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

STOCK DEFINITION AND GEOGRAPHIC RANGE

Minke whales have a cosmopolitan distribution in temperate, tropical and high-latitude waters. They are 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 on both the continental shelf and in deeper, off-shelf waters. Spring to fall are times of relatively widespread and common acoustic occurrence on the shelf (e.g., Risch et al. 2013), while September through April is the period of highest acoustic occurrence in deep-ocean waters throughout most of the western North Atlantic (Clark and Gagnon 2002; Risch et al. 2014). In New England waters the whales are most abundant during the spring-to-fall period. Records based on visual sightings and summarized by Mitchell (1991) hinted at a possible winter distribution in the West Indies, and in the mid-ocean south and east of Bermuda., This suggestion that has been validated by acoustic detections throughout broad ocean areas off the Caribbean from late September through early June (Clark and Gagnon 2002; Risch et al. 2014).

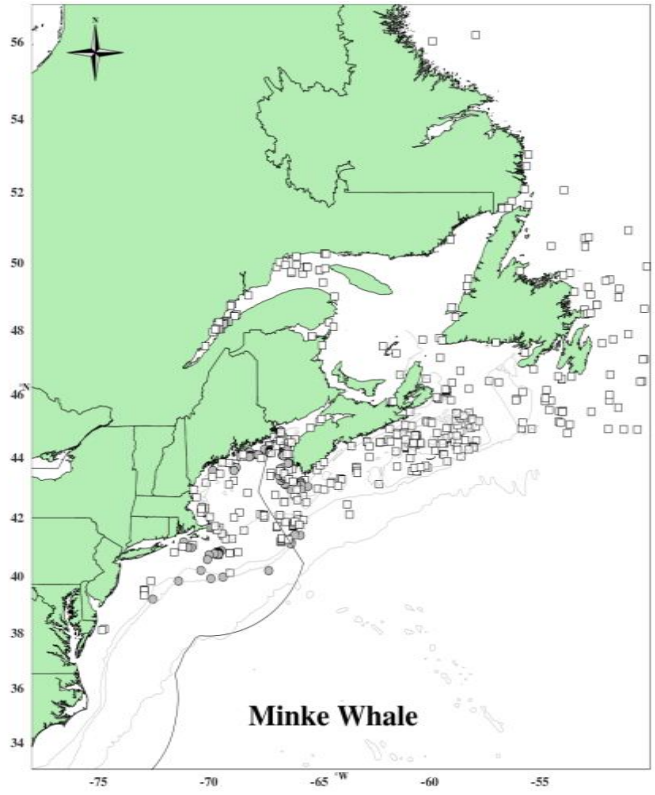

Figure 1. Distribution of minke whale sightings from NEFSC and SEFSC shipboard and aerial surveys during the summers of 1995, 1998, 1999, 2002, 2004, 2006, 2007, 2008, 2010, 2011, 2016 and 2021 and DFO's 2007 TNASS and 2016 NAISS surveys. Isobaths are the 100-m, 200-mm 1000-m and 4000-m depth contours. Circle symbols represent shipboard sightings and squares are aerial sightings.

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. Anderwald et al. (2011) found no evidence for geographic structure comparing these putative populations. However, using individual genotypes and likelihood assignment methods, they identified two cryptic stocks distributed across the North Atlantic. Until better information is available, common 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 western half of the Davis Strait (45ºW) to the Gulf of Mexico.

In summary, key uncertainties about stock structure are due to the limited understanding of the distribution, movements, and genetic structure of this stock. It is unknown whether the stock may contain multiple demographically independent populations that should be separate stocks. To date, no analyses of stock structure within this stock have been performed.

POPULATION SIZE

The best available current abundance estimate for common minke whales in the Canadian East Coast stock is the sum of the 2016 NEFSC and Department of Fisheries and Oceans Canada (DFO) surveys: 21,968 (CV=0.31). Because the survey areas did not overlap, the estimates from the two surveys were added together and the CVs pooled using a

delta method to produce a species abundance estimate for the stock area. This is assumed to be the majority of the Canadian East Coast stock. The 2016 estimate is derived from surveys covering more of this species habitat: from Newfoundland to Florida, in contrast to the most recent estimate from 2021 that only covered from Nova Scotia to Florida. A key uncertainty in the population size estimate is the precision and accuracy of the availability bias correction factor that was applied. More information on the spatio-temporal variability of the species' dive profile is needed.

