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MAINTAINING FAVOURABLE CONSERVATION STATUS OF HARBOUR PORPOISE IN UK WATERS

This paper was provided to the Joint Committee for decision/discussion or information. Please refer to the minutes of the meeting for Committee's position on the paper.

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JOINT NATURE CONSERVATION COMMITTEE

MAINTAINING FAVOURABLE CONSERVATION STATUS OF HARBOUR PORPOISE IN UK WATERS

Paper by Eunice Pinn, Mark Tasker, Sonia Mendes & John Goold

1. Harbour porpoise favourable conservation status (FCS)

1.1 Conservation status is defined in the Habitats Directive as *'the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations'*. Conservation status can be considered favourable if:

i. population dynamics data indicate that the species is maintaining itself on a long-term basis as a viable component of its natural habitats;

ii. the natural range of the species is neither being reduced nor is likely to be reduced in the foreseeable future; and

iii. there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

1.2 Assessment of FCS therefore requires consideration of: range, population, main pressures and threats, habitat and future prospects. For harbour porpoise, range and population are equated to distribution and abundance, respectively.

1.3 In the 2nd UK report on implementation of the Habitats Directive (submitted to the European Commission in 2007), the conservation status of harbour porpoise in UK waters was assessed as favourable with medium confidence. Between the only two wide-scale surveys in UK and adjacent waters in 1994 and 2005, there was no evidence of a change in the abundance of the species whilst there was evidence of a slight increase in range. Bycatch was noted as having been reduced in recent years due, in part, to a reduction in fishing effort. The species was expected to survive and prosper under the current conservation approach.

2. UK populations of harbour porpoise

2.1 There has been much debate regarding the genetic structuring of harbour porpoise populations in the NE Atlantic. A population structure workshop held in 2007 under the aegis of the Agreement on the Conservation of Small Cetaceans of the Baltic, North-East Atlantic, Irish and North Seas (ASCOBANS) and the Helsinki Commission (HELCOM) concluded that there was some population structure within the North Sea, but the evidence was insufficient to define boundaries between any (sub-) populations at this time

(ASCOBANS, 2009). Consequently, for the purposes of conservation, harbour porpoise in the North Sea are considered to represent a single population. Porpoises to the west of the UK are regarded as a separate population.

2.2 Harbour porpoise are the most abundant cetacean in the North Sea (note that UK waters cover only about half of this Sea). Specifically for the North Sea and Channel, in 1994, harbour porpoise abundance was estimated at approximately 268,500 animals (CV = 0.15; 95% CI = 230,000-313,000) (Hammond *et al.*, 2002). An estimate for 2005 for the survey blocks that cover approximately the same area, although slightly smaller, was 231,000 (CV = 0.14; 95% CI = 201,000-266,000) (SCANS II, 2008). These figures indicate that there was no statistically significant difference in the abundance of harbour porpoises in 1994 and 2005 in the North Sea and Channel. Because the 1994 survey did not cover all waters to the west of the UK, it is not possible to provide a similar comparison for the western harbour porpoise population.

2.3 Historically, abundance/range is thought to have declined during the 20th century in some areas such as the southern North Sea and English Channel (e.g. Smeenk, 1987; Evans *et al*., 1992). However, there is evidence that porpoise numbers in these areas have been increasing in recent years through a general shift in the population as a whole from the northern North Sea (Evans *et al.*, 2003; Haelters & Jacques, 2006; Hassami, 2006; Thomsen *et al*., 2006; SCANS II, 2008).

3. The threats to harbour porpoise and the protection measures that the UK is taking

3.1 Annex 1 to this paper gives the legal background to the UK's obligation to protect harbour porpoise. As a response to these obligations, the UK Conservation Strategy for the Harbour Porpoise was published in 2000. This focused on the threats to harbour porpoise and outlined actions required to address their conservation. Five key elements were identified that remain relevant today:

i. incidental killing and capture
ii. disturbance
iii. pollution
iv. protected areas
v. surveillance

Interlinked with these are the additional issues of disease, prey availability and the potential effects of climate change.

