

## **Minke Whale Populations in the North Atlantic – an Overview with Special Reference to UK waters**

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### **NORTH ATLANTIC**

#### **Distribution & Movements**

North Atlantic minke whales (*Balaenoptera acutorostrata acutorostrata*) are widely distributed mainly in continental shelf waters from Baffin Bay to the West Indies, and from Svalbard to the Azores. Like many other balaenopterids, minkes are thought to undergo seasonal migrations between summer feeding grounds in high latitudes and temperate winter breeding grounds (Stewart & Leatherwood, 1985).

#### **Population Structure**

Clearly separated genetically from both North Pacific (*Balaenoptera acutorostrata scammoni*) and Antarctic minkes (*Balaenoptera bonaerensis*), investigations into the fine-scale population structure of the North Atlantic sub-species have resulted in different sub-divisions, depending on the nature of genetic markers used. Some differentiation between animals from West Greenland, the Central and Northeast Atlantic was detected using allozymes, DNA-fingerprinting, RAPD-typing and microsatellites (Daníelsdóttir *et al.*, 1992, 1995; Árnason & Spilliaert, 1991; Martinez & Pastene, 1999; Andersen *et al.*, 2003), whereas mitochondrial DNA analyses (Palsbøll, 1990; Bakke *et al.*, 1996) and a recent microsatellite study (Anderwald *et al.*, in prep.) found no or very little sub-division between regions. A general consensus from these studies is that, if population differentiation between North Atlantic minke whales from different regions does exist, it seems to be present only at low levels. Representative sampling for genetic analysis in this species is hindered by the lack of understanding about its winter distribution / breeding grounds and the added difficulty of spatial and temporal segregation by both sex and age in at least parts of its range: e.g. adult females generally appear to migrate further north than adult males and juveniles during the summer months, and females migrate closer to the coast than males in coastal Norway (e.g. Jonsgård, 1951, 1962; Mitchell, 1974; Christensen, 1975).

#### **Diet**

Regional differences exist with respect to diet. In general, krill and capelin form an important part of minke whale diet in the northern range of the species' distribution, whereas clupeids are taken around the coast of Norway and western UK, and sandeel in the North Sea, and (in addition to krill and capelin) Iceland and West Greenland (e.g. Lindstrøm *et al.*, 1997; Neve, 2000; Sigurjónsson *et al.*, 2000; Olsen & Holst, 2001;

From: Robinson, K.P., Stevick, P.T. & MacLeod, C.D. (Eds) *An Integrated Approach to Non-lethal Research on Minke Whales in European Waters*. European Cetacean Society Spec. Public. Series 47: 8-13.

Haug *et al.*, 2002; Pierce *et al.*, 2004; pers. obs.). In the UK sample (n=10; Pierce *et al.*, 2004), sandeels predominated, followed by clupeids and, to a lesser extent, mackerel.

### **Group Sizes**

The species is usually solitary, but aggregations of 5 to 15 individuals may sometimes occur in areas with high prey densities.

## **BRITISH & IRISH WATERS**

### **Distribution & Movements**

In UK waters, minke whales are distributed mainly around Scotland and in the northern and central North Sea regularly south to the Yorkshire coast, with small numbers also in the Irish Sea and western English Channel (Evans *et al.*, 2003; Reid *et al.*, 2003). By far the most sightings within continental shelf waters occur between May and September, with peak numbers from July to September, depending on the region (Evans *et al.*, 2003).

It is not clear yet whether minke whales around the UK and Ireland undergo similar latitudinal migrations to animals that spend the summer further north, or if they merely move further offshore during the winter months. The Sea Watch Database holds 165 winter sighting records of the species, collected by volunteer observers between November and March for the UK and Ireland since the mid-1990s, with no obvious latitudinal trend in distribution (Fig. 1). Although the sample size is small, this suggests that at least some individuals spend the winter close to Britain and Ireland. Occasional records of young calves in spring and summer leave the possibility open that some females may give birth in these latitudes, although this remains speculative until more data are available.