Earlier Abundance Estimates

Please see Appendix IV for earlier abundance estimates.

Recent Surveys and Abundance Estimates

An abundance estimate of 2,802 (CV=0.81) minke whales was generated from a shipboard and aerial survey conducted during 27 June–28 September 2016 (Palka 2020) in a region covering 425,192 km^2. The aerial portion included 11,782 km of tracklines over waters north of New Jersey from the coastline to the 100-m depth contour, throughout the U.S. waters. The shipboard portion consisted of 4,351 km of tracklines in waters offshore of central Virginia to Massachusetts (waters that were deeper than the 100-m depth contour out to beyond the U.S. EEZ). Both visual platforms used a two-team data collection procedure, which allows estimation of abundance to correct for perception bias of the detected species (Laake and Borchers 2004). The estimates were also corrected for availability bias.

Abundance estimates of 6,158 (CV=0.40) minke whales from the Canadian Gulf of St. Lawrence/Bay of Fundy/Scotian shelf region and 13,008 (CV=0.46) minke whales from the Newfoundland/Labrador region were generated from an aerial survey conducted by the Department of Fisheries and Oceans, Canada (DFO). This survey covered Atlantic Canadian shelf and shelf-break waters extending from the northern tip of Labrador to the U.S. border off southern Nova Scotia in August and September of 2016 (Lawson and Gosselin 2018). A total of 29,123 km were flown over the Gulf of St. Lawrence/Bay of Fundy/Scotian Shelf stratum using two Cessna Skymaster 337s and 21,037 km were flown over the Newfoundland/Labrador stratum using a DeHavilland Twin Otter. The Newfoundland estimate was derived from the Twin Otter data using two-team mark-recapture multi-covariate distance sampling methods resulting in an abundance estimate and estimate of perception bias. The Gulf of St. Lawrence estimate was derived from the Skymaster data using single-team multi-covariate distance sampling with left truncation (to accommodate the obscured area under the plane) where size-bias was also investigated, and the Otter-based perception bias correction was applied. An availability bias correction factor, which was based on the cetaceans' surface intervals, was applied to both abundance estimates.

A more recent abundance estimate of 5,630 (CV=0.58) minke whales was generated from vessel surveys conducted in U.S. waters of the western North Atlantic during the summer of 2021 (Table 1; Garrison and Dias 2023; Palka 2023). One survey was conducted from 16 June to 23 August in waters north of 36ºN latitude and consisted of 5,871 km of on-effort trackline along the shelf break and offshore to the outer edge of the U.S. EEZ (NEFSC and SEFSC 2022). The second vessel survey covered waters from central Florida (25ºN latitude) to approximately 38ºN latitude between the 200-m isobaths and the outer edge of the U.S. EEZ during 12 June–31 August. A total of 5,659 km of trackline was covered on effort (NEFSC and SEFSC 2022). Both surveys utilized two visual teams and an independent observer approach to estimate detection probability on the trackline (Laake and Borchers 2004). Mark-recapture distance sampling was used to estimate abundance.

Table 1. Summary of recent abundance estimates for the Canadian East Coast stock of common minke whales (*Balaenoptera acutorostrata acutorostrata*) by month, year, and area covered during each survey, and resulting estimate (N_{est}) and coefficient of variation. (CV). The estimate considered best is in bold font.

Month/Year	Area	N_{est}	CV
Jun–Sep 2016	Central Virginia to lower Bay of Fundy	2,802	0.81
Aug–Sep 2016	Gulf of St. Lawrence/Bay of Fundy/Scotian Shelf	6,158	0.40
Aug–Sep 2016	Newfoundland/Labrador	13,008	0.46
Jun–Sep 2016	**Central Virginia to Labrador (COMBINED)**	**21,968**	**0.31**
Jun–Aug 2021	New Jersey to lower Bay of Fundy	5,630	0.58

Month/Year	Area	N_{est}	CV
Jun–Aug 2021	Central Florida to New Jersey	0	0
Jun–Aug 2021	Central Florida to lower Bay of Fundy (COMBINED)	5,630	0.58

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 the Canadian East Coast stock of common minke whales is 21,968 animals (CV=0.30). The minimum population estimate is 17,022 animals.

