



## *Status of Marine Mammals in the North Atlantic*

# **THE MINKE WHALE**



*This series of reports is intended to provide information on North Atlantic marine mammals suitable for the general reader. Reports are produced on species that have been considered by the NAMMCO Scientific Committee, and therefore reflect the views of the Council and Scientific Committee of NAMMCO.*

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## **MINKE WHALE** (*Balaenoptera acutorostrata*)

The minke whale is the smallest of the balaenopterids, or rorquals. It attains a length of 8-9 m and a weight of about 8 tonnes in the North Atlantic. As with all balaenopterids, the females are somewhat larger than the males. Minke whales are black or dark grey dorsally and white on the ventral side. A transverse white band is characteristic for the species in the Northern Hemisphere. With a worldwide distribution, it is the most common of the rorquals.

### **Distribution and Stock Definition:**

The minke whale is found throughout most of the North Atlantic, but is generally more common in coastal or shelf areas (Fig. 1). Although the migratory patterns of North Atlantic minke whales are not known, they tend to occupy higher latitudes in the summer and lower latitudes in the winter. Breeding and calving areas are not known.

North Atlantic minke whales have been divided into four management stocks by the International Whaling Commission (IWC) (Donovan 1991) (See Fig. 1). The original stock divisions were not based on extensive biological information. More recent data from genetic, mark-recapture and other types of studies tend to support these divisions on large geographical scales, but the boundaries between the stock areas remain uncertain. Genetic studies indicate that the West Greenlandic and Central Atlantic minke whales do not belong to the same stock as the Northeastern Atlantic minke whales (NAMMCO 1999). On a smaller geographic scale, there is no evidence for division within the Central Atlantic stock area. Mark-recapture analyses of animals tagged in the Central and Northeast Atlantic stock areas show little evidence of mixing between these two areas (IWC 1991). This evidence supports the large-scale differentiation of minke whale stocks, however present knowledge of the movements, seasonal distribution and breeding patterns of minke whales is extremely limited. The eastern boundary of the West Greenland stock area off Cape Farewell, for example, is particularly questionable, as there appears to be a continuous distribution of minke whales between East and West Greenland (IWC 1990).

### **Ecology:**

Minke whales reach sexual maturity at an age of 5 to 7 years (NAMMCO 1999). They are essentially annual breeders, with most mature females becoming pregnant every year. Mating occurs in the late winter and gestation lasts about 10 months, with calves born in low latitudes during the winter (Martin *et al.* 1990).

Minke whales feed on a wide variety of fish and invertebrates. In the North Atlantic, they consume mainly krill (*Thysanoessa* spp. and *Meganyctiphanes* spp.), herring (*Clupea harengus*), capelin (*Mallotus villosus*), sandeel (*Ammodytidae*), cod (*Gadus morhua*), polar cod (*Boreogadus saida*), haddock (*Melanogrammus aeglefinus*), as well as other species of fish and invertebrates (NAMMCO 1998a). The diet varies both by location and over time. In the Northeast Atlantic stock area, krill, herring and cod are the most important prey species. In the Northwest and Central Atlantic, capelin appears to make up a larger part of the diet. Interannual variations in diet composition, probably reflecting prey availability, have also been noted in the Northeast Atlantic (Haug *et al.* 1999).

