke whales (CV=0.00) (Table 2).

Bluefin Tuna Purse Seine

In a bluefin tuna purse seine off Stellwagen Bank one minke whale was reported caught and released uninjured in 1991 (D. Beach, NMFS NE Regional Office, pers. comm.) and in 1996. The minke caught during 1991 escaped after a crew member cut the rope that was wrapped around the tail. The minke whale caught during 1996 escaped by diving beneath the net. The tuna purse seine fishery occurring between Cape Hatteras and Cape Cod is directed at small and medium bluefin and skip jack for the canning industry, while the fishery north of Cape Cod is directed at large medium and giant bluefin tuna (NMFS 1995). The latter fisheries are entirely separate from any other Atlantic tuna purse seine fishery. Spotter aircraft were used to locate fish schools. The official start date, set by regulation, was August 15. Individual vessel quotas (IVQs) and a limited access system prevent a derby fishery situation. Catch rates for large mediums and giant tuna are high and consequently, the season usually only lasts a few weeks. The 1996 regulations allocated 250 MT (5 IVQs) with a minimum of 90% giants and 10% large mediums.

Limited observer data are available for the bluefin tuna purse seine fishery. Out of 45 total trips made in 1996, 43 trips (95.6%) were observed. Forty-four sets were made on the 43 observed trips and all sets were observed. A total of 136 days were covered. No trips were observed during 1997 and 1998.

Gulf of Maine and Mid-Atlantic Lobster Trap/Pot Fishery

The strandings and entanglement database, maintained by the New England Aquarium and the Northeast Regional Office/NMFS, reported seven 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 (one mortality and one a 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 1995 entanglement records have not been completely audited. No mortalities or serious injuries of minke whales in 1996 were confirmed. From the four confirmed 1997 records one minke whale mortality was attributed to the lobster trap fishery (Tables 4 and 5). No fishery could be attributed to the other three 1997 minke mortalities (see unknown fisheries). No minke whale mortalities were attributed to a fishery for 1998 (Table 4).

There are three distinctly identified stock areas for the American lobster: 1) Gulf of Maine, 2) south of Cape Cod to Long Island Sound, and 3) Georges Bank and south to Cape Hatteras. In 1997, there were 3,431 vessels holding licenses to harvest lobsters in federal waters, 2,674 vessels licensed to use lobster pot gear in state waters, 675 vessels licensed to use bottom trawls and approximately 100 licenses to use dredge gear to harvest lobsters. Lobsters are taken primarily by traps, with about 2-3% of the harvest being taken by mobile gear (trawlers and dredges). About 80% of lobsters are harvested from state waters. The offshore fishery in federal waters has developed in the past 10 to 15 years, largely due to technological improvements in equipment and lower competition in the offshore areas. In January 1997, NMFS changed the classification of the Gulf of Maine and USA mid-Atlantic lobster pot fisheries from Category III to Category I (1997 List of Fisheries 62FR33, January 2, 1997) based on examination of 1990 to 1994 stranding and entanglement records of large whales (including right whales, humpback and minke whales). 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, 0 in 1996, 1 in 1997, and 0 in 1998. Estimated average annual mortality related to this fishery during 1994 to 1998 (excluding 1995 because these data were not audited) was 0.5 minke whales per year (Table 4). The mortality estimate will be updated when all strandings and entanglement records have been audited.

Mid-Atlantic Coastal Gillnet

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 gillnet on 06 July 1998 off Long Island, New York (Tables 4 and 5). This take is being assigned to the mid-Atlantic coastal gillnet fishery. No minke whales have been taken from this fishery during observed trips in 1993 to 1998. In July 1993, an observer program was initiated in the USA Atlantic coastal gillnet fishery by the NEFSC Sea Sampling program. Twenty trips were observed during 1993. During 1994 and 1995, 221 and 382 trips were observed, respectively. This fishery, which extends from North Carolina to New York, is actually a combination of small vessel fisheries that target a variety of fish species, some of these vessels operate right off the beach. During 1998, it was estimated there were 302 full and part-time vessels participating in this fishery. This is the number of unique vessels in the commercial landings database (Weighout) that report catch from fisheries during 1998 from the states of Connecticut to North Carolina. This does not include a small percentage of records where the vessel number was missing. Observer coverage, expressed as percent of tons of fish landed, was 5%, 4%, 3%, and 5% for 1995 to 1998, respectively. Observed fishing effort was concentrated off New Jersey and scattered between Delaware and North Carolina from the beach to 50 miles off the beach.

Annual mortalities due to this fishery, as determined from strandings and entanglement records that have been audited, were 0 in 1991, 1992, 1994, 1996, and 1997 and 1 in 1998. Estimated average annual mortality related to this fishery during 1994 to 1998 (excluding 1995 because these data were not audited) was 0.3 minke whales per year (Table 4). The mortality estimate will be updated when all strandings and entanglement records have been audited.

