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

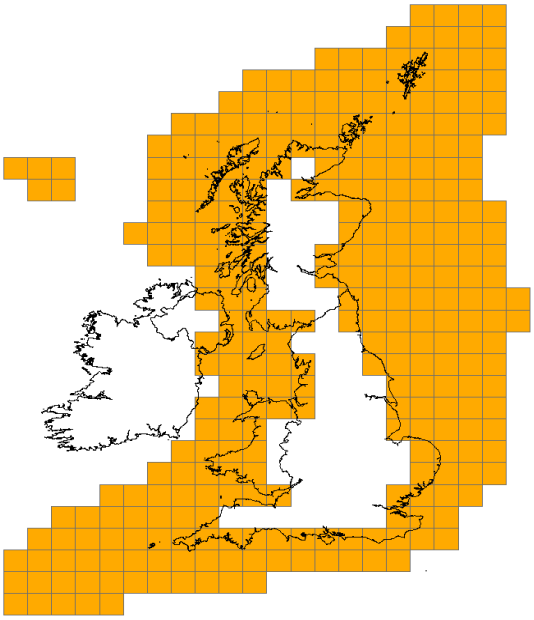
on the implementation of the Directive
from January 2007 to December 2012
Conservation status assessment for

Species:

S1349 - Bottlenose dolphin (*Tursiops truncatus*)

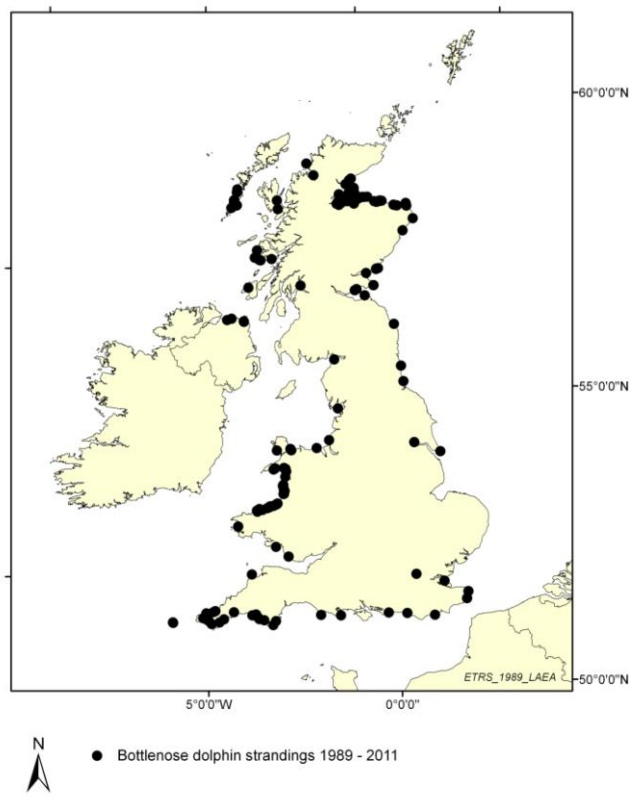
Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

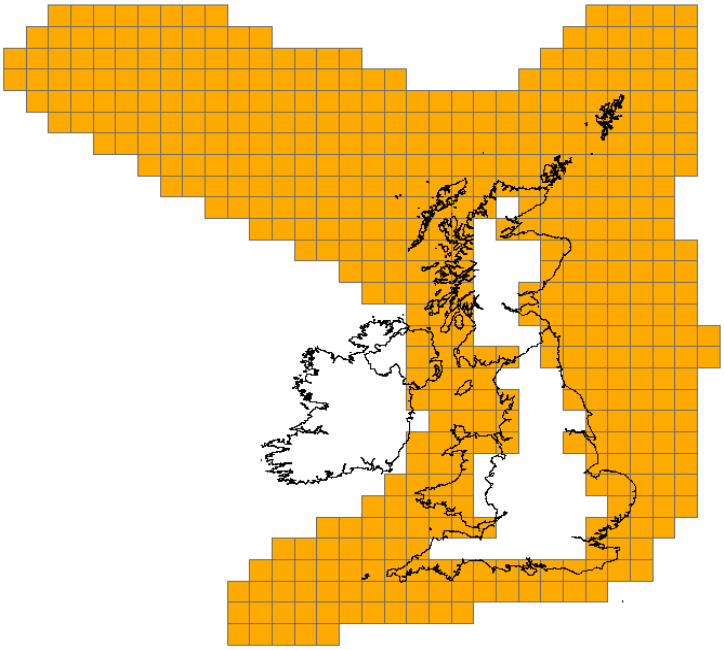
Field name	*Brief explanations*	
0.2 Species	**0.2.1 Species code**	**S1349**
	0.2.2 Species scientific name	***Tursiops truncatus***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**
	The distribution, movements and abundance of highly mobile marine species such as bottlenose dolphins are best studied at large spatial scales, but previous research effort has generally been focused on relatively small areas, occupied by populations with high site fidelity. Sightings of bottlenose dolphin have been recorded in the northern North Sea, English Channel, Celtic Sea, Irish Sea, west of Scotland and Ireland and along the continental shelf of France and Spain to the strait of Gibraltar (Reid et al., 2003). The northern European range extends as far north as the Faroe Islands (Bloch and Mikkleson, 2000) and the species has been		