Incidental killing and capture (bycatch)

3.2 Bycatch, the incidental capture of cetaceans during fishing activities, is the greatest threat to the conservation of small cetaceans, not only in Europe, but also throughout the world's oceans (Rojas-Bracho & Taylor, 1999; Lewison *et al.*, 2004; Reid *et al.*, 2006; Scheidat *et al.*, 2008; Read, 2008).

3.3 In order to address this threat, JNCC staff worked with DETR (now Defra) to develop a UK Small Cetacean Bycatch Response Strategy that was published in 2003 (DETR *et al*., 2003). This strategy identified measures to reduce small cetacean bycatch to a level below that set as unacceptable by ASCOBANS in 2000 (1.7% of the best population estimate, see Annex 1). Subsequently, EC Regulation 812/2004 came into force which required monitoring of cetacean bycatch and the use of acoustic deterrents in specified fisheries and areas (see Annex 1). The UK Bycatch Monitoring Programme was formally initiated in 2005. JNCC are members of the Steering Group that oversees the implementation of this programme.

Indicators from stranded animals

i. The annual number of UK-stranded harbour porpoises reported to the UK's cetacean stranding monitoring project increased from approximately 50-200 per annum in the 1990s to 350-400 between 2002 and 2006 (Jepson, 2006; Deaville & Jepson, 2007). This increase was partly driven by the establishment of a more effective reporting and feedback system (Jepson, 2006; Deaville & Jepson, 2007). Since that peak, the number of reports of stranded harbour porpoises has declined (Deaville & Jepson, 2008). Between 2004 and 2008, there has also been a decrease in the proportion of animals dying as a result of bycatch (Deaville & Jepson, 2009). There has also been a marked decrease in the number of stranded common dolphins diagnosed as bycatch during 2007 and 2008, despite a gradual increase in overall stranding numbers (Deaville & Jepson, 2008, 2009).

Bycatch monitoring

ii. Since monitoring began, for the period 2005-2008 inclusive, there have been no observations of cetacean bycatch in any of the many fleet segments listed for compulsory monitoring under EC Regulation 812/2004 (Northridge *et al*., 2007; SMRU, 2008, 2009). This is not to suggest that UK fisheries do not have a bycatch of any cetaceans, but rather that the segments being statutorily observed under the Regulation have very low bycatch rates and are thus unlikely to be at a level that are a conservation threat.

iii. Additional monitoring of pelagic trawl and static net fisheries has also been undertaken, partly under the requirements of the Habitats Directive. Harbour porpoise bycatch has been recorded in bass gillnets in the North Sea and tangle-nets in the southwest mainly targeting monkfish and hake (Northridge *et al*., 2007; SMRU, 2008, 2009). Overall, between 2005 and 2008, 1 in 100 observed hauls contained a porpoise bycatch, equating to 400-850 bycaught individuals per annum in the Celtic and Irish Seas where most of the monitoring has focused to date (Northridge *et al*., 2007; SMRU, 2008, 2009). The bycatch levels recorded are below the threshold level set by ASCOBANS and are unlikely on their own to represent a major conservation threat to

either species. However, there are bycatches in many other European fisheries affecting the same biological populations and the true significance of these estimates cannot presently be determined (ICES, 2008).

Pingers

iv. Sound can affect the behaviour of cetaceans. A benign use of this effect is to deploy acoustic devices ('pingers') on nets. Currently, the pinger element of Regulation 812/2004 is not being enforced, although a few of the vessels required to use pingers are doing so. This is due to concerns raised by the industry over the reliability, effectiveness and safety of the pingers available on the market at present. The European Commission recognises this and have indicated (COM2009 (368) final) that they are content that trials and development of pingers should continue. Initial trials of four different designs indicated that none was sufficiently robust. One suggestion from the fishing industry was to use a louder pinger that would enable a wider spacing on gill nets, thereby reducing some of the problems associated with handling and durability. Initial trials of a louder pinger have been successful, with no bycatch reported in trials with functioning pingers whilst bycatch was observed with non-functioning pingers or in the absence of pingers (SMRU, 2008). Application on commercial vessels will be trialled during the 2009/10 fishing season.

