European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)

Third Report by the United Kingdom under Article 17

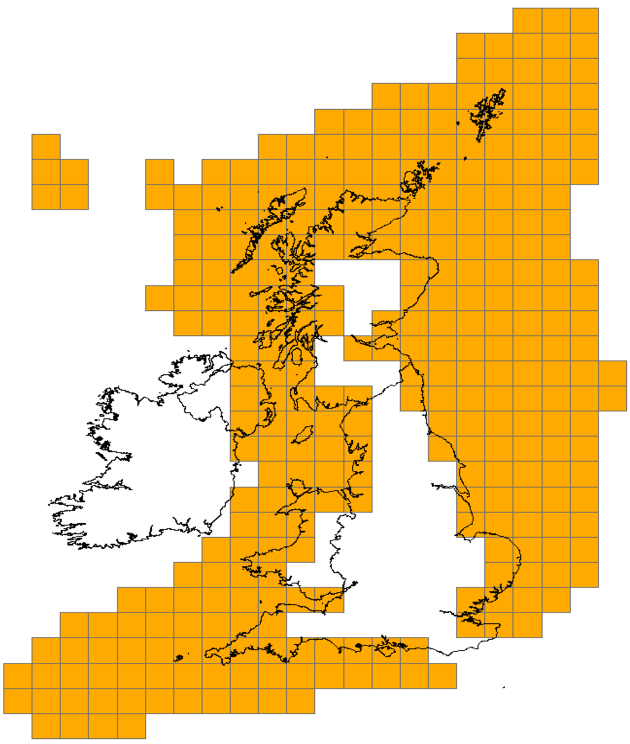
on the implementation of the Directive
from January 2007 to December 2012
Conservation status assessment for

Species:

S2618 - Minke whale (*Balaenoptera acutorostrata*)

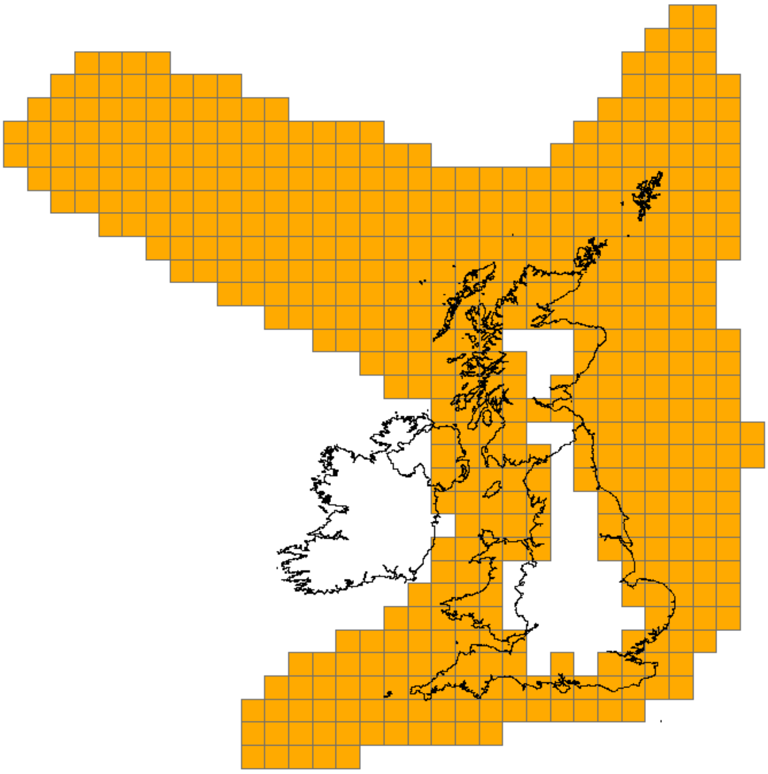
Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

Field name	***Brief explanations***	
0.2 Species	**0.2.1 Species code**	**S2618**
	0.2.2 Species scientific name	***Balaenoptera acutorostrata***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**
	Balaenoptera acutorostrata is the most common of the baleen whales in the Atlantic and around the British Isles. It mainly occurs along the Atlantic seaboard of Great Britain and Ireland but is also present in the North Sea. The central North Sea and waters to the west of Britain and Ireland are at the southern limit of the summer range of this species in the northeast Atlantic (Reid et al. 2003). Small numbers have		

	been recorded in the Irish Sea, but it is rare in the southern North Sea and the Channel. Minke whales occur mainly on the continental shelf in water depths of 200m or less. It can often be sighted close to land, and is known to enter estuaries, bays and inlets. Offshore sightings have been reported, particularly between north-west Scotland and the Faroes (Reid et al. 2003) and over the Rockall bank (CODA, 2009). Most sightings occur between July-September, and some individuals remain in coastal waters year-round (Evans et al., 2003; Evans, 2008; Reid et al., 2003). Minke whales are also known from the strandings records in UK waters. Between 2005-2010, 87 minke whales stranded on the UK, of which 72 were in Scotland, 11 in England, 2 in Wales, 1 in Northern Ireland and 1 in the Isle of Man. A further 12 strandings occurred in 2011 (11 in Scotland and 1 in England) (Deaville and Jepson, 2011). During 2012, two strandings were recorded between April-July (1 in Scotland and 1 in England), 7 in Scotland during July - September and 1 in England during October-December (Deaville, 2012).