	noted in offshore waters beyond the continental shelf west of the UK, Ireland, France and Spain (Macleod et al. 2008). In UK waters, bottlenose dolphins are essentially coastal, with particular consistent regions of high density in Cardigan Bay and the Moray Firth. The areas of common occurrence are evident in the strandings record (additional map 1). However, they are also occasionally found in other regions, e.g., the Bristol Channel, off the coast of Fife and the Channel Islands (Deaville and Jepson, 2011). They have also been recorded further offshore, particularly to the south west of Britain and Ireland. The Cetacean Offshore Distribution and Abundance (CODA) survey reported bottlenose dolphin sightings within the northwestern offshore component of the UK EEZ (CODA, 2009). Temporal variation in sighting effort makes it difficult to assess how the occurrence of dolphins in different areas may have changed over time. However, over the last two decades, sightings have only been consistently reported from two areas in Scotland: the east coast of Scotland (Wilson et al. 2004, Anderwald et al. 2010) and the Sound of Barra (Grellier & Wilson 2003). The east coast has one of the highest human population densities of the Scottish coast, but the Sound of Barra, on the Outer Hebrides is one of its most remote areas. Regular reports of sightings in both these areas from members of the public provide some support for the assumption that the regular occurrence of dolphins in any part of the Scottish coast is now unlikely to remain undetected (Cheney et al., 2013).

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 bottlenose dolphin 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). A presence 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 CODA survey in July 2007 were also mapped as the survey area lies predominantly beyond the JCP prediction area which is primarily continental shelf. 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 CODA survey were used to look at distribution beyond the continental shelf (CODA, 2009).

1.1.4 Additional distribution map Optional	**Additional Map 1** 
	Additional map 1 shows the distribution of strandings records of bottlenose dolphins around the UK during 1989-2011. There are 52 records of stranded bottlenose dolphins for 2005-2010. Of these, 18 stranded in Scotland, 16 stranded in Wales, 15 stranded in England, two stranded in Northern Ireland and one stranded in the Channel Islands (Deaville and Jepson, 2011). A further 15 stranded in 2011 and 7 were recorded in 2012 (CSIP, 2011a, b, c, d; 2012a, b, c, d). Paxton et al. (in prep) modelled the density of bottlenose dolphins in waters off the UK for mid-August 2010. The model correctly predicts the known high-density areas where there are resident bottlenose dolphin populations; Moray Firth and Cardigan Bay. The distribution of the Moray Firth population along inshore waters of the Scottish east coast is also reflected. The model also predicts a high density offshore area off southwest England. A number of sightings of relatively large groups (up to 25 individuals) of bottlenose dolphins were encountered in this area on the Celtic shelf and shelf edge during the SCANS-II survey (Hammond et al. In press).

1.1.5 Range map	
	Range is based on the predicted distribution (1.1.1), actual sightings (CODA, 2009), strandings (CSIP) and expert judgement. The range map combines that of both coastal and offshore bottlenose dolphins. In the North Atlantic, offshore and coastal forms have been identified (Mead and Potter, 1995). Based on toxicology, diet (Borell et al. 2005) and genetics (Natoli et al. 2005), coastal forms also exhibit a regional subpopulation structure. This is often driven by preferences for certain habitat characteristics such as seabed topography, salinity and water temperature (Natoli et al 2005). In many inshore areas, bottlenose dolphins maintain definable, long-term multi-generational home ranges (Hammond et al. 2008). The range represented extends throughout the UK EEZ. However, with the exception of areas with coastal populations (Cardigan Bay, Moray Firth and Hebrides) densities of the widespread, offshore form are low, at least on the continental shelf (SCANS-II, 2008).