### **Population Trends**

Sighting rates of minke whales have increased dramatically in west, north and east Scotland since the early 1990s (Evans *et al.*, 2003), most likely due to an increase in prey availability. On the west coast, however, minke whale numbers were unusually low in 2005 and 2006 (Fig. 2a).

### **Foraging Ecology**

It can be difficult to explain sudden increases or decreases in numbers of a cetacean species, especially within a small area and over a short period of time. However, in some cases it is possible to infer to some extent the status of one taxon from the status of another which may be easier to observe. Interactions between minke whales and seabirds feeding on the same prey (mostly schooling fish such as sandeels or clupeids like sprat and herring) are well documented both for the UK (Evans, 1990; Gill *et al.*, 1999; Anderwald *et al.*, 2002) and other parts of the world (e.g. Hoelzel *et al.*, 1989).

In UK waters, the most common seabird species associated with feeding minke whales are auks (mainly razorbills and common guillemots), kittiwakes, large gulls (herring gulls, great and lesser black-backed gulls), Manx shearwaters and shags, depending on the time of year and distance from breeding colonies. Both taxa can also benefit from

predatory fish, such as mackerel and herring, trapping small schooling fish against the surface and thus making them more accessible to the whales and especially to the seabirds.

On the west coast of Scotland, Manx shearwaters are often observed following minke whales in the earlier part of the season (May to July), taking advantage of the activity of the whales, which are believed to feed mainly on sandeels during that time of year (Gill *et al.*, 1999; Macleod *et al.*, 2004). During the second half of the season (July to September), however, when sprat are more important in their diet (Anderwald *et al.*, 2006), minkes are mainly associated with mixed-species flocks of seabirds. During this part of the season, the whales appear to mainly take advantage of the seabirds for finding prey, often joining active multi-species feeding groups of birds, although associations with shearwaters or lunges without any seabirds associated can still be observed on occasions (pers. obs.). As expected, the exceptionally low sighting rates of minke whales in August and September during 2005 and 2006 coincided with equally low numbers of those species (auks, kittiwakes and large gulls) usually encountered in multi-species seabird flocks during that time of year and lower seabird species diversity (Figs. 2a-c) as compared to “good” years (2003 and 2004). The only exception was Manx shearwaters, which were often observed in large aggregations in both years (Fig. 2b). This is not surprising, since Manx shearwaters are the only species amongst those commonly found in association with minke whales that is also capable of feeding on macro-plankton when no fish is available. Furthermore, shearwaters can travel over longer distances on a single daily foraging flight than either minke whales or other seabird species, and are therefore likely to be less affected by local prey shortage.