1.1.2 Method used - map	**Estimate based on partial data with some extrapolation and/or modelling**
	The distribution map was based on an analysis of effort related survey data spanning 1994-2010 compiled for the Joint Cetacean Protocol (http://jncc.defra.gov.uk/page-5657). Sightings data were standardised and a model fitted using a suite of explanatory environmental covariates (Paxton et al. in prep). The best model was used to predict density of minke whales across a prediction grid with a resolution of 5x5km, at a variety of spatial and temporal scales. For the purposes of this reporting period, the predicted density for mid-August 2010 was used to assess distribution of this species. Any grid cell with a density value less than 0.0001/sq km was assigned a zero value (i.e. absence) and cells with density greater than the threshold were assigned a 1 (i.e. presence). This presence/absence surface was then mapped against a grid of 50x50km resolution to summarise distribution; a 50x50km cell was given a 'presence' code (i.e. 1) if at least 25% of the 5x5km prediction grid cells had a presence (i.e. density >0.0001/sq km). Sightings from the Cetacean Offshore Distribution and Abundance (CODA) survey in July 2007 were also mapped as the survey area lies predominantly beyond the JCP prediction area. These sightings were also converted to presence at a 50x50km resolution.
1.1.3 Year or period	**2006-2012**
	The map used to interpret distribution was a mid-August 2010 density prediction derived from modelling a collation of datasets held by the Joint Cetacean Protocol for the period 1994-2010 (Paxton et al. in prep). Additionally, sightings data from the July 2007 Cetacean Offshore Distribution and Abundance survey were used to look at distribution beyond the continental shelf (CODA, 2009).
1.1.4 Additional distribution map Optional	**False**
	Paxton et al. (in prep) predicted the distribution of minke whales on mid-August 2010 based on analysis of data collected between 1994 and 2010. The data are from a wide variety of sources but all surveys recorded survey effort and sightings i.e. Opportunistic sightings were not used. The data were standardised and corrections applied to account for animals missed during surveys, and detections modelled using a variety of environmental covariates, year, season and latitude and longitude. The best model was used to predict spatial distribution at a 5x5km resolution for mid-August for each year (i.e. 1994-2010) (Paxton et al., in prep).

	The model output for mid-August 2010 was assessed to for areas of relatively high and low density for this species. The map shows that this species most commonly occurs in all waters around the Scottish coastline, the Northern Isles, central and northern North Sea and the Irish Sea. Predicted densities were low in the southern North Sea, Channel and central Irish Sea. This distribution compares well with that reported by Reid et al. (2003).
1.1.5 Range map	
	Range is based on the predicted distribution (1.1.1), actual sightings and expert judgement. The distribution map is based on predicted distribution up to a depth of 300m only, and does not capture the distribution of this species further offshore. Only CODA data (CODA, 2009) were available for mapping this species distribution in offshore waters during the reporting period. However, long-term data sets summarised by Reid et al. (2003) confirm the presence of this species beyond the continental shelf edge, particularly in areas of shallower offshore banks. The offshore area of the UK EEZ is therefore considered part of this species range.

2.1 Biogeographical region & marine regions	**MATL**
2.2 Published sources	**Andersen, L., Born, E., Dietz, R., Haug, T., Øien, N., & Bendixen, C. 2003. Genetic population structure of minke whales**

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2.3 Range	
2.3.1 Surface area Range	**1088567**
	The range is based on the distributional data for the reporting period (1.1.1) and expert judgement as to the likely boundaries of the species range. Sightings data suggest that use of different parts of the range changes with season and minke whales are most widespread in UK waters during summer. There may also be inter-annual variation in the southerly extent of the range during summer, depending on the distribution and abundance of food resources around the UK and further north. The surface area as depicted in the range map (1.1.5) represents the likely greatest extent of this species considering year-round distribution data.
2.3.2 Method used Surface area of Range	**Estimate based on partial data with some extrapolation and/or modelling**
	The range was based on a model prediction of the distribution of minke whales during mid-August 2010 (Paxton et al. in prep). A model was fitted to effort-related survey data comprising the Joint Cetacean Protocol (JCP) spanning 1994-2010 and with coverage within most of the UK EEZ, excluding waters beyond 300m depth. The best model was used to predict minke whale density on a gridded surface (resolution 5x5 sq km) at a variety of temporal and spatial scales. Sightings from the Cetacean Offshore Distribution and Abundance survey (CODA, 2009) were also mapped in ArcMap 10.1 together with the JCP predicted distribution, to provide additional data for UK waters deeper than 300m. These data sources were used to inform judgement about where this species regularly occurs and therefore determine range.

2.3.3 Short-term trend Period	**2001-2010**	
2.3.4 Short term trend Trend direction	**stable**	
	This is the first reporting period for which the UK has quantified the area of minke whale range and therefore trends cannot be assessed. The outputs of the JCP (Paxton et al, in prep) are insufficient to assess the trends in range of this species because it occurs both on and off the shelf. The JCP analysis did not cover offshore waters due to the scarcity/lack of data in offshore waters.	
2.3.5 Short-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
2.3.6 Long-term trend Period Optional	**1994-2010**	
2.3.7 Long-term trend Trend direction Optional	**stable**	
	This is the first reporting period for which the UK has quantified the area of minke whale range and therefore trends cannot be assessed. The outputs of the JCP (Paxton et al, in prep) are insufficient to assess the trends in range of this species because it occurs both on and off the shelf. The JCP analysis did not cover offshore waters due to the scarcity/lack of data in offshore waters. However, the range mapped in 1.1.5 compares well with the long-term distribution of sightings and inferred range in Reid et al. (2003) suggesting there has been no change and range is stable.	
2.3.8 Long-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
2.3.9 Favourable reference range	**a) Value in km²**	
	b) Operator for FRR	**approximately equal to**
	The FRR in UK waters is considered to approximately equal the current range for this species, as there has been no detected changes in range since 1994.	
	c) FRR is unknown (indicated by "true")	**False**

