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

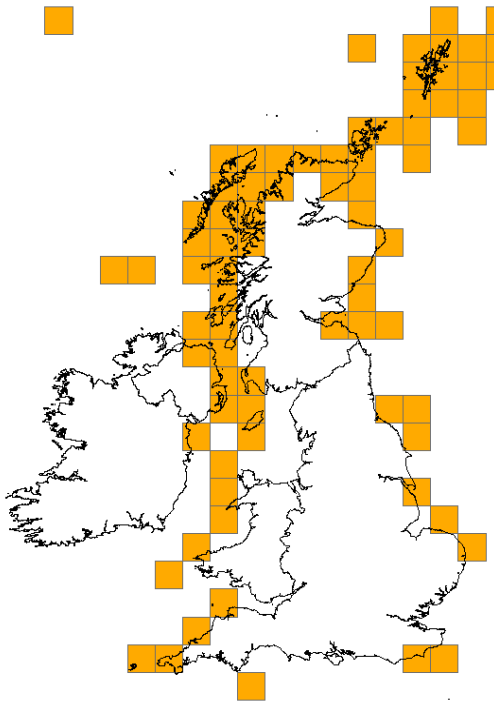
on the implementation of the Directive
from January 2007 to December 2012
Conservation status assessment for

Species:

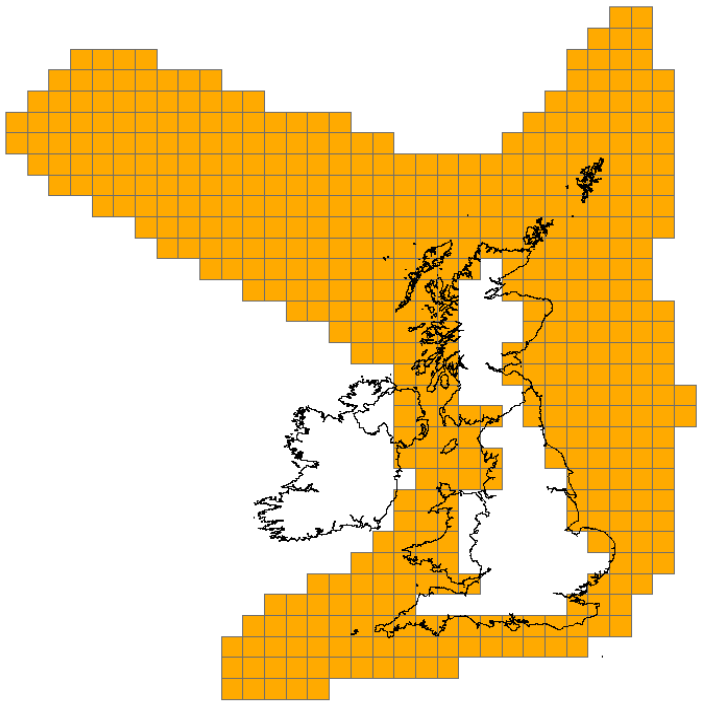
S2027 - Killer whale (*Orcinus orca*)

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**	**S2027**
	0.2.2 Species scientific name	***Orcinus orca***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**
	This species occurs in deep waters beyond the edge of the continental shelf as well as in coastal waters (Weir et al., 2001; Reid et al., 2003). In UK waters, sightings are regular off the Northern Isles, Hebrides and mainland Scotland (more so on the west) (Bolt et al., 2009), less common west and south of Ireland and rare in the central and southern North Sea, Irish Sea, and English Channel. UK sightings are recorded in all months, but most coastal sightings occur between May-September		

	(Evans, 2003; Reid et al., 2003; Evans, 2008). Around Shetland sightings peak during June-July which coincides with harbour seal pupping (Bolt et al., 2009); pups being a known prey of killer whales in this region. Pods of up to 20 individuals have been recorded during opportunistic sightings around Shetland, Orkney, Hebrides and mainland Scotland. Although sightings are regular, strandings do not occur every year on UK shores (Jepson, 2005). Between 2005-2010, 5 killer whales were found stranded, 4 in Scotland and 1 in England (Deaville and Jepson, 2011). No strandings occurred in 2011 (Deaville, 2011), whilst one individual had been recorded stranded (Scotland) during 2012 (Deaville, 2012).