2.1 Biogeographical region & marine regions	**MATL**
2.2 Published sources	**"Anderwald, P., Evans, P.G.H., Canning, C., Hepworth, K., Innes, M., Macdonald, P., Sim, I., Stockin, K. and Weir, C. 2010. Cetaceans of the East Grampian Region. Sea Watch Foundation, Aberdeen, UK.** **Augusto, J.F., Rachinas-Lopes, P. and dos Santos, M.E. 2011. Social structure of the declining resident community of common bottlenose dolphins in the Sado Estuary, Portugal. Journal of the Marine Biological Association of the United Kingdom. FirstView Article : pp 1-10**

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2.3 Range	
2.3.1 Surface area Range	**1057457** The range is based on the distributional data for the reporting period (1.1.1) and expert judgement. The entire range is not uniformly occupied and highest densities occur in key coastal locations. Use of range may also vary seasonally. However, the estimate of range given year represents the greatest range considering year round and coastal and offshore populations. Greatest numbers are thought to occur in UK waters between July and October with a secondary peak in some localities in March-April (Reid et al., 2003; Evans et al., 2003) although animals are present year round in some areas (Wilson et al., 1997; Veneruso & Evans, 2012; Cheney et al, 2013). The peaks in occurrence were also noted in recent analysis of sightings data spanning 1994-2010 (Paxton et al, in prep). Cheney et al (2013) noted three parapatric communities of bottlenose dolphins in Scottish coastal waters, each of a different size and with marked contrasts in their ranging patterns. On the west coast, there are two small and socially segregated communities of dolphins, one of which includes approximately 15 individuals that have only been recorded in the waters around the Sound of Barra, whereas the other is double that size and ranges more widely throughout the Inner Hebrides and mainland coasts. On the east coast, there is a population of nearly 200 interacting dolphins between the Moray Firth and Fife, with individual differences in ranging behaviour and site fidelity. Analyses of photo-identification data from multiple studies have also shown that bottlenose dolphins can make long-distance movements between the east and west coasts of Scotland, and further exchange between Scottish and Irish waters has recently been revealed (Robinson et al. 2012). Whether these movements represent exchange between different coastal communities or interaction with more widely ranging offshore animals remains uncertain, but this finding suggests that it would be worthwhile to continue making comparisons between photo-identification catalogues from Scottish and other European waters.

	Importantly, this finding also highlights the value of maintaining long-term research effort in each of these areas. Without the long-term archives available through previous projects, these rare movements would not have been detected.	
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 bottlenose dolphins 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 bottlenose dolphin density on a gridded surface (resolution 5x5km) 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 representative of the current reporting period.	
2.3.3 Short-term trend Period	**2001-2010**	
2.3.4 Short term trend Trend direction	**stable**	
	Visual inspection of inferred range from modelled density reported in the Joint Cetacean Protocol phase III analyses (Paxton et al. in prep) suggests that it was stable for the 2001-2010 period. There appear to be few changes in density (in the northwest North Sea) throughout the range and core areas of high density are stable.	
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**	
	The modelled predicted density for bottlenose dolphin for mid-August 1994, 2005 and 2010 from the analysis of the Joint Cetacean Protocol (Paxton et al., in prep) were compared to assess density and changes in inferred range over this time period. Predicted density was mapped as described in 1.1.2. There appears to have been no change in the overall range since 1994, although the coastal populations appear to have expanded their distribution along the coast both in north east Scotland and also in Welsh waters.	
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 current range is thought to be approximately equivalent to the Favourable Reference Range. During the last reporting round (2001-2006), the range for this species was equated to the UK EEZ. In the absence of any evidence of a decline, the current range also approximates the UK EEZ and hence the FRR.	
	c) FRR is unknown (indicated by "true")	**False**
	d) Method used to set FRR	**Based on expert judgement, the current range for bottlenose dolphins in UK waters has all significant ecological variations for the given biogeographical region, and is sufficiently large to be considered suitable for the survival of the species for the foreseeable future. The current range is therefore considered to approximate the FRR.**
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	**a) Unit**	**number of individuals**
	b) Minimum	**7728**