Current Population Trend

A trend analysis has not been conducted for this stock. The statistical power to detect a trend in abundance for this stock is poor due to the relatively imprecise abundance estimates and variable survey design (see Appendix IV for a survey history of this stock). For example, the power to detect a precipitous decline in abundance (i.e., 50% decrease in 15 years) with estimates of low precision (e.g., CV>0.30) remains below 80% (alpha=0.30) unless surveys are conducted on an annual basis (Taylor et al. 2007). There is current work to standardize the strata-specific previous abundance estimates to consistently represent the same regions and include appropriate corrections for perception and availability bias. These standardized abundance estimates will be used in state-space trend models that incorporate environmental factors that could potentially influence the process and observational errors for each stratum.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. However, they can be estimated according to life history parameters, such as the age of female sexual maturity (6-8 years) and pregnancy rates (0.86 to 0.93). Based on these parameters, the mean 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 maximum age appears to be about 50 years (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). Key uncertainties about the maximum net productivity rate are due to the limited understanding of the stock-specific life history parameters; thus the default value was used.

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 17,022. The maximum productivity rate is 0.04, the default value for cetaceans. The recovery factor is 0.5, the default value for stocks of unknown status relative to Optimum Sustainable Population (OSP) and with the CV of the average mortality estimate less than 0.3 (Wade and Angliss 1997). PBR for the Canadian East Coast common minke whale is 170 (Table 2).

Table 2. Best and minimum abundance estimates for the Canadian East Coast stock of common minke whales with Maximum Productivity Rate (R_{max}), Recovery Factor (F_r) and PBR.

N_{est}	CV	N_{min}	F_r	R_{max}	PBR
21,968	0.31	17,022	0.5	0.04	170

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

For the period 2017 through 2021, the annual detected (i.e., observed) human-caused mortality and serious injury to common minke whales averaged 9.40 individuals per year (Table 3. This is derived from two components: 1) incidental fishery entanglement records at 8.60 per year, and 2) vessel strikes averaging 0.80 per year.

Injury determinations are made based upon the best available information; these determinations may change with the availability of new information (Henry et al. 2023). Only records considered to be confirmed human-caused

mortalities or serious injuries are reported in the observed mortality and serious injury (M/SI) rows of Table 4.

Table 3. The total annual estimated average human-caused mortality and serious injury for the Canadian East Coast stock of common minke whales.

Years	Source	Annual Avg.
2017−2021	Fishery entanglement non-observed	8.60
2017−2021	U.S. fisheries using observer data	0
2017−2021	Vessel strikes	0.8
TOTAL		9.40

Fishery-Related Serious Injury and Mortality

United States

U.S. fishery interaction records for large whales are sourced from dedicated fishery observer data and opportunistic reports compiled in the Greater Atlantic Regional Fisheries Office (GARFO)/NMFS entanglement/stranding database. No confirmed fishery-related mortalities or serious injuries of minke whales have been reported in the NMFS Sea Sampling bycatch database (fishery observers) during this reporting period. Records of stranded, floating, or injured minke whales with substantial evidence of fishery interactions causing serious injury or mortality for the reporting period, are presented in Table 4 (Henry et al. 2023). These records likely underestimate entanglements for the stock.

Confirmed mortalities and serious injuries of common minke whales in the last five years as recorded in the audited Greater Atlantic Regional Office/NMFS entanglement/stranding database are reported in Table 4. Most cases in which gear was recovered and identified involved gillnet or pot/trap gear.

Canada

Read (1994) reported common minke whale interactions with gillnets in Newfoundland and Labrador, with cod traps in Newfoundland, and with herring weirs in the Bay of Fundy. Hooker et al. (1997) summarized bycatch data from a Canadian fisheries observer program whereby observers were deployed on all foreign fishing vessels operating in Canadian waters, on 25% - 40% of large Canadian fishing vessels (greater than 100 feet long), and on approximately 5% of smaller Canadian fishing vessels. From 1991 -1996, no observed common minke whale bycatch interactions were reported. More current observer data are not available. Wimmer and Maclean (2021) reported that 34% of the live entanglements documented in Eastern Canada between 2004 and 2019 involved minke whales.