	d) Method used to set FRR	**Based on best expert judgement, the current range has all significant ecological variations of the species included for a given biogeographical region, and is sufficiently large to be considered suitable for the survival of the species for the foreseeable future. The current range of minke whale includes all of the UK's continental shelf and there appears to have been no change in range since 1994 (Reid et al. 2003).**
2.3.10 Reason for change Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to…	**a) Genuine change?**	**False**
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.4 Population		
2.4.1 Population size estimation (using individuals or agreed exceptions where possible)	**a) Unit**	**number of individuals**
	b) Minimum	**6819**
	c) Maximum	**36711**
2.4.2 Population size estimation (using population unit other than individuals) Optional *(if 2.4.1 filled in)*	**a) Unit**	
	b) Minimum	
	c) Maximum	
2.4.3 Additional information on population estimates / conversion Optional	**a) Definition of "locality"**	
	b) Method to	

	convert data	
	c) Problems encountered to provide population size estimation	
2.4.4 Year or period	**2005-2007**	
	The estimates of minimum and maximum population size are based on stratified abundance estimates from the SCANS-II surveys in July 2005 and CODA surveys in July 2007.	
2.4.5 Method used Population size	**Estimate based on partial data with some extrapolation and/or modelling**	
	Survey blocks from the SCANS-II continental shelf survey of July 2005 (SCANS-II, 2008) and adjoining offshore blocks from the CODA survey in July 2007 (CODA, 2009) were mapped in ArcMap 10.1. The estimated minke whale range (2.3.2) was mapped on top and the areas of each of the survey blocks within the range were measured. Any areas of range not covered by a SCANS-II or CODA block were assigned to an appropriate adjoining block. The density estimates per block were used to derive abundance for each portion of the block within the minke whale range (area of block within the range multiplied by the estimate of density). All the abundance estimates for each block were summed to give a total abundance throughout the entire UK EEZ. The associated CV and 95% confidence intervals were calculated; the lower and upper 95% confidence interval abundance estimates are presented as the minimum and maximum population sizes.	
2.4.6 Short-term trend Period	**2001-2010**	
2.4.7 Short-term trend Trend direction	**unknown**	
	The Joint Cetacean Protocol Phase III analyses assessed trends in the abundance of minke whale (Paxton et al. in prep). However, the geographic area over which trends are assessed do not include important areas of this species range and population, which is beyond the shelf edge. Therefore detected changes in abundance on the shelf would not necessarily reflect changes throughout its range. Detected changes on the shelf might be an artefact of redistribution of animals to other areas of its range (offshore or animals remaining further north) which were not included in the analysis. For these reasons, the trends in abundance reported by Paxton et al. (in prep) for this species are not robust for assessment as they do not capture its entire UK range or necessarily reflect the population. Therefore we conclude that trend in the short-term in unknown.	
2.4.8 Short-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	

	c) Confidence interval	
2.4.9 Short-term trend Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
2.4.10 Long-term trend – Period Optional	**1994-2010**	
2.4.11 Long-term trend Trend direction Optional	**stable**	
	Paxton et al. (in prep) reports a statistically significant decline at the 5% level of minke whales in the truncated EEZ area (EEZ up to 300m depth). On average abundance declined by 9% per annum. However, the confidence intervals surrounding this estimate are wide (1 - 16%). Caution is also needed, because this analysis looks at trends in abundance primarily on the continental shelf and it is known that minke whales also occur beyond the shelf edge (e.g. Reid et al. 2003, CODA 2009). Whilst trends in abundance may be real they may also be an artefact of much wider dispersion of minke whales to offshore waters and/or outside UK waters. There is no statistically significant difference in the abundance of minke whales estimated in 1994 and 2005 in a comparable area from the SCANS and SCANS-II surveys (Hammond et al. 2002; Hammond et al. in press). The variability in minke whale abundance from different parts of its North Atlantic summer range is well documented; for example in the North Sea alone, estimates of abundance include: 5 429 (CV= 0.34) in 1989; 7 250 (CV=0.21) in 1994; 20 294 (CV=0.26) in 1995; 11 713 (CV=0.29) in 1998; 6 246 (CV=0.48) in 2004 (Schweder et al., 1997; Hammond et al., 2002; Skaug et al., 2004; Bøthun et al., 2009). The IUCN assessment of North Atlantic minke whales is that the population is stable (IUCN Red List).	
2.4.12 Long-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
2.4.13 Long term trend	**Estimate based on partial data with some extrapolation and/or**	