exceptions where possible)		
	c) Maximum	**21062**
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**	
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 offshore blocks (1&2) from CODA 2007, were mapped in ArcMap 10.1. The estimated bottlenose dolphin range (2.3.2) was mapped on top and the areas of each of the survey blocks within the range were measured. The density estimates per block were used to derive abundance for each portion of the block within the bottlenose dolphin range (area of block within the range multiplied by the density). All the abundance estimates for each block were summed to give a total abundance throughout the entire UK range. The associated CV and 95% confidence interval was 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	**stable**	
	Paxton et al. (in prep) report trends by comparing average abundance for each direction species in the area of interest, in three time periods 1) 1994-2000 2) 2001-2006 and 3) 2007-2010. For the assessment of short-term trends, differences between periods 2) and 3) are assessed. The results show that there was no statistically significant trend at the 5% level in average bottlenose dolphin abundance between period 2) 2001-2006 and period 3) 2007-2010. The assessment by Paxton et al. (in prep) is relevant to a large-spatial	

	scale and does not necessarily reflect trends in coastal populations. However, the results from long-term monitoring studies suggest that there have been no declines in coastal populations. Cheney et al. (2013) provides the most recent population estimate of 195 (95% HPDI: 162–253) for the east coast of Scotland population. The population is considered to be stable or increasing (Cheney et al., 2012). In the Cardigan Bay area, there is some evidence for an overall increase in abundance since 2001, with summer population estimates ranging from 150-250 individuals (Baines et al., 2002; Ugarte and Evans, 2006; Pesante et al., 2008b).	
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**	
	Similarly, no changes were noted in the long term trend for bottlenose dolphin between 1994-2000 and 2007-2010 within the 'truncated UK EEZ (water depths up to 300m; Paxton et al. in prep).	
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**
	In the 2007 report the FRP was given as 8000. This estimate was the sum of broad regions (as defined by the SCANS II survey) that includes all the countries bordering the North Sea, Ireland and France. The current reporting period is the first time that the abundance of bottlenose dolphins in the UK EEZ has been reported and is considered equivalent to the FRP. The point estimate of abundance for the UK EEZ is 12,758 (CV=0.26).	
	c) FRP is unknown (indicated by "true")	**False**
	d) Method used to set FRP	**The estimate of abundance calculated for the UK from the SCANS-II (Hammond et al. in press) and CODA (Macleod et al. 2009) surveys in July 2005 and 2007, respectively, is 12,758 (CV=0.26) bottlenose dolphins. The resident Scottish and semi-resident Welsh populations are components of this and the abundance of these has been the focus of dedicated photo-identification studies. In the absence of any declines in abundance since 1994 of the wider population or in the coastal resident populations, the current population size is considered to be equivalent to the Favourable Reference Population.** **The estimate for bottlenose dolphin abundance on the European continental shelf, extending from 60N south to the Straits of Gibraltar, from the SCANS-II survey in July 2005 was 16,485 (CV=0.42) (Hammond et al. in press). Highest estimated densities were in coastal waters of SW France, Spain and Portugal and in the Celtic Sea (Hammond et al, in press). The CODA (Cetacean Offshore Distribution and Abundance in the European Atlantic) survey, undertaken in July 2007, estimated that there were 19,295 (CV=0.25) bottlenose dolphins. The species was most common west of Scotland and Ireland in European offshore waters (beyond the continental shelf, ranging from waters off NW Scotland to NW Spain) (CODA 2009).**