Mortalities and serious injuries that were likely a result of an interaction with Canadian fisheries are detailed in Table 4.

Table 4. Confirmed human-caused mortality and serious injury records of common minke whales (*Balaenoptera acutorostrata acutorostrata*): 2017–2021.

Date[b]	Injury determination	ID	Location[b]	Assigned Cause[c]	Value against PBR[d]	Country[e]	Gear Type[f]	Description
24Apr17	Mortality	-	Staten Island, NY	VS	1	US	-	Evidence of bruising on dorsal and right scapular region. Histopathology results support blunt trauma from vessel strike most parsimonious as cause of death (COD).
06Jul17	Mortality	-	Manomet Point, MA	EN	1	US	PT	Live animal anchored in gear. Witnessed becoming entangled in second set. Gear hauled and animal found deceased with line through mouth and constricting wraps on peduncle.
22Jul17	Mortality	-	Piscataqua River, NH	EN	1	US	NP	No gear present. Evidence of multiple constricting wraps on lower jaw and ventral pleats with associated hemorrhaging.

Date[b]	Injury determination	ID	Location[b]	Assigned Cause[c]	Value against PBR[d]	Country[e]	Gear Type[f]	Description
09Aug17	Mortality	-	off Plymouth, MA	EN	1	US	NP	No gear present. Evidence of constricting entanglement at fluke insertion, across fluke blades and ventral pleats. No necropsy but fresh carcass with extensive injuries supports COD of entanglement as most parsimonious.
11Aug17	Prorated Injury	-	off York, ME	EN	0.75	US	NR	Partially disentangled from anchoring gear. Final configuration unknown.
12Aug17	Mortality	-	off Tremont, ME	EN	1	US	GU	Fresh carcass of a pregnant female in gear. Constricting wrap injuries with associated hemorrhaging on dorsal and ventral surfaces and flukes.
14Aug17	Mortality	-	Pt. Judith, RI	EN	1	US	NP	Evidence of constricting entanglement along left side with associated hemorrhaging. Found floating in stationary offshore fishing trap, but not entangled in trap gear. No gear present on animal.
17Aug17	Mortality	-	Rye, NH	EN	1	US	NR	Evidence of constricting wraps on fluke blades and peduncle. Documented with line in baleen, but not present at time of necropsy. Limited necropsy, but extent of injuries and robust animal with evidence of recent feeding supports COD of entanglement as most parsimonious.
28Aug17	Mortality	-	off Portland, ME	EN	1	US	PT	Fresh carcass anchored in gear. Endline wrapped around mouth and laceration from constricting gear on peduncle.
30Aug17	Mortality	-	off North Cape, PEI	EN	1	CN	NR	Fresh carcass in gear. Full configuration unclear, but complex enough to not have drifted into post-mortem.
04Sep17	Mortality	-	St. Carroll's, NL	EN	1	CN	NE	Alive in herring net. Found dead the next day. Fisher pulled carcass ashore and removed the net.
06Sep17	Mortality		Newport, RI	VS	1	US	-	Hemorrhaging at left pectoral, left body, and aft of blowholes. Histopathology results support blunt trauma from vessel strike as COD.
17Sep17	Mortality	-	Henry Island, NS	EN	1	CN	NR	Fresh carcass with gear in mouth and around flukes. Evidence of constricting wrap on dorsum. No necropsy, but configuration complex enough that it is unlikely to have drifted into gear post-mortem.
26Sep17	Prorated Injury	-	off Richbuctou, NB	EN	0.75	CN	NR	Animal initially anchored in gear then not resighted. Unable to confirm if gear free, partially entangled, or drowned.
27Sep17	Mortality	-	off Richbuctou, NB	EN	1	CN	NP	No gear present. Fresh carcass with evidence of constricting wraps.
10Oct17	Mortality		off Rockland, ME	EN	1	US	PT	Entangled in 2 different sets of gear. Constricting wrap around lower jaw. Found at depth when fisher hauled gear.
09Feb18	Mortality	-	Tiverton, Long Island, NS	EN	1	XC	NP	No gear present. Evidence of constricting body, flipper, and peduncle wraps. No necropsy conducted, but COD from entanglement most parsimonious.