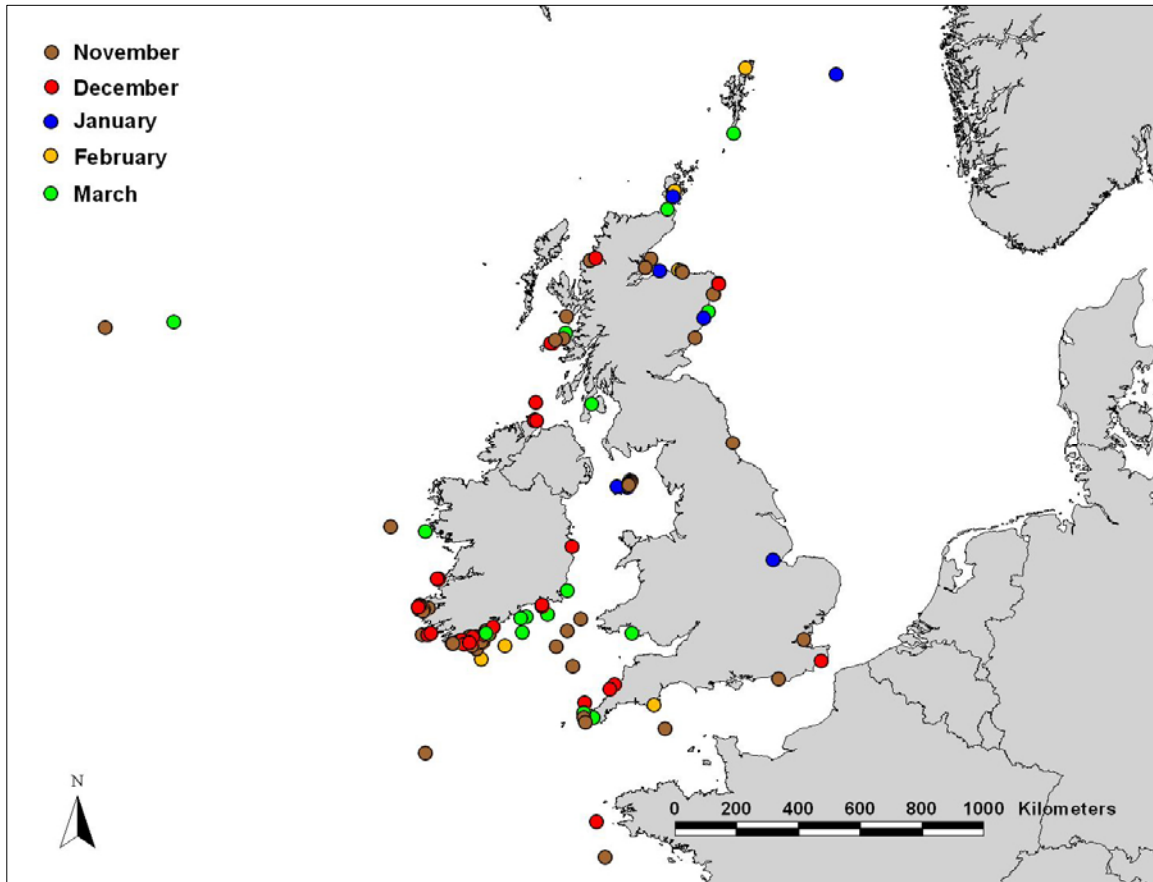


Fig. 1. Distribution of minke whale sightings around the UK and Ireland in winter.

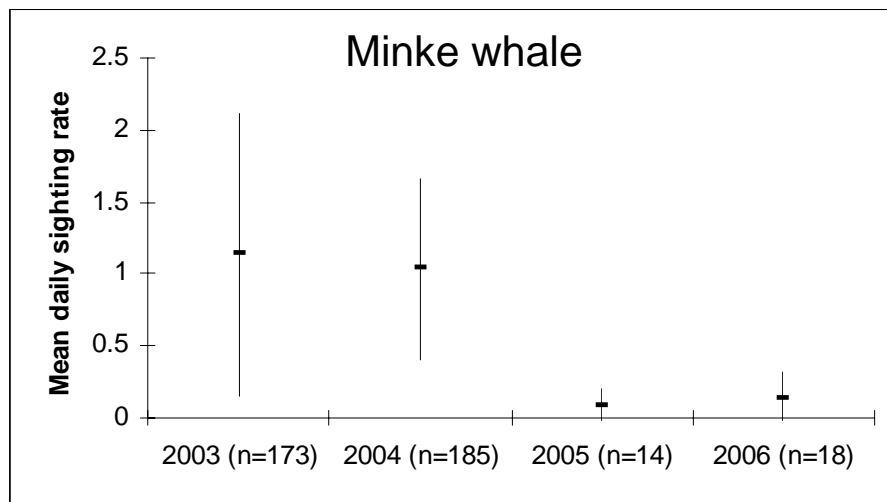


Fig. 2a. Sighting rates of minke whales around the Small Isles during August and September from 2003 to 2006.