		Paxton et al (in press) noted some consistent patterns in bottlenose dolphin predicted density over the long term with no significant population changes in either the short or long term. The animals were essentially coastal, with particular consistent regions of high density in Cardigan Bay, the Moray Firth and the west coast of Ireland. In contrast to the offshore population (s), the coastal populations are much smaller in size, comprising approximately 300 animals in the Irish Sea (Evans, 2012) and 200-300 in Scottish coastal waters (Cheney et al., 2013). In Scotland, interaction parameters have demonstrated that the dolphins off the east coast are highly mobile, whereas those off the west coast form two discrete communities. **The relationship between offshore groups and those occurring in coastal waters remains uncertain, although more detailed studies in the NW Atlantic suggest that inshore and offshore populations are often ecologically and genetically discrete (Hoelzel et al. 1998). Nevertheless, some offshore animals may utilise coastal waters occasionally and strand. This is a potential confounding factor when using samples from stranded individuals to explore population structure (Cheney et al., 2013). The current populatution size of bottlenose dolphins in UK waters is considered to be approximately equal to the Favourable Reference population.**
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	**1057457**	
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**	
	The suitable habitat for this species is assumed to be equivalent to its range. However, some groups show relatively high fidelity to coastal regions whilst others are much wider ranging. Movements have been related to prey migrations and availability (Veneruso & Evans, 2012).	
2.5.4 Quality of the habitat	**a) Habitat quality**	**Good**
	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. Bottlenose dolphins are found offshore, at the shelf break and close inshore. The inshore distribution includes estuaries, bays, lagoons and other shallow coastal regions, with occasional ranging far up into rivers (Hammond et al., 2012). The offshore form is apparently less restricted in range and movement, although some offshore dolphins can become residents around oceanic islands (Hammond et al., 2012). Areas of high bottlenose dolphin density are linked to feeding (Hastie et al., 2004). Bottlenose dolphins are generally considered to be selectively opportunistic. Their prey includes a wide variety of benthic and pelagic, solitary and schooling, fish and cephalopods (Barros and Wells 1998, Blanco et al. 2001, Santos et al. 2001). Individuals may specialise on particular prey species or switch as availability changes particularly with area and season. Prey include gadoids (cod, saithe, whiting, haddock), salmon, sprats, sandeels, flatfish and cephalopods (Reid et al., 2003).	
	b) Assessment method	**Given that there is no evidence of a decline in population abundance or retraction of range, the habitat is assumed to be good for bottlenose dolphins.**
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	
F02: Fishing and harvesting aquatic resources	M	
G01: Outdoor sports and leisure activities, recreational activities	M	
C02: Exploration and extraction of oil or gas	L	
D03: shipping lanes, ports, marine constructions	L	
G04: Military use and civil unrest	L	

Common bottlenose dolphins in coastal areas are exposed to a wide variety of threats. In UK waters these include the incidental capture in fishing gear, the toxic effects of xenobiotic chemicals; reduced prey availability caused by environmental degradation and overfishing (Pauly et al. 1998; Jackson et al. 2001); direct and indirect disturbance and harassment (e.g. boat traffic and commercial dolphin watching and interactive programs); marine construction and demolition and other forms of habitat destruction and degradation (including anthropogenic noise). In contrast, offshore bottlenose dolphins appear widespread and abundant, and not apparently facing the threats faced by inshore animals.
Between 1991-2010, 63 post mortem examinations were undertaken on stranded UK bottlenose dolphins (Deaville and Jepson, 2011). The main causes of death were infectious disease (13%), live stranding (8%), bycatch (6%) and starvation (3%). Also of note, five neonates died as a consequence of infanticide.
Some inshore groups of bottlenose dolphins have disappeared (e.g. Humber estuary, off The Netherlands) or are in decline (e.g. in the Sado Estuary, Augusto et al. 2011). Pollution may play a role in declines through reproductive effects, such as reduced calf survivorship. PCB exposure data has also been generated for UK-stranded bottlenose dolphins (n=15) with mean levels of 100,000ng/g lipid weight (Jepson et al 2008). Although these data are from stranded animals, they show that PCB exposures are similar or greater

than levels in biopsied bottlenose dolphins in the SW Atlantic such as Indian River Lagoon (Florida, US), Sarasota Bay (Florida, US) and Charleston (North Carolina, US) (Schwacke et al. 2002; Wells et al. 2005; Hall et al. 2006). Given the concerns about high PCB levels, ASCOBANS funded the Institute of Zoology to coordinate a project to assess PCB exposure in stranded bottlenose dolphins in European waters (Project ref: SSFA/ASCOBANS/2010/3). The final report to the ASCOBANS Secretariat on this project is due in 2013. Else where in the North Atlantic, there is evidence that bottlenose dolphins sometimes forage around fish-farm cages or take fish from gillnets (e.g., Reeves et al. 2001; Read et al. 2003), commercial trawling gear, crab traps, or recreational fishing gear (Wells and Scott 1999). This can result in incidental mortality through entanglement and ingestion of fishing gear.	
2.6.1 Method used – Pressures	**mainly based on expert judgement and other data**
	Pressure ranking for bottlenose dolphin is mainly based on expert opinion, published literature and data from post mortem of stranded animals, which indicate sources of mortality for this species. Pressures have been ranked as Medium where the threat is ubiquitous and known mortalities; however, there is no known population level impact to rank it as high. Pressures are ranked as low where the threat is isolated or given the distribution of animals and the threat unlikely to be a significant threat.