Method used Optional	**modelling**	
2.4.14 Favourable reference population	**a) Number of individuals/agreed exceptions/other units**	
	b) Operator	**approximately equal to**
	c) FRP is unknown (indicated by "true")	**False**
	d) Method used to set FRP	**Historically, minke whales have been heavily exploited in the North Atlantic, especially in the years between 1952-1983. Therefore, current abundance of minke whales is likely to be less than it was at the mid-20th Century, although historical abundance is unknown. However, compared to a more recent reference point (the 1994 SCANS estimate), the current abundance is approximately equal to it. The current estimate of abundance in it's UK range is based on estimates from the 2005 SCANS-II survey (SCANS-II, 2008) and the 2007 CODA survey (CODA, 2009). The point estimate is 15,822 individuals (CV=0.45). The total abundance estimate for European Atlantic continental shelf waters (in an area extending from the Northern Isles south to Gulf of Gibraltar) was estimated at 18,958 (CV=0.35) minke whales, with the highest densities occurring in the waters of northern Scotland and the Shetland Islands (Hammond et al. in press). Although there is some evidence of a decline since 1994 in the abundance of minke whales in the truncated UK EEZ from the JCP analysis (waters up to 300m deep)(Paxton et al. in prep), the SCANS surveys (1994 and 2005) do not support this. They found no statistically significant difference between the minke whale abundance estimates from the two surveys in a comparable area; however, this was based on only two estimates and the power to detect anything but major changes was very low (Hammond et al. in press). The minke whales occurring around the UK are part of a much larger population and the abundance of this**

		species in many regions of its North Atlantic range, including the UK, is extremely variable from one-year to the next. The central North Sea and waters west of Scotland and Ireland are at the southern limit of this species summer range and their presence in this area may be expected to vary depending of the availability of prey in that area and further north (Hammond et al. 2011). For example, in the North Sea there are many estimates of abundance which highlight this variabiity: 5 429 (CV= 0.34) in 1989; 7 250 (CV=0.21) in 1994; 20 294 (CV=0.26) in 1995; 11 713 (CV=0.29) in 1998; 6 246 (CV=0.48) in 2004 (Hammond et al., 2002; Schweder et al., 1993; Skaug et al., 2004; Bøthun et al., 2009). The International Whaling Commission is undertaking a compilation and review of abundance estimates of minke whale populations which is expected to be completed by mid-2013. The International Whaling Commission defined 4 broad North Atlantic management areas for minke whales in 1977 (Donovan, 1991): East Canada,West Greenland, Central (East Greenland, Iceland and Jan Mayen)and Northeast (North Sea, Vesterålen/Lofoten, Barents Sea and Svalbard). These were later further subdivided into the "IWC Small Areas" but neither necessarily represent population structure as boundaries relate to feeding rather than breeding grounds. In the North Atlantic, morphological differences, supported by isozyme studies of genetic variation, suggest the existence of three distinct geographical populations of minke whales: West Greenland, Iceland and Norwegian (Christensen et al., 1990). Anderson et al (2003) proposed the existence of four sub-populations based on the analysis of microsatellite DNA: West Greenland, Central (East Greenland and Jan Mayen), Northeast (Svalbard, Barents Sea and Vesterålen/Lofoten) and Norwegian North Sea. Contrary to this, Anderwald et al (2012a) found no evidence for geographic structuring at the feeding grounds, but through an analysis of individual genotypes of animals sampled from the North Atlantic feeding grounds, suggested two cryptic breeding stocks. The findings imply very broad-scale

		seasonal movements with minke whales being widely distributed across the North Atlantic seasonally, but then segregating to some extent to at least two breeding grounds. However, the current widely accepted view within the International Whaling Commission is that the Northeast Atlantic minke whales are a single population (Hammond, pers. comm).
2.4.15 Reason for change Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	**a) Genuine change?**	**False**
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.5 Habitat for the species		
2.5.1 Area estimation	**1088567**	
	The suitable habitat for this species is assumed to be equivalent to its range in the current reporting period. However, parts of the range are used preferentially and seasonal movements mean that the continental shelf is utilised most extensively during the summer (Reid et al. 2003).	
2.5.2 Year or period	**2007-2010**	
2.5.3 Method used Habitat for the species	**Estimate based on partial data with some extrapolation and/or modelling**	
2.5.4 Quality of the habitat	**a) Habitat quality**	**Unknown**
	Cetacean habitats (e.g. feeding and breeding areas) vary temporally and spatially and are influenced by natural and anthropogenic factors (e.g. Ingram et al., 2007; MacLeod et al., 2007; Weir et al., 2007). It is often difficult to determine what features characterise cetacean habitats and in quantifying their extent. *Balaenoptera acutorostrata* is extensively distributed in northern hemisphere temperate and polar seas. In European waters, it occurs mainly on the continental shelf (Reid et al. 2003) but also offshore. It is often sighted close to land, where it sometimes enters estuaries, bays or inlets, and often feeds in areas of upwelling or strong currents around headlands and small islands (Evans et al., 2003; Reid et al., 2003; Evans, 2008; Anderwald et al. 2012). These areas, such as the Moray Firth, Scotland, where the Dooley	