Date[b]	Injury determination	ID	Location[b]	Assigned Cause[c]	Value against PBR[d]	Country[e]	Gear Type[f]	Description
25May18	Mortality	-	Digby, NS	VS	1	CN	-	Fresh carcass in harbor with large area of hemorrhage aft of blowholes. Necropsy did not state COD, but blunt trauma from vessel strike most parsimonious.
11Jun18	Mortality	-	Cape Dauphin, NS	EN	1	CN	PT	Fresh, pregnant carcass anchored in gear.
19Jun18	Mortality	-	East Point, PEI	EN	1	CN	NP	No gear present. Fresh, pregnant carcass with evidence of extensive constricting body and peduncle wraps with associated hemorrhaging.
22Jun18	Prorated Injury	-	off Grand Manan, NB	EN	0.75	XC	NR	Full configuration unclear - line across back, one buoy under left pectoral and another trailing 30–40ft aft. Reported as anchored but unable to confirm. Response team was not able to relocate.
24Jun18	Mortality	-	Wellfleet, MA	EN	1	XU	GN	Evidence of extensive constricting body and mouth wraps with associated hemorrhaging. Deep lacerations at fluke insertion from constricting gear. COD - peracute underwater entrapment.
07Jul18	Mortality	-	off Newcastle, NH	EN	1	US	PT	Anchored in gear with line through mouth and wrapping around body. Associated bruising at right corner of mouth. COD - peracute underwater entrapment.
22Jul18	Mortality	-	Cape Neddick, ME	EN	1	XU	NP	No necropsy, but evidence of constricting wrap at fluke insertion with associated hemorrhaging. Histopathology confirms pre-mortem human-induced trauma.
28Jul18	Mortality	-	Biddeford, ME	EN	1	XU	NP	No gear present, but evidence of constricting gear with associated bruising at mouth, around body and peduncle.
06Aug18	Prorated Injury	-	Fish Cove Point, NL	EN	0.75	CN	NE	Free-swimming towing net with float attached. Member of public cut off float. Original and final configuration unknown.
29Aug18	Prorated Injury	-	off Chatham, MA	EN	0.75	XU	NR	Free-swimming with buoy near flukes, full configuration unknown.
03Sep18	Mortality	-	Nancy Head, Campobello, NB	EN	1	CN	WE, SE	Live animal entrapped. Failed attempt by fisher to remove animal with seine. Animal became entangled in seine and drowned.
16Sep18	Mortality	-	off Rye, NH	EN	1	US	PT	Fresh carcass anchored in gear. Constricting body, jaw, peduncle, and fluke wraps with associated hemorrhaging.
07Nov18	Mortality	-	Tangier Island, VA	EN	1	XU	NE	Constricting gear with associated hemorrhaging partly amputating tip of rostrum. Poor body condition. COD - chronic entanglement.
25Dec18	Mortality	-	Yarmouth Bar, NS	EN	1	XC	NP	No gear present. Evidence of constricting entanglement on head, ventral pleats, peduncle and flukes. No necropsy, but COD from entanglement most parsimonious.
27Mar19	Mortality	-	Duxbury, MA	EN	1	US	NR	Carcass with line through mouth when first documented, but not present at exam. No COD determined, but mouth abrasion with associated hemorrhaging in muscle and staining of bone is consistent with pre-mortem entanglement.