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	
C03: Renewable abiotic energy use	M	
G01: Outdoor sports and leisure activities, recreational activities	M	
M01: Changes in abiotic conditions	M	
M02: Changes in biotic conditions	M	
C02: Exploration and extraction of oil or gas	L	
D03: shipping lanes, ports, marine constructions	L	
F02: Fishing and harvesting aquatic resources	L	
G04: Military use and civil unrest	L	

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).	
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	**A limited amount of information is available regarding life history of bottlenose dolphins in UK waters, and most of the studies have been carried out in other geographical regions around the world. Females grow faster initially and reach asymptotic length at an earlier age than males. Females reach asymptotic size at about 12 years of age and males at about 20 years of age, resulting in a significant sexual dimorphism in adult body length, girth, and mass. Globally, females sexually mature at 5-13 years and at length of 220-235 cm and males at 10-15 years (although may reach>20 years before attaining breeding status) and at length of 245-260 cm. The reproductive lifespan of females is prolonged, with little or no indication of senescence. Females mate promiscuously and associate with multiple males during the months before conception (Mann et al., 2000; Evans, 2008). Calves are born after a gestation period of about one year, and at birth calves range in length between 84 and 140 cm, depending on the geographic region (Ridgway and Harrison, 1995). Females typically give birth in the spring or summer to a single calf (twins are exceptionally rare) (Evans, 2008); although off the Aberdeenshire coast in the UK, sightings of calves are reported year round but with a peak in Spring (Stockin et al., 2006). Calves nurse, at least occasionally, typically for 3-6 years and occasionally up to 8 years. Females continue nursing their offspring nearly halfway through the next pregnancy (Mann et al., 2000). Mitcheson (2008) reported that the most common inter-birth- interval was 3-6 years based on a study of the resident Scottish east coast population. In a study carried out in Wales, Veneruso et al. (2012) found that a higher number of births in particular years may be a result of a number of females becoming reproductively mature at the same time, creating a "baby boom". The mean birth rate was 5.24% considering a closed population model, and 7.73% using an open population model. The estimated mean birth rate of the other resident population of bottlenose dolphins in the UK, in the Moray Firth/east Scotland, is 6.0%, broadly similar to that in Cardigan Bay. Calf mortality rates were 20% and 25% in the first and second year respectively, reducing to 10% by the third year (Veneruso et al., 2012).**
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**
	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 judgement. Therefore, the conclusion for this parameter is Favourable.	
	b) Qualifier	
2.9.2 Population	**a) Conclusion**	**Favourable**
	Given that trends in population in the short (2001-2012) and long term (1994-2012) have been assessed as stable, the overall conclusion for this parameter is Favourable.	
	b) Qualifier	
2.9.3 Habitat for the species	**a) Conclusion**	**Favourable**
	Although there is an acknowledged difficulty associated with defining habitats for cetaceans, the judgement of Favourable was based on the relatively high level of spatial and temporal variability in the behaviour and ecology of common dolphins. Additionally, where range and/or population is considered to be in a Favourable condition, it has been assumed that habitat must also be considered to be Favourable.	
	b) Qualifier	
2.9.4 Future prospects	**a) Conclusion**	**Favourable**
	According to the EU guidance for the current reporting period, future prospects should be assessed as favourable if all parameters have good prospects. The evaluation matrix within the guidance was used, and all parameters had good prospects and therefore, the overall assessment of prospects is favourable.	
	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, 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. 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, formerly the DTI) has provided funding to initiate plans for the third SCANS survey, scheduled for July 2015. 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. Between 2009 and 2011 the UK trialled alternative pinger types (the DDD) not listed on Annex II of Regulation 812/2004, as part of a scientific investigation as outlined under paragraph 3 Article 2 of the Regulation. This work was a response to a request from the fishing industry to assess the efficacy of using a louder and more robust device that could be attached to the ends of fleets of nets, rather than every 100 or 200 m along the length of each fleet as specified in Annex II of the Regulation. Following successful field trials in the southwest, industry have been supplied with sufficient devices to equip all vessels in the local fleet. Following the completion of an extension trial funded by the Fisheries Challenge Fund (FCF) (Kingston and Northridge 2011), monitoring of vessels using pingers is being continued under the heading of scientific studies as required by Regulation 812/2004. The purpose of this is to improve our understanding of the effective range of the DDD pinger and to assess possible habituation issues. 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 the next year (before June 2013). 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. Bycatch monitoring in the UK fisheries in IVa and VIa as required by EU Reg 812/2004 has not demonstrated a single cetacean bycatch event since the programme began in 2005. The UK has identified those fisheries that are thought to have highest bycatch rates of cetaceans, and has refocused a majority of observer effort into these segments. Most sampling effort is now directed at under-15 m vessels using static gears in subareas IV and VII. Some sampling under Scientific Studies of over-12 m vessels using pingers is also being continued, though at a lower rate than in recent years. 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 since the introduction of these guidelines has demonstrated the effectiveness of soft start approach. 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. (2012). 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 is being used by industry until they formally receive Cabinet clearance. Similar guidelines have 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. 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). 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	**a) Unit**	**number of individuals**