	Current interacts with warm water plumes, stimulate greater phytoplankton biomass and associated higher primary productivity. This in turn brings an increase in availability of sandeel, one of the main prey species of minke whale in the North Atlantic (Tetley, 2004; Tetley et al., 2008). A correlation between gravel/sand mixtures and sandy seabed sediments and minke whale presence during spring and summer in the North Atlantic was linked to prey, in particular sandeels which seek refuge in these substrate types during this period. These habitats were also associated with steep slopes and shallow depths (Naud et al., 2003; Macleod et al., 2004; Tetley, 2004). Changes in prey availability may also lead to shifts in minke whale distribution. Off the west of Scotland, small scale shifts in minke distribution between spring and late summer/autumn were thought to correlate with a shift from feeding on sandeel to herring (Macleod et al., 2004) or sprat (Anderwald et al. 2012). Along the coast of Newfoundland seasonal patterns of abundance are significantly correlated with capelin abundance, with increased sightings during June and July (Piatt et al., 1989). Feeding habits and migratory behaviour of northeast Atlantic minke whales is likely to have changed as a consequence of collapse of Norwegian herring and Barents Sea capelin stocks between the 1970s and 1980s (Haug et al., 1995; Olsen and Host, 2001). The minke whale is widely distributed during summer in the North Atlantic but highest densities tend to occur on traditional feeding areas off Newfoundland-Labrador, West and Southeast Greenland, around Iceland, off Svalbard and in the Barents Sea, Western Norway and in the North Sea. These areas differ substantially with respect to oceanography, water temperature and ice cover, supporting the theory that minke whale distribution is mainly influenced by prey availability (Andersen et al., 2003; Born et al., 2003). During the winter, minke whales are mostly absent from coastal areas of the North Atlantic, and do not appear to feed during breeding (December to May) and calving (October to March), although evidence of this is limited. Minke whales tend to winter between about 11° and 45°N latitude (Born et al., 2003).	
	b) Assessment method	**Minke whale distribution is driven by that of their prey and they are able to switch prey preference depending on availability. In turn, the prey distribution is influenced by a suite of dynamic factors, such as chlorophyll concentration and sea surface temperature (e.g. Anderwald et al. 2012), which make it difficult to quantify the 'area' of habitat.**
2.5.5 Short-term trend Period	**2001-2012**	
2.5.6 Short-term trend Trend direction	**unknown**	
2.5.7 Long-term trend Period Optional	**1988-2012**	
2.5.8 Long-term trend Trend direction Optional	**unknown**	

2.5.9 Area of suitable habitat for the species	**a) Value in km²**	
	b) Absence of data indicated as '0'	
2.5.10 Reason for change Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to	**a) Genuine change?**	**False**
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.6 Main pressures		
a) Pressure	**b) Ranking**	**c) Pollution qualifier**
	H = high importance (max 5 entries) M = medium importance L = low importance	
F02: Fishing and harvesting aquatic resources	H	
XO: Threats and pressures from outside the Member State	H	
D03: shipping lanes, ports, marine constructions	M	
H03: Marine water pollution	M	X

Between 1991-2010, 43 post mortem examinations were undertaken on minke whales. The main causes of death were live stranding (16%), starvation (14%), entanglement (7%) and physical traumas from ship strike (2%). In 2011, 2 post mortem examinations were undertaken. While one result is still pending, the other shows the cause of death to be entanglement (Deaville, 2011). The cause of death of one of the two animals stranded in 2012 was live stranding (Deaville, 2012).

In the UK, entanglement is largely confined to minke whales and they are most commonly caught in mooring rope and creel lines or other discarded fishing gear and marine litter (Pierce et al., 2004; Deaville and Jepson, 2011). In Scottish waters, about half of the individuals stranded appear to have died as a consequence of entanglement, and this number is very likely to be under reported as not all affected animals will die or wash ashore (Northridge et al., 2010). In other fisheries worldwide, minke whale entanglements are associated with gill nets, bottom trawls, purse seines and trawls (Song et al., 2010). Collisions are also an important problem, as minke whales are the fifth species most frequently hit by vessels worldwide (Jensen and Silber, 2004; Vanderlaan and Taggart, 2007), including whale-watching boats (Dolman et al., 2006).

A variety of pollutants are also known to accumulate in minke whales via their diet (Aono et al. 1997;

Klevaine and Skaare, 1998; Hobbs et al. 2003). In the northeast Atlantic, samples from 72 minke whales taken in summer 1992 showed the three major contaminants to be PCB, DDT and chlordanes. The highest levels were found in mature males as compared to mature females and juveniles of both sexes. The range of concentrations was 0.6–20.8 and 0.5–14.8 μg g-1 lipid weight for total PCB and DDT, respectively. A more recent study by Hobbs et al. (2003) reported levels of PCBs and organochlorane pesticides in the blubber of minke whales in 7 regions within the North Atlantic and European Arctic. The range of concentrations of total PCBs, DDT and CHL were 0.89-22 8 μg/g lipid; 0.65-62.8 μg/g lipid; and 0.33-21.10 μg/g, respectively. Kannan et al. (2000) reported a threshold value for PCBs in cetaceans at 8.7 μg/g lipid weight in blubber for the onset of toxic effects. Hobbs et al (2003) also found a general increase in the major organochlorine groups (PCBs, DDT and chlordanes) from west to east. HCHs (hexachlorocyclohexane) showed the opposite trend.
The Northeast Atlantic minke whale population has been reduced by whaling, especially in the years between 1952-1983. After the 1985 moratorium on commercial whaling, catches of this species in the North Atlantic were initially phased out, but later resumed at a lower level in 1993. Norway and Iceland, both whaling under objection to the moratorium, set there own national catch limits; 533 and 58 minke whales were taken in the 2011/12 season by Norway and Iceland, respectively. Greenland is also awarded a quota for aboriginal subsistence whaling of minke whales. The annual 'strike limit' for the east and west minke whale stocks combined is 190 for 2010-12.

2.6.1 Method used – Pressures	**mainly based on expert judgement and other data**
	Pressure ranking for *Balaenoptera acutorostrata* is mainly based on expert opinion, published literature and data from post mortem of stranded animals, which indicate sources of mortality for this species.