1.1.2 Method used - map	**Estimate based on partial data with some extrapolation and/or modelling**
	A national sightings database is collated by the SeaWatch Foundation. This includes opportunistic sightings at sea and on land by a large number of, mainly amateur, observers, together with some effort related data. Sightings held within the SeaWatch foundation database for the 2007-2012 reporting period were mapped; there were 651 sightings within the reporting period. Additionally, a few sightings held in the Joint Cetacean Protocol (JCP) were also used. All sightings were converted to presence in 50x50km grid cells to represent distribution over the period.
1.1.3 Year or period	**2006-2012**
	Data were collated for the current reporting period 2007-2012.
1.1.4 Additional distribution map Optional	**False**
1.1.5 Range map	

	Range is based on the distribution data available for the map (1.1.2) and expert judgement. There are records of this species off all coasts of the UK; records further offshore are less common but this is likely due to the limited survey effort in these waters. Therefore, it is expected that killer whales range throughout UK waters, albeit they are more common further north off the coasts of Scotland and in particular around the Northern Isles.

2.1 Biogeographical region & marine regions	**MATL**
2.2 Published sources	**Beck, S., Kuningas, S., Esteban-Pavo, R. and Foote, A.D. 2011. The influence of ecology on sociality in the killer whale (Orcinus orca). Behavioral Ecology doi: 10.1093/beheco/arr151** **Bolt, H.E., Harvey, P. V., Mandleber, L. and Foote, A. D. 2009. Occurrence of killer whales in Scottish inshore waters: temporal and spatial patterns relative to the distribution of declining harbour seal populations. Aquatic Conserv: Mar. Freshw. Ecosyst. 19: 671–675.** **Couperus, A.S. 1993. Killer whales and pilot whales near trawlers east of Shetland. Sula 7: 41-52.** **Deaville, R. and Jepson, P.D. 2011. Final report for the period 1st January 2005-31st December 2010. UK Cetacean Strandings Investigation Programme (CSIP).** **Deaville, R. 2011. Quarterly report for the period 1st October-30th December 2011. UK Cetacean Strandings Investigation Programme (CSIP).** **Deaville, R. 2012. Quarterly report for the period 1st April-30th June 2012. UK Cetacean Strandings Investigation Programme (CSIP).** **Deaville, R., Brownlow, A., Law, R., Loveridge, J., Patterson, T., Penrose, R., Perkins, M., Reid, R., Smith, B. and Jepson, P. D. 2012. Killer whale strandings in the UK 1913-2010. Abstract book from the North Atlantic Killer whale workshop. Galway, Ireland, 25th March 2012.** **de Stephanis, R., Comulier, T., Verborgh, P. et al. 2008. Summer spatial distribution of cetacean in the Strait of Gibraltar in relation to the oceanographic context. Marine Ecology Progress Series, 353, 275-288.** **Evans, P. G. H., Anderwald, P., and Baines, M. E. 2003. UK Cetacean Status Review. Report to English Nature and the Countryside Council for Wales.** **Evans, P. G. H., 2008. Whales, porpoises and dolphins Order Cetacea. In Harris, S. & Yalden, D.W. (eds) Mammals of the British Isles. Chapter 12, pp 655-779. The Mammal Society.**

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2.3 Range	
2.3.1 Surface area Range	**1088567**
	The range was based on the distributional data and expert judgement to determine where killer whales regularly occur. Killer whales have been sighted throughout the UK EEZ and therefore this was chosen as the current surface area of their range. However, it is recognised that use of the southern part of the range is less than the west and north of the proposed range.
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 the distributional data (2007-2012) and expert judgement to determine where killer whales regularly occur. Distribution was mapped on 50x50km grid cells together with actual sightings (651). Killer whales are more common on the north and west; sightings are infrequent in the southern North Sea and English Channel. However, as these animals are likely part of the same populations

	identified in UK waters it was decided to include these less frequently used areas into the range.	
2.3.3 Short-term trend Period	**2001-2012**	
2.3.4 Short term trend Trend direction	**unknown**	
2.3.5 Short-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
2.3.6 Long-term trend Period Optional	**1988-2012**	
2.3.7 Long-term trend Trend direction Optional	**unknown**	
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 approximates the UK range. However, the UK range is only part of a much wider-range. The distinct population around the Hebrides on the west of Scotland has also been identified in Irish waters (e.g. Whooley, 2012). Similarly, the Northern Isles and Northern North Sea herring eating animals are known to be part of the Norwegian and Icelandic populations.	
	c) FRR is unknown (indicated by "true")	**False**
	d) Method used to set FRR	**Based on expert judgement, the current range for killer whales in UK waters 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. However, the range in UK waters is only a proportion of the total range of this species in the Marine Atlantic Biogeographical region and the required area is therefore greater than the UK range in isolation.
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	**50**
	c) Maximum	**100**
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	**1992-2008**	
	Represents the range of years over which photo-Identification studies have been carried out in the Hebrides, Northern Isles and Northern North Sea.	
2.4.5 Method used Population size	**Estimate based on partial data with some extrapolation and/or modelling**	
	Only numbers from photographically identified individuals can be used; there are no estimates of the wider ranging Northern North Sea animals in UK waters from the 2005 SCANS-II line transect survey. Although about 69 individuals have been photographically identified, this represents a minimum estimate. Due to these issues class 2 (50 – 100 individuals) from Table 3 of the Explanatory Notes & Guidelines for the period 2007-2012 has been used to report the minimum and maximum population size estimation.	
2.4.6 Short-term trend Period	**2001-2012**	
2.4.7 Short-term trend Trend direction	**unknown**	
2.4.8 Short-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	
	c) Confidence interval	
2.4.9 Short-term trend Method used	**Absent data**	
2.4.10 Long-term trend – Period Optional	**1988-2012**	
2.4.11 Long-term trend Trend direction Optional	**unknown**	
2.4.12 Long-term trend Magnitude Optional	**a) Minimum**	