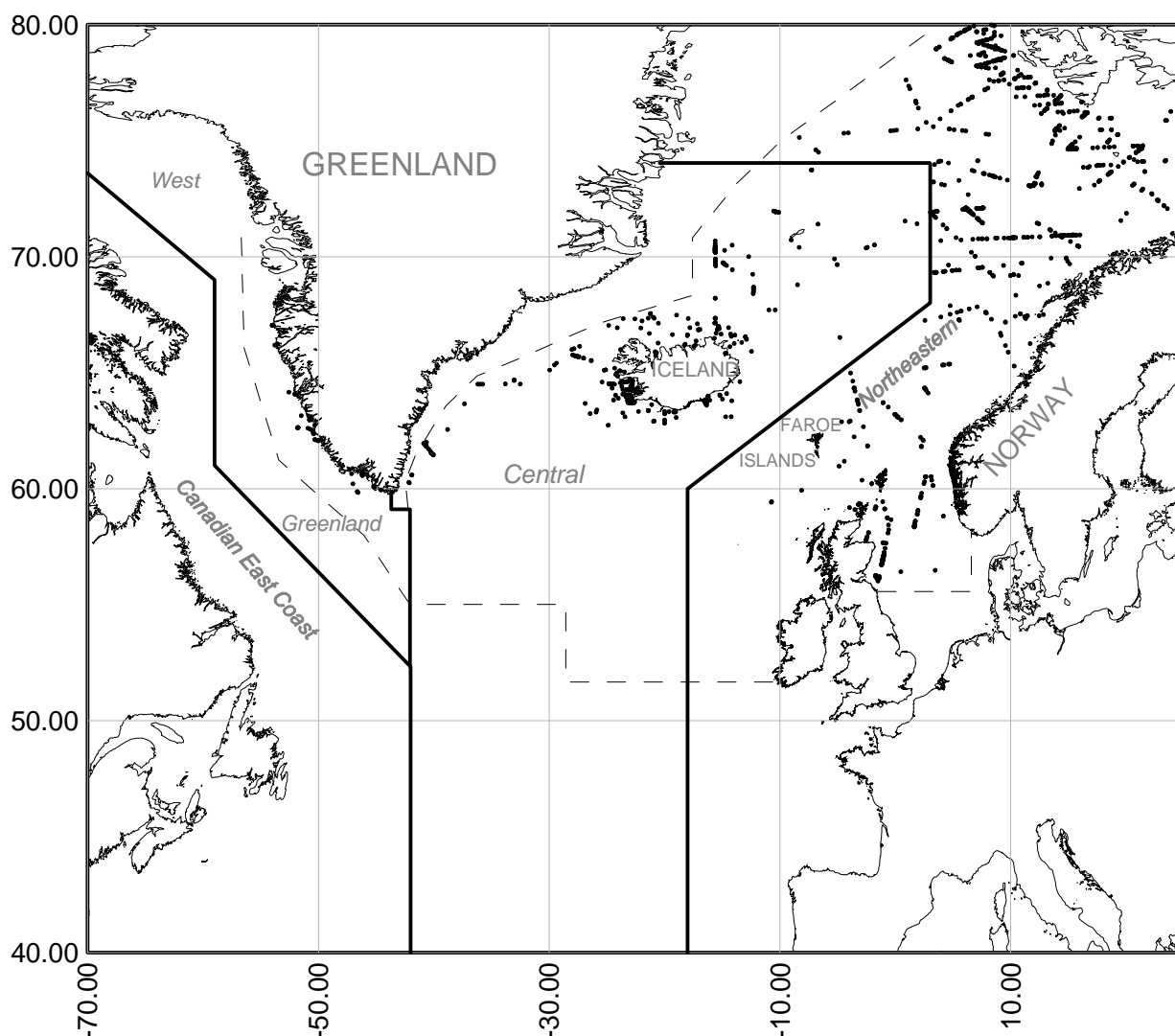


Fig. 1. Summer (July-August) sightings of minke whales in the North Atlantic during the NASS-95 survey (NAMMCO 1998b) and the West Greenland aerial survey of 1993 (Larsen 1995). Dashed line is the boundary of the survey area. Solid lines are the boundaries of the stock areas used by the IWC (Donovan 1991).

Minke whales are very important predators in the marine ecosystem, particularly in the Northeast and Central Atlantic stock areas. They are estimated to consume more than 1.8 million tonnes of prey annually in the northern Northeast Atlantic stock area (NAMMCO 1998a), much of which is commercially important species of fish such as herring, cod and haddock. This consumption is similar in magnitude to the total commercial fishery for pelagic fish in the area (Toresen *et al.* 1998). The minke whale is the most important marine mammal predator on fish in Icelandic shelf waters, consuming about 1 million tonnes of fish per year (Sigurjónsson and Vikingsson 1997). Multispecies modelling has indicated that these levels of consumption may have important implications for the yield of commercial fisheries in the northeast and

central Atlantic (NAMMCO 1998a; Stefánsson *et al.* 1997), however this modelling is still at an early stage.