Unknown Fisheries

The strandings and entanglement database, maintained by the New England Aquarium and the Northeast Regional Office/NMFS, included 36 records of minke whales within USA waters for 1975-1992. The gear included unspecified fishing net, unspecified cable or line, fish trap, 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 NE Regional Office entanglement/stranding database for 1993 to 1997 also contains records of minke whales. At this time the 1994, and 1996-1998 records have been audited (Tables 4 and 5). Other years will

be available later. The examination of the minke entanglement records from 1997 indicate that 4 out of 4 confirmed records of mortality are likely a result of fishery interactions, one attributed to the lobster pot fishery (see above), and three not attributed to any particular fishery because the reports do not contain the necessary details.

In general, an entangled or stranded cetacean could be an animal that is part of a 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, there were no minke whales observed taken in any fishery that participated in the Sea Sampling Program, however, there were three confirmed minke whale mortalities due to some unknown fishery. Thus, for 1997, three is the best minimum estimate of mortality due to one or more fisheries.

During 1994 to 1998 (excluding 1995 because the data have not been audited), the estimated average annual mortality in unknown fisheries, as determined from strandings and entanglement records, is 0.8 minke whales per year (Table 4). The mortality estimate will be updated when all strandings and entanglement records have been audited.

CANADA

In Canadian waters, information about minke whale interactions with fishing gear is not well quantified or recorded, though some records are available. Read (1994) reported interactions between minke whales and gillnets in Newfoundland and Labrador, cod traps in Newfoundland, and 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 and 1990, 15 of 17 minke whales were released alive from herring weirs in the Bay of Fundy. Due to the formation of a cooperative program between Canadian fishermen and biologists it is expected that now most minke whales will be able to be released alive (A. Westgate, pers. comm.).

In USA and Canadian waters the herring weir fishery occurred from May to September each year along the southwestern shore of the Bay of Fundy, and scattered along the western Nova Scotia and northern Maine coasts. In 1990 there were 180 active weirs in western Bay of Fundy (Read 1994). According to Canadian DFO officials, for 1998, there were 225 weir licenses for herring weirs on the New Brunswick and Nova Scotia sides of the Bay of Fundy (60 from Grand Manan Island, 95 from Deer and Campobello Islands, 30 from Passamaquoddy Bay, 35 from East Charlotte area, and 5 from the Saint John area). The number of licenses has been fairly consistent since 1985 (Ed Trippel, pers. comm.). The number of active weirs is less than the number of licenses, and the number of active weirs is less each year (A. Read, 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 towing gear, the rest died.

Salmon gillnets in Canada, now no longer being 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, where a total of 124 minke whale interactions were documented in cod traps, groundfish gillnets, salmon gillnets, other gillnets and other traps. This 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 in Newfoundland closed in 1993 due to the depleted groundfish resources (Read 1994).

Table 2. From data collected during observed trips, 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 CV) and the mean annual mortality (CV in parentheses).

Fishery	Years	Vessels	Data Type [1]	Observer Coverage [2]	Observed Mortality	Estimated Mortality	Estimated CVs	Mean Annual Mortality
Pelagic Drift Gillnet	94-98	1994=12 1995=11 1996=10 1997=NA[4] 1998=13	Obs. Data Logbook	.87, .99, .64, NA[4], .99	0, 4, 0, NA[4], 0	0, 4.5[3], 0, NA[4], 0	0	1.1[4] (0)
TOTAL								1.1[4] (0)

[1] Observer data (Obs. Data), used to measure bycatch rates, are collected within the Northeast Fisheries Science Center (NEFSC) Sea Sampling Program. Mandatory logbook (Logbook) data, used to measure total effort for the pelagic drift gillnet fishery, are collected at the Southeast Fisheries Science Center (SEFSC).

[2] The unit of effort for the observer coverage of the pelagic drift gillnet fishery is sets.

[3] One vessel, not observed during 1995, recorded in the SEFSC mandatory logbook 1 set in a 10 day trip. If it is assumed that the vessel fished 1.4 sets per day, as estimated from the 1995 Sea Sampling data, the point estimate increases by 0.42 animals. However, the SEFSC mandatory logbook data were taken at face value, and therefore it was assumed 1 set was fished within this trip; thus the point estimate increases by 0.03 animals.

[4] Fishery closed during 1997. So average bycatch is for 1994 to 1996, and 1998.

Table 3. 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).

Fishery	Years	Ratio	Injured	Uninjured
Tuna purse seine	96-98	0/0, NA[2], NA[2]	0, NA[2], NA[2]	1[1], NA[2], NA[2]

NA=Not Available.

[1] The minke whale escaped by diving beneath the net.