2.7 Threats

a) Threat	b) Ranking	c) Pollution qualifier
	H = high importance (max 5 entries) M = medium importance L = low importance	
F02: Fishing and harvesting aquatic resources	H	
XE: Threats and pressures from outside the EU territory	H	
D03: shipping lanes, ports, marine constructions	M	
H03: Marine water pollution	M	X
M01: Changes in abiotic conditions	M	
M02: Changes in biotic conditions	M	

The pressures identified are expected to continue in the longer term. New threats from climate change are expected and the impacts, whilst largely unknown, are expected to be mediated through changes in prey distribution and abundance (Simmonds and Isaac, 2007). Climate change (changes in biotic and abiotic effects) has been ranked as Medium because the effects will be indirect. MacLeod (2009) concluded that

climate change is likely to have little/no impact on the range of the northern minke whale as it is a cosmopolitan species and occurs in all water temperatures from ice-edge to tropical waters. Lambert (2012) predicts a northward contraction in range of the minke whale from the current (2000-2008) compared with the prediction for 2040-2049. However, the model predicts future reduction in range primarily from the Bay of Biscay and western Channel whilst the majority of the UK range remains the same.	
2.7.1 Method used – Threats	**expert opinion**

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions *(assessment of conservation status at end of reporting period)*		
2.9.1 Range	**a) Conclusion**	**Favourable**
	The analysis of range (2.3.4 and 2.3.7) shows that there has been no significant change since 1994. Therefore, the assessment for this parameter is Favourable.	
	b) Qualifier	
2.9.2 Population	**a) Conclusion**	**Favourable**
	An abundance of 15,822 minke whales (CV=0.45) has been estimated within the UK range (1.1.5) based on surveys in July 2005 and 2007. This is the first reporting period to report a UK abundance estimate and given there is no robust evidence of a decline since 1994, is therefore considered to approximate the FRV. There is a great deal of inter-annual variability in the abundance of this species. Whilst analyses of the JCP data (Paxton et al. in prep) suggest a long-term decline of this species since 1994, the trend is not apparent in the short-term 2001-2010. Point estimates of abundance from the SCANS surveys of 1994 and 2005 are also not significantly different and does not support a population decline. It is widely accepted that there is a single population of minke whales in the northeast Atlantic; contrary to this, a recent study suggested that whilst there was no evidence of geographical structuring on the feeding grounds, there was weak evidence of a segregation at the breeding grounds into at least 2 subpopulations which formed mixed assemblages on the feeding ground (Anderwald et al. 2012). Further studies are needed to investigate this. However, the overall conclusion for this parameter is Favourable.	
	b) Qualifier	

2.9.3 Habitat for the species	**a) Conclusion**	**Favourable**
	In the absence of habitat data, the UK has taken the approach of assuming a link between habitat and range and therefore the assessment of habitat follows that of range. Therefore, the assessment for this parameter is Favourable.	
	b) Qualifier	
2.9.4 Future prospects	**a) Conclusion**	**Favourable**
	Following the Commission guidance, the assessment for future prospects is considered Favourable. All parameters are considered good for this species.	
	b) Qualifier	
2.9.5 Overall assessment of Conservation Status	**Favourable**	
	Conservation measures have been undertaken in the UK and adjacent waters, to protect, survey and monitor marine mammal abundance, health and distribution as part of the requirements of the Habitats Directive. It is important to stress that many human activities that have the potential to affect the assessed species are already regulated with the conservation of marine mammals and other wildlife in mind. Assuming that these measures are maintained and further measures are taken, should other pressures emerge or existing pressures change, then the future prospects for cetacean species in UK waters should be favourable. Monitoring of pressures and the effectiveness of mitigation measures is essential and this is underway for major pressures (e.g. bycatch, noise from seismic, pollution). However the effects of lesser understood impacts are hard to predict. Many cetaceans occurring in UK waters will also use waters of other Member States and those of non-Members, so coordination of conservation measures through, for instance ASCOBANS (Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas) is essential to avoid activities in other waters affecting the animals occurring in UK waters. The Habitats Directive is being implemented by identifying and protecting appropriate sites and monitoring bycatch. The UK government funds a national strandings scheme which aims to provide a coordinated approach to the investigation of cetacean strandings in order to assess the number and trends of stranded cetaceans, and potential causes of death. To further implement the directive, a surveillance strategy for cetaceans is being developed linking to the Joint Cetacean Protocol which ultimately aims to enable transboundary approaches to evaluating the conservation status of cetaceans. The JCP Phase III analysis has proved the value of the approach in enabling assessment of range and trends over the short and long-term in the UK EEZ for the first time. Ultimately, the JCP will broaden its data providers to other European Member States. This is reliant on data contributions from European Member States and will be progressed in 2013. An update of the Atlas of cetacean distribution in north-west European waters, published by Joint Nature Conservation Committee (JNCC) in	