	b) Maximum	
	c) Confidence interval	
2.4.13 Long term trend Method used Optional	**Absent data**	
2.4.14 Favourable reference population	**a) Number of individuals/agreed exceptions/other units**	
	b) Operator	
	c) FRP is unknown (indicated by "true")	**True**
	d) Method used to set FRP	**The population size of killer whales in the entire Northeast Atlantic is unknown, although there are regional estimates from a variety of sources. Foote et al. (2007) estimated abundance of killer whales in the areas surveyed by the North Atlantic Sightings Surveys (NASS) (mainly around Iceland, Faroes and Norway and limited effort in offshore waters west of the UK) in 1987, 1989, 1995 and 2001. Estimates varied considerably between years, but the most recent estimate for the NASS area in 2001 was 15,014 individuals (CV = 0.42). There was no analysis of trend due to the differences in areas surveyed each year rendering the abundance estimates incomparable. Killer whales in UK waters are part of this wider population with known movements of individuals between UK, Iceland and Norway (Foote et al. 2011). Forney and Wade (2007) described killer whales as abundant in Norwegian waters, common in Icelandic and Faroese waters, and uncommon to rare around the UK based on a literature review of surveys. In the UK, estimation of killer whale numbers primarily comes from photo-identification studies. The number of identified individuals is 10 from the Hebrides (from**

		years 1992, 1994–1995, 1998, 2000–2001. 2004–2005, 2007–2008), 38 from the Northern Isles and Caithness (NAKID project) and 21 from the North Sea (from years 2007–2008) (Foote et al 2010). There are shown to be 3 different populations (Foote et al. 2011). Herring eating individuals around the Northern Isles and North Sea are part of the same population and a much wider population of >200 individuals (Foote et al. 2010) but the 'numbers in the UK component' have not been fully established. The marine mammal specialists of the Northern Isles are a subset of the North Atlantic mackerel eating killer whales (Foote et al. 2010) and number about 50. The west coast of Scotland population (which ranges in Welsh and Irish waters) is a genetically distinct population of critically few individuals. No calves have been recorded with any of the individuals (Kötter et al., 2012); two adult females identified in 1992 have never calved. There are no data on the historical occurrence and abundance of this population but high historical mortality may have led to a decline and the current low numbers. This population is likely to continue to decline/has declined in the short-term; one adult male has not been photographed since 2001 (Kötter et al. 2012). In contrast to the killer whales around Northern Scotland and in the North Sea which are part of wider-ranging, relatively abundant populations, the long-term viability of the west coast population is of concern.
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**	
	In the absence of data to define habitat, the suitable habitat for this species is assumed to be equivalent to its range. It is known that killer whales are not evenly distributed throughout their range and certain geographic areas, and hence their habitats, are preferable. Habitat preferences are likely linked to prey preferences but given the temporally and spatially dynamic nature of the prey resource the exact habitat areas cannot be quantified.	
2.5.2 Year or period	**2007-2012**	
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. In the Northeast Atlantic, killer whales seasonally specialise on particular prey and these preferences are known drivers of movements, site fidelity and ultimately population structuring (Foote et al. 2010). The prey choices include Norwegian spring-spawning stock of Atlantic herring (*Clupea harengus*) (Simila and Ugarte, 1993; Simila et al., 1996; Simila, 1997), the Icelandic summer spawning stock of Atlantic herring (Sigurjonsson et al., 1988; Simon et al., 2007), the Northeast Atlantic mackerel (*Scomber scombrus*) stock (Luque et al., 2006; Foote et al., 2010) and the eastern stock of Atlantic blue fin tuna (*Thunnus thynnus*) (Guinet et al., 2007; de Stephanis et al., 2008). The waters north and west of the UK as well as the area of North Sea between Shetland and Norway are foraging grounds (Couperus, 1993; Fisher et al., 1998; Bolt et al., 2009). Killer whales around the UK appear to be two distinct populations (Foote et al., 2010). Killer whales seen around the Northern Isles specialise in feeding on grey (*Halychoeros grypus*) and harbour (*Phoca vitulina*) seals and occasionally eider ducks (*Somateria mollissima*) (Foote et al., 2010; Beck et al., 2011) but they are a subset of the wider northern North Sea population which is associated with Northeast Atlantic mackerel and herring (Foote et al., 2009; Foote et al., 2010).	
	b) Assessment method	**Prey distribution and availability is the main feature of interest in terms of assessing habitat quality. The published literature reports the prey preferences of Northern Isles and North Sea killer whales as both pelagic fish species and marine mammals. The waters north and west of the UK as well as the area of North Sea between Shetland and Norway**