[2] No observer coverage during 1997 and 1998.

Table 4. From strandings and entanglement data, summary of confirmed incidental mortality 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 assigned to this fishery (Mortality), and mean annual mortality.

Fishery	Years	Vessels	Data Type [1]	Observed Mortality	Mean Annual Mortality
GOM and mid-Atlantic Lobster Trap/Pot	94-98	1997=6880 licenses[2]	Entanglement & Strandings	1, NA[3], 0, 1, 0	0.5[3] (0)
Mid-Atlantic coastal gillnet	94-98	1998=302	Entanglement & Strandings	0, NA[3], 0, 0, 1	0.3[3]
Unknown Fisheries	94-98	NA	Entanglement & Strandings	0, NA[3], 0, 3, 0	0.8[3] (0)
TOTAL					1.6[3] (0)

NA=Not Available.

[1] 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).

[2] Number of vessels licensed to harvest lobsters in federal and state waters, with lobster traps/pots, bottom trawls, and dredge gear.

[3] 1995 stranding and entanglement records have not been audited, so average bycatch is an average of 1994, 1996, 1997, and 1998.

Table 5. Summarized records of mortality and serious injury likely to result in mortality. Canadian East Coast stock of minke whales, January 1994 - December 1998 (excluding 1995). This listing includes only confirmed records related to USA commercial fisheries and/or ship strikes in USA waters. Causes of mortality or injury, assigned as primary or secondary, are based on records maintained by NMFS/NER and NMFS/SER.

Date	Report Type	Sex, age, ID	Location	Assigned Cause: P=primary, S=secondary			Notes
				Ship strike	Entang./ Fsh.inter	Unknown uncertain	
7/2/94	mortality	NA	off NH		P		Lobster lines (3 pair traps involved; line through mouth; one line around lower jaw; chafing on tail; whale brought up dead with traps.
5/15/97	mortality	female 5.5m (est)	Gloucester, MA (42°36 70°38')		P		Deep lacerations around tail stock, abrasions around flukes and mouth
5/16/97	mortality	female 5.5m (est)	Rockport, MA (42°40 70°35')		P		Abrasions around flukes; feeding prior to entanglement
8/14/97	mortality	female 2.8m	Jewell Island, ME (43°39' 70°02')		P		Fresh lacerations on flukes and pectoral fins
8/30/97	mortality	female 8m (est)	Cape Small, ME (43°40' 69°57')		P		Observed entangled in lobster gear by ME Marine Patrol
6/24/98	mortality	male 3.4m	Long Beach, NY (40° 34' 73° 42')		P		Alive initially, then died in a 6-inch mesh gillnet.
12/12/98	mortality	unk sex and size	Cape Cod Bay, MA	P			Body of whale seen in wake of a whale watching vessel.

Other Mortality

Minke whales have been and are still being 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 populations are presently still being harvested at low levels.

USA

Minke whales inhabit coastal waters during much of the year and are subject to collision with vessels. According to the NE marine mammal entanglement and stranding database, on 7 July 1974, a necropsy on a minke whale suggested a vessel collision occurred; 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 they hit 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 the past five years, fours years of stranding and entanglement records have been audited (1994, and 1996 to 1998). During these four years, one minke whale was confirmed struck by a ship, thus, there is an annual average of 0.3 minke whales per year struck by ships.

All entangled and stranded minke whales that had injuries suggestive of a vessel collision or fishery interactions will be audited and summarized in the next stock assessment report.

CANADA

Whales and dolphins stranded between 1991 and 1996 on the coast of Nova Scotia were documented by the Nova Scotia Stranding Network (Hooker *et al.* 1997). Strandings on the beaches of Sable Island were documented by researchers with Fisheries and Oceans, Canada (Lucas and Hooker 1997). Sable Island is approximately 170 km southeast of mainland Nova Scotia. No minke whales were recorded stranded on Sable Island. On the mainland of Nova Scotia, a total of seven reported minke whales stranded during 1991 to 1996 (Table 6). 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, one from Minas Basin, one was at an unknown location, and the rest stranded in the vicinity of Halifax, Nova Scotia. It is unknown how many of the strandings can be attributed to fishery interactions.

Table 6. Documented number of stranded minke whales along the coast of Nova Scotia by month and year, according to Hooker *et al.* (1997).

Year	Month	Number of strandings
1991	Sept	1
1992	July	1
1993	July	1
	Oct	2
1994	Aug	1
1995	-	0
1996	July	1
TOTAL		7

STATUS OF STOCK

The status of minke whales, relative to OSP, in the USA Atlantic EEZ is unknown. The minke whale is not listed as endangered under the Endangered Species Act (ESA). The total fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because estimated fishery-related mortality and serious injury does not exceed PBR and the minke whale is not listed as a threatened or endangered species under the ESA.

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