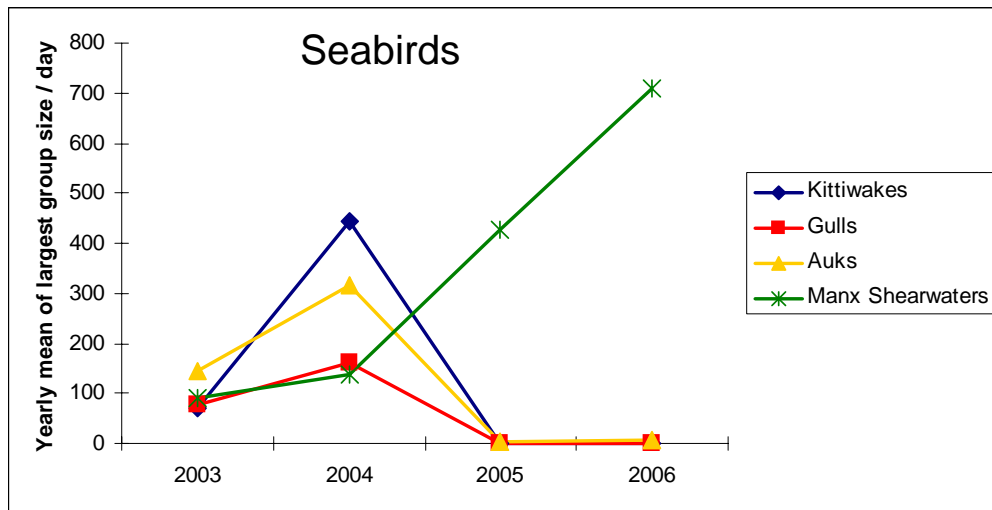


Fig. 2b. Yearly average of largest group size / day for seabird aggregations around the Small Isles during August and September from 2003 to 2006.

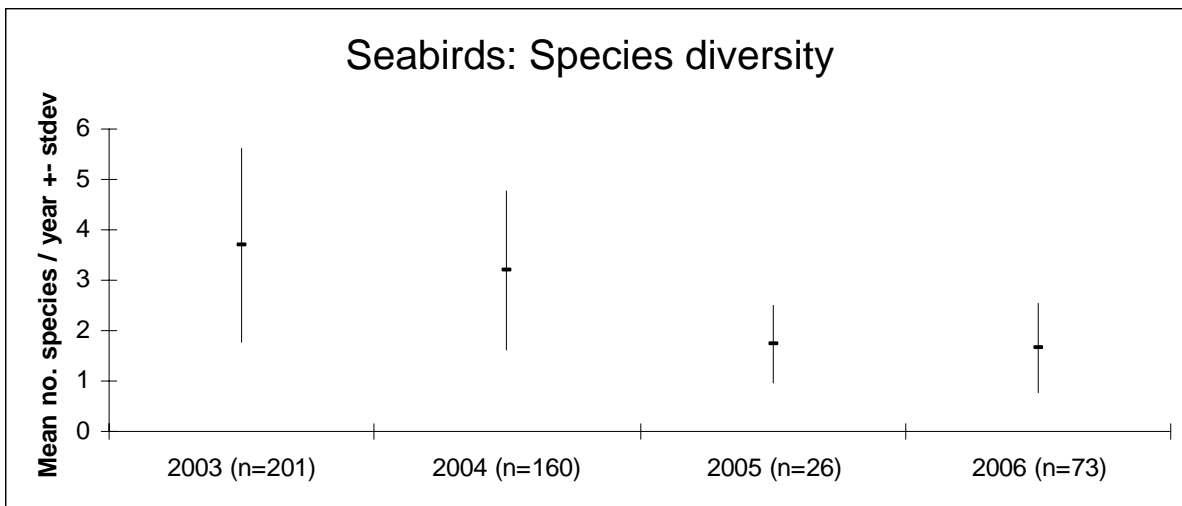


Fig. 2c. Species diversity for seabird aggregations, as mean number of species per seabird group per year, around the Small Isles during August and September from 2003 to 2006.

Low numbers of both minke whales and seabird species normally congregating in multi-species feeding aggregations thus point towards a local shortage of sprat at least in our study area around the Small Isles during 2005 and 2006. Preliminary results suggest that numbers of both minkes and seabirds have increased again in 2007, and information on the possible reasons for the short-term sprat shortage in the last two years is currently being processed.

From: Robinson, K.P., Stevick, P.T. & MacLeod, C.D. (Eds) *An Integrated Approach to Non-lethal Research on Minke Whales in European Waters*. European Cetacean Society Spec. Public. Series 47: 8-13.

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