		are foraging grounds for this species (Couperus, 1993; Fisher et al., 1998; Bolt et al., 2009). Killer whales seen around the Northern Isles specialise in feeding on grey (*Halychoeros grypus*) and harbour (*Phoca vitulina*) seals and occasionally eider ducks (*Somateria mollissima*) (Foote et al., 2010; Beck et al., 2011) but they are a subset of the wider northern North Sea population which is associated with Northeast Atlantic mackerel and herring (Foote et al., 2009; Foote et al., 2010). However, on the west coast, the distinct small population has likely declined and there may be features of the habitat which have contributed to this but are unknown.
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	
H03: Marine water pollution	H	X
F02: Fishing and harvesting aquatic resources	M	
D03: shipping lanes, ports, marine constructions	L	
G01: Outdoor sports and leisure activities, recreational activities	L	

The main causes of death of the five stranded killer whales in the UK between 1991-2005 were starvation (40%), infectious disease (20%) and live stranding (20%) (Deaville and Jepson, 2011). The killer whale stranded in 2012 also appeared to have died due to starvation (Deaville, 2012). Killer whales are also exposed to very high levels of contaminants, and are considered to be one of the most polluted arctic animals (Wolkers et al., 2007). Blubber samples examined revealed extremely high concentrations of polybrominated diphenyl ethers (PBDEs), polybrominated biphenyls (PBBs), polychlorinated naphthalenes (PCNs) and dichlorodiphenyldichloro-ethylene (DDE). The levels exceed proposed thresholds for toxicity (Kannan et al., 2000: Jepson et al., 2005), and the life-time exposure to these contaminants is cause for concern (Rayne et al., 2004). Blubber and liver samples from five of the UK stranded animals (1991-2005) were analysed for chemical contaminants. The blubber levels were similar to the highest PCB levels currently recorded from transient adult male killer whales in British Columbia, Canada (Ross et al., 2000; Hickie et al., 2007; McHugh et al., 2007).
This species is likely to be affected by human disturbance, particularly boat traffic and noise. Boat presence has been linked to significant changes in behaviour, with reduced time spent feeding and consequently a substantial decrease in energy intake (Williams et al., 2002; Williams et al., 2006). Background noise, on the other hand, can interfere with communication between killer whales, possibly affecting activities such as cooperative foraging (Foote et al., 2004).
Direct fishing is no longer a conservation issue for this species, as the last records of direct hunting by Norway, Iceland and Faroese whalers date back to the late 1980s. Small numbers were also taken by a live-capture fishery from Icelandic waters, but the last record dates to 1988 (Foote et al., 2007).

2.6.1 Method used – Pressures	**mainly based on expert judgement and other data**
	Pressure ranking for Orcinus orca is mainly based on expert opinion and data from stranded animals, which indicate sources of mortality for this species. For most pressures the ranking is considered low because of the low numbers of killer whales in UK waters. However, starvation was the cause of death of 40% of 5 individuals stranded between 1991-2005 which may indicate problems with prey resource. Also, levels of pollutants in the few animals sampled are high and therefore cause for concern.

2.7 Threats		
a) Threat	**b) Ranking**	**c) Pollution qualifier**
	H = high importance (max 5 entries) M = medium importance L = low importance	

H03: Marine water pollution	H	X
F02: Fishing and harvesting aquatic resources	M	
M01: Changes in abiotic conditions	M	
M02: Changes in biotic conditions	M	
D03: shipping lanes, ports, marine constructions	L	
G01: Outdoor sports and leisure activities, recreational activities	L	

2.7.1 Method used – Threats	**expert opinion**
	Assessment is based on expert opinion and published literature. 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 effects (biotic and abiotic) have been ranged as Medium importance given their likely indirect effect. MacLeod (2009) concludes that climate change is likely to have little/no impact on the range of this cosmopolitan species.