Date[b]	Injury determination	ID	Location[b]	Assigned Cause[c]	Value against PBR[d]	Country[e]	Gear Type[f]	Description
05Jun19	Mortality	-	Queensland Beach, NS	EN	1	CN	NP	No necropsy, but evidence of multiple constricting body and peduncle wraps. Fluke cleanly severed. Likely removed post-mortem. COD = EN most parsimonious.
04Aug19	Prorated Injury	-	off Montauk, NY	EN	0.75	XU	NR	Free-swimming with line crossing over back just in front of dorsal fin. Line fouled with growth. Attachment point(s) and full configuration unknown.
09Aug19	Prorated Injury	-	Rigolet, Labrador	EN	0.75	CN	NE	Anchored with line around rostrum and constricting peduncle wraps. Partially disentangled. Final configuration unknown.
21Aug19	Prorated Injury	-	Mer et Monde, QC	EN	0.75	XC	NR	Free-swimming with line over back and possibly through mouth. Full configuration and attachment point(s) unknown.
01Sep19	Prorated Injury	-	off Chatham, MA	EN	0.75	XU	NR	Free-swimming with buoy trailing from fluke area. Attachment point(s) and full configuration unknown.
10Sep19	Prorated Injury	-	off Matinicus Rock, ME	EN	0.75	XU	NR	Unable to confirm if anchored or free-swimming. Full configuration and attachment point(s) unknown.
19Sep19	Mortality	-	off Burnt Island, ME	EN	1	US	-	No gear present, but evidence of constricting body, peduncle, and fluke wraps. No necropsy, but COD due to EN is most parsimonious.
14Jan20	Mortality	-	off Port Mouton Island, NS	EN	1	CN	PT	Fresh carcass anchored in gear.
03Feb20	Mortality	-	off Chesconessex, VA	EN	1	US	GN	Gear around pectorals and peduncle and through mouth. COD = Peracute underwater entrapment.
17Jun20	Mortality	-	off Newport, RI	EN	1	US	NE	Fresh carcass anchored in gear.
26Aug20	Mortality	-	off Wood Island, ME	EN	1	US	PT	Limited necropsy - fresh, scavenged carcass with flipper wraps and evidence of constricting peduncle wrap. Stomach full of partially digested fish indicating acute mortality. COD from entanglement most parsimonious.
04Sep20	Serious Injury	-	off North Truro, MA	EN	1	XU	NE	Free-swimming with netting in mouth, embedded in rostrum, and trailing alongside each flank. Poor condition - emaciated, pocked skin, and deep, open wounds. Disentanglement response unsuccessful. No resights.
06Oct20	Mortality	-	Dennis Harbor, MA	EN	1	US	GU	Closed bridle of line through mouth with associated hemorrhaging at corners of the mouth.
06Jun21	Prorated Injury	-	off North Truro, MA	EN	0.75	XU	NR	Free-swimming with a large jumble of gear on its back, forward of dorsal. Attachment point(s) and full configuration unknown.
04Jul21	Mortality	-	off Point Judith, RI	EN	1	XU	NE	Constricting rostrum wraps with associated hemorrhaging. Propeller lacerations on ventral jaw acquired post mortem. COD consistent with entanglement.
11Jul21	Prorated Injury	-	Mary's Harbour, NL	EN	0.75	CN	GN	Fisher self-reported animal entangled in gear in unknown configuration. Partially disentangled - released carrying part of net and poly float from unknown attachment point(s) and in unknown configuration.

Date[b]	Injury determination	ID	Location[b]	Assigned Cause[c]	Value against PBR[d]	Country[e]	Gear Type[f]	Description
17Jul21	Mortality	-	off Manomet Point, Plymouth, MA	VS	1	US	-	Fractured rostrum and mandibles with associated tissue damage consistent with blunt force trauma. Robust body condition and partially digested fish in forestomach indicates acute mortality.
01Aug21	Mortality	-	off Sequin Island, ME	EN	1	US	PT	Anchored in gear with constricting wraps on left pectoral and at fluke insertion. Limited necropsy but COD from entanglement most parsimonious. Robust condition and unlikely to have drifted into gear post mortem and become so extensively wrapped.

Assigned Cause	5-Year mean (US/CN/XU/XC)
Vessel strike	0.8 (0.6/ 0.2/0/0)
Entanglement	8.60 (3.15/2.40/2.35/0.70)

a. For more details on events please see Henry et al. 2023.
b. 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.
c. Assigned cause: EN=entanglement, VS=vessel strike, ET=entrapment (summed with entanglement).
d. Mortality events are counted as 1 against PBR. Serious injury events have been evaluated using NMFS guidelines (NOAA 2012).
e. US=United States, XU=Unassigned 1st sight in U.S., CN=Canada, XC=Unassigned 1st sight in CN.
f. H=hook, GN=gillnet, GU=gear unidentifiable, MF=monofilament, NP=none present, NR=none recovered/received, PT=pot/trap, WE=weir.