Minke whales are themselves preyed upon by humans, killer whales (*Orcinus orca*), and perhaps by large sharks in southerly latitudes. The magnitude of killer whale and shark predation on minke whales is not known.

#### **Abundance and Trends:**

Estimates of the abundance of minke and other species of whales in the North Atlantic have been based largely on sightings surveys conducted from ships and airplanes. The surveys are conducted by cruising along preset transect lines, with observers registering all the whales seen out to a certain distance from the ship or plane. These counts are translated into estimates of abundance by applying the observed density to areas not counted directly, while correcting (as far as possible) for distance from the transect line, whales below the surface not visible to the observers, and whales visible but missed by the observers. Because of the relatively small area in which whales are actually counted compared to the large survey area, and the uncertainties associated with correction factors, there is always a high degree of variance in these estimates.

The most recent large scale survey from which estimates are available, the North Atlantic Sightings Survey (NASS), was conducted co-operatively by Norway, Iceland and the Faroe Islands in 1995, and covered much of the North Atlantic north of 50° and west to Greenland. The NASS-95 survey was conducted primarily from ships, but coastal Iceland was surveyed by plane. Other NASS surveys were conducted in 1987 and 1989.

The most recent abundance estimate for the Northeastern stock area from the NASS-95 survey is 112,125 (95% confidence interval (CI) 91,498-137,401) (NAMMCO 1998b). This is higher than the abundance estimate from the NASS-89 survey of 67,380 (95% CI 46,572-97,485) (Schweder *et al.* 1997)), but the confidence intervals overlap, indicating that the difference is not significant.

NASS-95 resulted in an estimate of 72,130 (95% CI 44,711-116,362) for the Central stock area (NAMMCO 1998b). This is significantly higher than the estimate of 28,000 (95% CI 21,600-31,400) from the NASS-87 and NASS-89 surveys (IWC 1991). However, the NASS-95 estimate has been re-considered by the NAMMCO Scientific Committee, which concluded that it may be positively biased (NAMMCO 2002).

Aerial surveys for minke whales were conducted off West Greenland in 1987, 1988 and 1993. The 1993 survey resulted in an estimate of 8,371 (95% CI 2,400-16,900) (Larsen 1995), which is higher but not significantly so than the 1987-88 estimate of 3,266 (95% CI 1,700-5,710) (IWC 1990). Both surveys are likely underestimates as they did not fully cover the range of minke whales in the area. As noted earlier, it is possible that West Greenland minke whales are part of a larger stock extending outside the area surveyed.

#### **Current Management and Utilisation:**

Whaling has been conducted in the North Atlantic for thousands of years. However, directed hunting for minke whales is relatively recent (Kalland 1995, Sigurjónsson

1997). Minke whaling developed in the 20<sup>th</sup> century in Norway, Iceland, Greenland and Canada, and has been primarily carried out on a small scale by fishermen from small vessels, as a supplement to their fishing activity. The main product from the minke whale harvest has always been meat for human consumption.

The minke whale falls under the management jurisdiction of the International Whaling Commission (IWC) for those countries that are members. The IWC began establishing quotas for the species in the 1970's. In 1986, the IWC instituted a temporary moratorium on commercial whaling. However, Norway is not bound by the moratorium, as it raised a formal objection to it as allowed under the International Convention for the Regulation of Whaling. Greenland continues to hunt minke whales under "aboriginal subsistence" quotas, which do not fall under the moratorium. Iceland withdrew from the IWC in 1992, but has not harvested minke whales since 1985. No other country in the North Atlantic presently has a directed harvest of minke whales.