	2003, will result from this project in 2014. In 2005, the UK was a major supporter of the EU LIFE Nature project SCANS-II which completed a survey for cetaceans in the European Atlantic continental shelf to generate precise estimates of abundance, primarily for the purposes of assessing cetacean bycatch. In 2007, the Cetacean Offshore Distribution and Abundance (CODA) project conducted surveys in European Atlantic offshore waters and estimated abundance of cetaceans and investigated habitat preferences in European Atlantic offshore waters. The UK Department of Energy and Climate Change (DECC, formerli DTI) has provided funding to initiate plans for the third SCANS survey, scheduled for July 2015/16. Any adverse interactions between fisheries and cetaceans may be detected through the UK's bycatch monitoring and stranding schemes. For minke whales, evidence of fisheries interactions mainly comes from the strandings scheme; between 1991-2010, entanglement was the cause of death for 7% of stranded minke whales. They are particularly susceptible to entanglement in mooring rope and creel lines or other discarded fishing gear and marine litter (Pierce et al., 2004; Deaville and Jepson, 2011). In Scotland the problem is more acute, with entanglement accounting for about half of the animals stranded, primarily in creels (Northridge et al. 2010). Scottish Government contracted Northridge et al. (2010) to undertake a study of the issue. The authors developed a 'risk of entanglement measure' (REM) that essentially provides a high value when both whales and creels are abundant and lower values where the overlap in distribution is least pronounced. The highest REMs were around the Hebrides, Skye, and also along the coasts of Angus, Fife and Orkney. Currently, entanglement does not appear to pose a conservation threat to this species (Northridge et al. 2010) and no immediate mitigation is needed. However, monitoring of the issue, primarily through the strandings scheme, will continue as a commitment to meeting the requirements of the Habitats Directive. Also in relation to bycatch, the UK is implementing the European Council Regulation EC 812/2004, which lays down measures concerning incidental catches of cetaceans in fisheries, and more generally the bycatch obligations within the Habitats Directive. A dedicated monitoring scheme is operated by the SMRU, while collaborative links with the three fishery research laboratories in the UK also allow selected observations from the Discard Sampling Programmes to be included in assessments of cetacean bycatch. Data from discard surveys conducted by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Marine Science Scotland (MSS) and the Agri-Food and Biosciences Institute of Northern Ireland (AFBINI) are used with discretion because discard sampling is not always compatible with protected species monitoring. The UK observer monitoring programme is also designed to fulfil the UK's obligations under Article 12 of the Habitats Directive. Currently, monitoring is focussed on gillnet fisheries off the southwest and some effort in the southern North Sea. Previous monitoring of pelagic fisheries in the northern North Sea and West of Scotland showed that the bycatch was extremely low and that observer effort would be better used in other fisheries where bycatch suspected. No minke whales have been recorded as bycaught through the monitoring scheme. The main species bycaught are harbour porpoise, common dolphin and grey seals. However, successful trials of the DDD-type pinger in 2009-

	2011 in the southwest, has led to the industry being supplied with sufficient devices to equip all vessels in the local fleet. Monitoring of vessels using pingers is being continued under the heading of scientific studies as required by Regulation 812/2004 (Kingston and Northridge 2011). The UK's Marine Management Organisation and the Marine Scotland Compliance Enforcement Unit are currently investigating the development of pinger detection units that may be used to determine compliance. No specific enforcement programme is yet underway, but this is expected during 2013. Concern regarding the impact of anthropogenically derived sound on marine mammals has been rising in recent decades. The range of sources of anthropogenic noise in the marine environment is many and varied. Some activities, e.g. shipping and other motorised vessels, use of explosives, drilling, dredging and construction, all produce noise indirectly. Other sources, such as active sonars operating at a variety of frequencies, air guns and boomers used in seismic surveys, pingers and acoustic harassment devices, are sources of deliberately introduced sound in the marine environment. The impact of this noise varies from nil (or attraction, e.g. bow riding) to severe depending on the type, frequency and duration of the noise, as well as the relation to the species of concern. Noise can be tolerated, with normal activity patterns being maintained and evidence of no overt response being observed (Würsig & Richardson 2009). Oil and gas exploration and production generates a variety of noise, including initial geophysical surveys (using seismic methodologies), rig construction and drilling, and, finally, structure removal. Of greatest concern is the noise associated with the seismic surveys which use airguns to generate low frequency sound. The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 implements the EU Habitats Directive for all oil and gas activities within the UKCS. As part of these regulations any company wishing to carry out a seismic survey must apply for consent from the DECC, the JNCC are consulted on whether consent should be granted for each individual seismic survey and if a consent is granted, a standard condition is that the operator must follow the JNCC guidelines for minimising the risk to marine mammals during seismic surveys (JNCC, 2010). The guidelines advise on conducting marine mammal observations prior to and during seismic activity and utilizing procedures such as soft start (gradually increasing the number of active airguns to allow animals nearby to move away) to reduce and avoid direct harm to animals. Over the years, most recently in 2010, these guidelines have been reviewed and revised in the light of scientific evidence, technical developments and operational understanding. A recent review of the marine mammal observer data collected during 1995-2010 (Stone, in prep.) has demonstrated the effectiveness of soft start approach, which is a key component of the guidelines. The review also includes an analysis of the responses of marine mammals to airguns. Sighting rates of minke whales were significantly reduced, fast swimming was more prevalent and frequent changes in course were evident when larger airgun arrays (500 cubic inches) were firing. There was no response to smaller airgun arrays. This review will be published in 2013. The main concern with aggregate extraction is noise generation during survey work. Non-intrusive studies utilise shallow seismic surveys with boomers, which are considerably quieter than the deep seismic surveys undertaken by the oil and gas industry. Currently, consideration is being