United States

Common minke whales inhabit coastal waters during much of the year and are thus susceptible to collision with vessels. Vessel strike interactions in U.S. and Canadian waters are reported in Table 4. In January 2017, a minke whale Unusual Mortality Event (UME) was declared for the U.S. Atlantic coast due to elevated numbers of mortalities. From January 2017 to December 2021, 123 minke whales stranded between Maine and South Carolina. Preliminary findings in several of the whales have shown evidence of human interactions or infectious disease. This most recent UME is ongoing (https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-minke-whale-unusual-mortality-event-along-atlantic-coast#minke-whale-strandings; accessed 27Jan2021). Anthropogenic mortalities and serious injuries that occurred in 2017–2021 as part of this UME are included in Table 4.

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 Department of Fisheries and Oceans, Canada documented strandings on the beaches of Sable Island (Lucas and Hooker 2000). Common minke whales stranded on the coast of the Canadian Maritime Provinces were recorded by the Marine Animal Response Society (MARS) (Wimmer and Maclean 2021).

The Whale Release and Strandings program reports common minke whale stranding mortalities in Newfoundland and Labrador (Ledwell and Huntington 2018, 2019, 2020, 2021a, 2021b). Those that have been determined to be human-caused serious injury or mortality are included in Table 4.

STATUS OF STOCK

Common minke whales are not listed as threatened or endangered under the Endangered Species Act, and the Canadian East Coast stock is not considered strategic under the Marine Mammal Protection Act because the estimated average annual human-related mortality does not exceed PBR. The total fishery-related mortality and serious injury for this stock (8.6) is less than 10% of the calculated PBR and, therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate. The status of common minke whales relative to OSP is unknown.

It is expected that the uncertainties described above will have little effect on the designation of the status of the entire stock. The estimate of human-caused mortality and serious injury in this assessment (9.4 animals annually, Table 3) is negatively biased due to reliance on strandings and entanglement data as the primary data sources.Human-caused mortality is below the PBR calculated from the abundance estimate for the U.S. and Canadian portion of the Canadian East Coast common minke whale stock's habitat.

OTHER FACTORS THAT MAY BE AFFECTING THE STOCK

Habitat Issues

Climate-related changes in spatial distribution and abundance, including poleward and depth shifts, have been documented in and predicted for a range of plankton species and commercially important fish stocks (Nye et al. 2009; Head et al. 2010; Pinsky et al. 2013; Poloczanska et al. 2013; Hare et al. 2016; Grieve et al. 2017; Morley et al. 2018) and cetacean species (e.g., MacLeod 2009; Sousa et al. 2019). There is uncertainty in how, if at all, the distribution and population size of this species will respond to these changes and how the ecological shifts will affect human impacts to the species.

Human-made noises have been shown to impact common minke whales. A study in the Northwest Atlantic, investigated the potential of vessel noise to mask baleen whale vocalizations and found an 80% loss of communication space for minke whale pulse trains relative to historical "quiet" conditions (Cholewiak et al. 2018). Minke whales have been observed to respond to mid-frequency active sonar and other training activities by reducing or ceasing calling and by exhibiting avoidance behaviors (Harris et al. 2019; Martin et al. 2015). In addition they have strongly avoided acoustic deterrent devices that were used as noise mitigation of construction activities (McGarry et al. 2017).

Although levels of persistent organic pollutants are decreasing in many cetacean species, elevated concentrations of persistent organic pollutants and emerging halogenated flame retardants have been reported in tissues of minke whales in the St. Lawrence Estuary in Canada that may affect the regulation of the thyroid and/or steroid axes (Simond et al. 2019).

Chavez-Rosales et al. (2022) documented an overall 178 km northeastward spatial distribution shift of the seasonal core habitat of Northwest Atlantic cetaceans that was related to changing habitat/climatic factors. Results varied by season and species. This study used sightings data collected during seasonal aerial and shipboard line transect abundance surveys during 2010 to 2017. During this time frame, the weighted centroid of the minke whale core habitat moved farthest during winter (133 km towards the northeast) and least during fall (10 km towards the west). There is uncertainty in how, if at all, the changes in distribution and population size of cetacean species may interact with changes in distribution of prey species and how the ecological shifts will affect human impacts to the species.

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