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	
2.8.3 Trans-boundary assessment	**The identified individuals off the west coast of Scotland are known to frequent waters around Ireland also (Foote et al. 2010). Between 2008-2011, there has been an increase in sightings of killer whales in Irish waters, and photographic evidence suggests that an increasing proportion of these animals belong to the Scottish West Coast Community (Whooley, 2012). As this population is small (10 individuals) the future prospects of this population are highly dependent on the actions within both the UK and the Irish EEZ.**

2.9 Conclusions *(assessment of conservation status at end of reporting period)*

2.9.1 Range	**a) Conclusion**	**Favourable**
	There has been no evidence of decline in range, and the current range is considered equivalent to the favourable reference range based on best available information and expert judgment. Therefore, the conclusion for this parameter is Favourable.	
	b) Qualifier	
2.9.2 Population	**a) Conclusion**	**Unknown**
	Trends and favourable reference population are unknown. Hence, the conclusion for this parameter is also unknown.	
	b) Qualifier	
2.9.3 Habitat for the species	**a) Conclusion**	**Unknown**
	The conclusion for this parameter is unknown given the lack of data to define habitat for this species.	
	b) Qualifier	
2.9.4 Future prospects	**a) Conclusion**	**Unknown**
	Given the incomplete information on population size within UK waters and trend information, the future prospect of this species are considered unknown. However, the evidence available for the west coast of Scotland population would suggest that there is likely to be a decline within the next two reporting periods (12 years) and if this population were assessed in isolation, then future prospects would be bad. Two adult males known to be part of this population are nearing the expected life-span for this species. No calves have been recorded (Kötter et al., 2012) and two adult females identified in 1992 have never calved.	
	b) Qualifier	
2.9.5 Overall assessment of Conservation Status	**Unknown**	
	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 and/or existing pressures change, then the future prospects for cetacean species in UK waters should be favourable. 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. Marine pollution is one such pressure that is regulated nationally and internationally, with benefits to marine mammals and other marine wildlife. However, despite legislation, levels of certain pollutants in marine mammals remain high because of their position as top predators in the marine food web, the effects of bioaccumulation and the recalcitrance of some pollutants, such as polychlorinated biphenyls (PCBs). Between 1990-2010, 22 killer whales have stranded on the UK coastline and 5 were examined post-mortem. All had elevated levels of contaminants, including some of the highest levels of PCBs ever recorded in marine mammals (mean sum25CBs levels 100mg/kg lipid, range 23.6-819.0) (Deaville et al. 2012). The UK strandings record for 1913-1989 shows that killer whale strandings occurred on all coastlines of the UK; this contrasts with the distribution of strandings in the last two decades where there has been a marked absence of strandings in some areas (e.g. southern North Sea). Deaville et al. (2012) suggest that this may indicate a contraction in range of coastal populations of killer whales over the last 100 years and that this may partly be driven by marine contaminants. An ASCOBANS supported project by the UK's Zoological Society of London, is undertaking a risk assessment for the toxic effects of PCB exposure in killer whales in European waters within the ASCOBANS range. The results of this project are due in 2013. The UK government funds the 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 Habitats 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, formerly the DTI) has provided funding to initiate plans for the third SCANS survey, scheduled for July 2015/2016. Bycatch of killer whales in the UK is not an issue. However, any adverse interactions between fisheries and this species may be detected through the UK's bycatch monitoring and stranding scheme. 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. Monitoring under Regulation 812/2004 is done largely in collaboration with the fishing industry. Bycatch mitigation work is a key complementary programme of work that is intended to ensure any problem that is identified with protected species bycatch can be addressed in an equitable and expedient manner to meet the UK's obligations under Regulation 812/2004 and Article 12 of the Habitats Directive. The observer scheme relies upon good collaborative links with industry. Nevertheless fisheries regulations were enacted in England and Scotland to ensure that there is also a legal obligation for skippers and owners to take observers when asked to do so. 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 an 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 from seismic survey vessels during 1995-2010 (Stone, in prep), has demonstrated the effectiveness of soft start approach, an integral component of the guidelines. This review has also analysed data on the responses of marine mammals to seismic airguns. Killer whales showed general avoidance to large airgun arrays (500 cubic inches) and displacement several kilometres away. No response was evident 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 has been developed for Scottish 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. They have 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. Such continual improvement of mitigation strategies by the military themselves 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**