	given to the possible impact of aggregate extraction works on cetaceans with a view to guidelines being developed for UK waters. However, by comparison to other anthropogenic sound in the marine environment, aggregate extraction is not considered to be a major threat at this time. Marine renewable energy generation is a rapidly evolving industry, with some developments amongst the largest offshore engineering projects ever undertaken. The marine renewables industry encompasses three major sectors: offshore wind, tidal-stream and wave energy. The ICES Working Group on Marine Mammal Ecology (WGMME) assessed the effects of construction and operation of windfarms (ICES WGMME 2010), tidal devices (ICES WGMME 2011) and wave energy converters (ICES WGMME 2012) on marine mammals, work that was synthesised by Murphy et al. (2012a). To date, pile driving constitutes the single most important type of impact. In the UK, operators are required to follow the JNCC guidelines for pile driving (JNCC, 2010a). With the amendments to the Habitats Regulations for England and Wales and the new Offshore Marine Regulations in 2007 (and subsequent amendments in 2010), the offences relating to the protection of European Protected Species (EPS) were revised. EPS are species listed on Annex IV. In the territorial waters of Scotland and Northern Ireland, the offence of intentional or reckless disturbance has been incorporated together with the deliberate injury and disturbance regulations. In England and Wales, this offence is covered by the Wildlife and Countryside Act 1981 (as amended). The JNCC, Natural England and the Countryside Council for Wales have provided advice on interpreting these regulations from the point of view of nature conservation. Guidance was developed for those carrying out activities in the marine environment, to help determine the likelihood of committing an offence, how this can be avoided, and, as a last resort, whether the activity could go ahead under licence. In addition, good practice guidelines and protocols were developed for specific activities (pile driving, seismic surveys and use of explosives) to minimise the risk of injury and reduce disturbance to cetaceans. With respect to the consequence of certain developments, if the activities involved are not likely to be detrimental to the Favourable Conservation Status of a population but an EPS could still be harmed (injured or significantly disturbed), then the applicant should apply for a licence from the relevant regulator to undertake these activities should mitigation or alternative solutions not be viable. Currently, a draft version of these guidelines are being used by industry until they formally receive Cabinet clearance. Similar guidelines, 'The Protection of marine European Protected Species from Injury and Disturbance' were drafted in 2012 for Scottish Inshore Waters. The impact of military activity and, in particular, use of low- and mid-frequency active sonar of high-intensity has become a major issue in recent years. The UK Ministry of Defence (MOD) has developed a number of measures to address the potential impact of military sonar and noise in the marine environment. The Royal Navy uses a range of measures to mitigate potential impacts on marine mammals including "soft starts" (the gradually progressive ramping up of active sonar source levels to allow animals to move away from the vessel conducting the exercise), use of trained marine mammal observers and reduction of sonar source levels when cetaceans are sighted close to a vessel operating sonar transmissions (data: UK MoD, cited in Jepson et al.

	2013). They also require, where ever practicable, naval helicopters and fixed-wing aircraft to maintain a 500m minimum flight altitude if any cetaceans are seen on the surface (data: UK MoD, cited in Jepson et al. 2013). They have also developed a real-time alert procedure for naval training operations. This enables local information on unusual cetacean sightings, such as the presence of a species group closer to shore than usual, to be incorporated into the training schedule and for operations to be relocated if necessary. This was successfully implemented in April 2009, in relation to the presence of short-beaked common dolphin in the Falmouth Bay area. Over 20 dolphins were seen 15 minutes after Royal Navy sonar trials started. The Royal Navy immediately modified the exercise until the group of dolphins had returned to open water several hours later. Subsequently, the real-time alert procedure has not had to be used, indicating the rarity of such events (naval training operations take place for 42 weeks of the year in this area).The rarity of cetacean MSEs in the vicinity of naval exercise areas suggests that such measures are effective. However, this may be dependent on other factors which may contribute to a MSE. The UKs statutory Nature Conservation bodies maintain an open dialogue with the MOD through, for example, their participation on the steering group for the UKs Cetacean Stranding Investigation Programme. There is ongoing revision and improvement of mitigation strategies by the military themselves and this is probably the best way to limit future impacts. As a response to the 1992 Convention on Biological Diversity the UK has developed biodiversity action plans (BAP) for all cetacean species. The long term goal of these plans is to increase the range and number of cetaceans in UK waters, ultimately via reducing anthropogenic mortalities and impacts. The UK has been committed to supporting several international agreements and conventions on the conservation of marine mammals and the marine environment in general (e.g. ASCOBANS, The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)). The UK's position within the International Whaling Commission (IWC) has been, amongst others, to support the moratorium on commercial whaling, to work towards placing the issue of environmental threats to cetaceans permanently on the IWC agenda and to ensure that international trade in whale products is prohibited.
2.9.6 Overall trend in Conservation Status	

3 Natura 2000 coverage & conservation measures - Annex II species
(only applies to species listed under Annex II of the Directive)

3.1 Population		
3.1.1 Population size Estimation of population size included in the SAC network	**a) Unit**	

	b) Minimum	
	c) Maximum	
3.1.2 Method used		
3.1.3 Trend of population size within the network (short-term trend) Optional		

3.2 Conservation measures
Conservation measures taken (i.e. already being implemented) within the reporting period and provided information about their importance, location and evaluation.

3.2.1 Measure	**3.2.2 Type**					**3.2.3 Ranking** H = high importance M = medium importance L = low importance	**3.2.4 Location** where the measure is PRIMARILY applied			**3.2.5 Broad evaluation of the measure**					
	a) Legal/statutory	**b) Administrative**	**c) Contractual**	**d) Recurrent**	**e) One-off**		**a) Inside**	**b) Outside**	**c) Both inside & outside**	**a) Maintain**	**b) Enhance**	**c) Long term**	**d) No effect**	**e) Unknown**	**f) Not evaluated**