Estimation of population size included in the SAC network	Scottish east coast (includes Moray Firth SAC): There was significant movement of individuals in the Scottish east coast area, with a higher rate of exchange of dolphins between the inner and southern Moray Firth (Cheney et al., 2013). Although these results do not provide information on the ranging patterns of individual dolphins, they clearly demonstrate that the population of bottlenose dolphins off the east coast of Scotland is highly mobile: individuals range from the inner Moray Firth to Fife. However, one confirmed sighting in 2007 of a group near Whitley Bay and the Tyne river mouth suggests that individuals occasionally range further south (Thompson et al. 2011). This population cannot, therefore, be subdivided into separate units based on area alone. The results of genetic analyses (Parsons et al. 2002, Thompson et al. 2011) show some but not complete isolation between animals found on the east and west coasts and elsewhere in Britain and Ireland. Cheney et al. (2013) provides the most recent population estimate of 195 (95% HPDI: 162–253) for this population. The population is considered to be stable or increasing (Cheney et al., 2012). Although evidence (Wilson et al, 2004) has suggested that the bottlenose dolphins have expanded their range beyond the Moray Firth SAC during the 1990s, the area of the SAC continues to be important for them. Recent monitoring suggests that despite interannual variability, the number of dolphins using the SAC between 1990 and 2010 has remained stable (Cheney et al, 2012). The site continues to be used year round (Thompson et al., 2011) indicating that the site provides an important habitat for the species. The results from the current monitoring programme indicate that there is a high probability that all the targets for this feature are being met and the condition of the bottlenose dolphins are considered to be favourable. 64% of the Scottish east coast bottlenose dolphin population is known to utilise the site (Cheney et al, 2012). Scottish west coast (includes proposed Sound of Barra SAC): The majority of individuals are observed in waters around Skye and to the north, and few individuals were seen south of Skye and in the Sound of Barra (Cheney et al., in press). Despite observations of significant movements of dolphins throughout the west coast, none of the individuals identified in the Sound of Barra were seen elsewhere. This suggests that there are two discrete communities of bottlenose dolphins on the west coast of Scotland. Cheney et al (2013) provides the most recent population estimate of 45 (95% HPDI: 33–66) for these two communities, of which 13–15 individuals use the waters around the Sound of Barra. Cardigan Bay Area (includes both cardigan Bay and Pen Llyn a'r Sarnau SACs) : Sightings of bottlenose dolphin in this area have long been recorded, going back at least to the 1920s (Evans and Scanlan, 1989) and today the area is known to host the largest population of semi-resident bottlenose dolphins in the UK (Evans and Pesante, 2008). The Cardigan Bay area, and particularly the SAC, is thought to be important in the summer months although a proportion of the population is known to remain in the region year-round (Baines et al., 2002; Pesante et al., 2008b). There is some evidence for an overall increase in abundance since 2001, with summer population estimates ranging from 150-250 individuals (Baines et al., 2002; Ugarte and Evans, 2006; Pesante et al., 2008b). During the winter months, it has become increasingly evident that a

significant number of animals leave the area, moving northwards. High concentrations of individuals have been reported off the north coast of the Isle of Anglesey, in Liverpool Bay and around the Isle of Man involving animals that have been previously and often regularly identified by Photo ID within Cardigan Bay (Pesante et al., 2008a). At present, the waters around the Isle of Man appear to be the northernmost range limit of this population (although bottlenose dolphins are seen regularly in the Solway Firth, no photographs exist suitable for matching), and as of yet, Photo ID catalogues from Ireland, Hebrides, Moray Firth, Cornwall or the English Channel have yielded no matches with the SWF Photo ID catalogue, showing no evidence of exchange outside of the Irish Sea (Pesante et al., 2008b). In addition to winter sightings of the species in the northern Irish Sea, bottlenose dolphins have recently been recorded off the North Wales coast also in summer (Veneruso & Evans, 2012). 42% of animals are considered residents of the SAC, 30% are occasional visitors and 28% transients.