The Norwegian catch is taken primarily from the Northeastern stock area, but a small proportion is taken from the Central stock area around Jan Mayen (Table 1). Norway also took minke whales in the West Greenland stock area until 1986. Whales are hunted from fishing vessels equipped with harpoon cannons. The harpoons are of the "hot" type, tipped with explosive penthrite grenades that detonate inside the animal. Since 1993, quotas for the Norwegian hunt have been established using the Revised Management Procedure developed by the IWC. The quota in 1998 was 671 whales, which is further divided over different areas and between vessels. Every vessel carries a national inspector who observes and records data on the hunt. Norway also participates in an international inspection scheme operated by NAMMCO.

Year	Northeast Atlantic	Central Atlantic			West Greenland	
	Norway	Norway	East Greenland	Iceland	Greenland	Norway
1978	1383	131	0	198	180	75
1979	1786	120	0	202	250	75
1980	1807	120	2	201	258	75
1981	1771	46	0	200	204	61
1982	1782	109	1	212	250	66
1983	1688	113	9	204	268	68
1984	630	104	11	178	235	70
1985	634	85	14	145	222	52
1986	329	50	2	0	145	0
1987	323	50	4	0	86	0
1988	29	0	10	0	109	0
1989	17	0	10	0	63	0
1990	5	0	6	0	89	0
1991	0	0	7	0	93	0
1992	95	0	8	0	96	0
1993	213	13	9	0	101	0
1994	239	41	8	0	100	0
1995	176	42	7	0	152	0

Year	Northeast Atlantic	Central Atlantic			West Greenland	
	Norway	Norway	East Greenland	Iceland	Greenland	Norway
1996	348	40	12	0	160	0
1997	483	20	11	0	146	0
1998	568	57	10	0	163	0
1999	530	59	14	0	165	0

Table 1: Recent reported catches of minke whales in the North Atlantic, by stock area. Data compiled from NAMMCO Marine Mammal Catch Database.

The Greenlandic catch is taken primarily from the West Greenland stock area, but a small proportion is taken by East Greenlanders from the Central stock area. The quota in 1998 was 175 for West Greenland and 12 for East Greenland. Whales are hunted for the most part using methods similar to those used in Norway. However, a proportion of the quota is taken by small boats in a rifle hunt. Wildlife officers carry out random inspections of minke whale hunts in Greenland. In addition, Greenland participates in the international inspection scheme under NAMMCO.

**Threats:**

Present harvesting of minke whales by Norway and Greenland in the Northeastern and Central stock areas is well within sustainable levels and therefore does not constitute a threat to the stocks. The West Greenlandic harvest is likely also sustainable, given that (a) recent surveys have probably underestimated the population, and (b) the West Greenland catch may be taken from a larger, more extensive stock.

Minke whales prey on some commercially important fish species such as herring, cod and capelin. The availability of this prey might therefore be reduced by commercial fisheries. However, minke whales feed on a wide variety of prey, and have been shown to change the composition of their diets in response to changes in prey abundance (Haug *et al.* 1999). They are therefore less vulnerable to prey depletion than more specialised species.

In addition to their direct toxicity, anthropogenic contaminants may affect the resilience and increase susceptibility to disease in marine mammals (Reijnders and de Ruiter-Dijkman 1995). However, baleen whales in general tend to have lower contaminant burdens than toothed whales and some seal species, presumably because they feed at a lower trophic level (Skaare 1995). There is no evidence that contaminants are presently affecting minke whales in the North Atlantic.

Minke whales are infrequently entangled in fishing gear, or struck by vessels. These sources of mortality are likely not significant in the North Atlantic.

**Status and Outlook:**

Minke whales remain the most abundant balaenopterid in the North Atlantic, and indeed in the world. Recent surveys indicate that minke whale abundance is stable or increasing in all areas, and may be approaching pre-exploitation levels (Sigurjónsson 1995, NAMMCO 1999). Present harvest levels constitute no threat to the stocks, and

are unlikely to in the future. There are no indications that minke whales are threatened by fisheries, contaminants or other factors. It is therefore likely that minke whales will remain an important component of the North Atlantic ecosystem for the foreseeable future.

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