Forty-three percent of groups encountered in Cardigan Bay SAC had one or more calves present, confirming that the site is an important nursery ground for the species (Veneruso & Evans, 2012). Calves can be born at any time of the year, although generally peaking in July and August. The number of newborn calves recorded has fluctuated between years in the SAC, averaging ten calves per year. The mean birth rate for the site is 5.24% using a closed population model and 7.73% with an open model, with an inter-birth interval of three years. A total of 44.90% of the calves survived into their fourth year (Veneruso & Evans, 2012). Calf mortality rates were 20% and 25% in the first and second year respectively, reducing to 10% by the third year. The first year mortality rate is comparable to that in Sarasota Bay (Wells and Scott, 1990) and Doubtful Sound, New Zealand (Haase and Schneider, 2001). The slight increase in mortality in the second year may reflect increased vulnerability with growing independence.

The combination of increased residency in Cardigan Bay SAC and overall lower population estimates may suggest that a core group of individuals continue to use Cardigan Bay SAC but that occasional visitors and transients are entering Cardigan Bay on fewer occasions, thus reducing overall numbers. Prey abundance is likely to be a factor influencing movements of bottlenose dolphins. So if fewer dolphins are using Cardigan Bay, this could be a result of reduced prey availability in the Bay or alternatively, increased availability in the other parts of the Irish Sea, attracting the dolphins to other sites. Anthropogenic disturbance may also have an influence on bottlenose dolphin movements. A localised study investigating the effects of boat traffic on bottlenose dolphins around New Quay Harbour was analysed for 2005 until 2010. This study showed that boat type and behaviour can have a significant effect on dolphin disturbance as well as the behaviour of the dolphins (Veneruso & Evans, 2012).

b) Minimum	**363**
c) Maximum	**460**

3.1.2 Method used	**Estimate based on partial data with some extrapolation and/or modelling**
	For Moray Firth: The results from the current monitoring programme indicate that there is a high probability that all the targets for this feature are being met and the condition of the bottlenose dolphins are considered to be favourable. 64% of the Scottish east coast bottlenose dolphin population is known to utilise the site. This equate to 103-162 individuals from a population of 162-253. For Cardigan Bay: 42% of animals are considered residents of the SAC, 30% are occasional visitors and 28% transients. This equate to 260-298 individuals from a population of 362-414 in the Irish Sea.
3.1.3 Trend of population size within the network (short-term trend) Optional	**stable**

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
4.1: Restoring/improving water quality	Y					H			Y	Y					
6.1: Establish protected areas/sites	Y					H			Y	Y					
6.3: Legal protection of habitats and species	Y					H			Y	Y					
8.3: Managing marine traffic				Y		H			Y	Y					
9.2: Regulating/ Managing exploitation of natural resources on sea	Y					H			Y	Y					

'The Management Scheme for the Moray Firth Special Area of Conservation (SAC)' sets out a framework for the co-operative management of activities affecting this major body of water (see http://morayfirth-partnership.org/648). The 'Conservation Objectives' have now been widened to both achieve the establishment and maintenance of a viable population of bottlenose dolphins, and to conserve the condition of subtidal sandbanks ('sandbanks which are slightly covered by sea water all the time'), within the Firth. The bottlenose dolphin population is a valuable asset to the area in terms of the contribution to the biodiversity of the marine ecosystem and also in terms of socio-economic benefits. As top marine predators, their presence is seen as a positive indicator of the status of the marine environment, and management

measures that aim to improve the environment for dolphins will benefit many other wildlife species. The significance of the dolphins in attracting visitors and boosting tourism, as well as being there for local people to enjoy, is widely recognised.

For the bottlenose dolphin the following conservation objectives have been established, and will be maintained in the long term:

- Population of the species (including range of genetic types where relevant) as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

The document also outlines the activities that may have an impact on the dolphin population and how these are dealt with. In the most recent assessment, the conservation objectives were all considered to have been met and the status of the feature was considered favourable (Cheney et al., 2012).