Disturbance

3.4 Cetaceans use sound as a primary source of information on their environment and for communication. Anthropogenic sound levels may be categorised as general background noise (from shipping and general industry at sea) and acute pulses (such as seismic airguns[1] and pile driving). At its most extreme, acute pulsed sound could theoretically kill or cause permanent injury to cetaceans, including harbour porpoise. However, there is no evidence, including from the stranding scheme, that injury or death of harbour porpoise has occurred in this manner. At lower levels, behavioural disturbance occurs. Although short-term effects on individuals have been observed (Miller *et al*., 2000; Nowacek *et al.*, 2001; Stone & Tasker, 2006), no scientific studies have conclusively demonstrated a link between exposure to sound and detrimental effects on a marine mammal population (NRC, 2005). Harbour porpoise undoubtedly move away from loud sources of sound (Johnston, 2002; Tougaard *et al*., 2003, 2005; Carstensen *et al*., 2006; Stone & Tasker, 2006; Tougaard & Teilmann, 2007).

3.5 There has been (and is) no systematic monitoring of the amount of sound in the oceans. Although there is little doubt that anthropogenic sound has increased since the pre-industrial era, the magnitude and extent is difficult to quantify. The amount of pulsed seismic noise in UK waters increased during

[1] Seismic airguns are underwater geophysical survey devices used to generate loud pulses of sound from the explosive discharge of compressed air.

1960-1990 but has declined generally in recent years (DECC, 2009). A recent increase in noise has been caused by high-intensity pulsed noise produced by pile-driving for offshore windfarm construction. Although this activity is relatively confined spatially for individual piling operations, the future scale of offshore windfarm construction is a potential concern.

3.6 In response to concerns over pulsed noise sources, JNCC staff developed, with regulators and industry, guidelines for the use of seismic airguns that were first published in 1995 (http://www.jncc.gov.uk/page-1534). Adherence to these guidelines is included as a condition of governmental consents to industry for exploratory and other geophysical surveys. Over the years, most recently in 2009, the guidelines have been reviewed in the light of scientific evidence, technical developments and operational understanding. It is impossible (and not ethical) to assess experimentally the effectiveness of the guidelines, but it is assumed that they allow time for the animals to move away from the vicinity of the airguns, minimising the risk of potential injury. The guidelines have raised the profile of the issue with relevant industries and caused a number of changes in industry behaviour that will have been beneficial. There is no direct evidence, including from the stranding scheme, that injury or death of harbour porpoises has occurred from seismic surveys. There is however evidence of behavioural change in harbour porpoises from seismic surveys (Stone & Tasker, 2006). Reporting mechanisms indicate that the guidelines are generally followed and that companies are aware of the risks to their activities if the licence conditions are not adhered to.

3.7 JNCC, NE and CCW staff have recently drafted guidance to marine users on how to assess the likelihood of committing a disturbance offence, how to avoid it and whether a licence might be required or not. This guidance has yet to be published by Defra. In order to minimise the risk of injury and disturbance to cetaceans, good practice guidelines and protocols have also been developed for pile driving (as used in windfarm construction). (http://www.jncc.gov.uk/page-4274) and the use of explosives (http://www.jncc.gov.uk/page-4900). It is too early to assess the effect of these guidelines.

Pollution

3.8 A working group on pollutants established under ASCOBANS, using information from a number of sources, identified the main pollutants affecting small cetaceans as chlorinated hydrocarbons and brominated flame retardants. These pollutants affect reproduction, growth and development (Reijnders, 2003). For example, harbour porpoises that have died as a result of infectious disease have significantly higher levels of polychlorinated biphenyls (PCBs) than healthy porpoises that have died of traumatic causes such as bycatch or bottlenose dolphin attacks. PCB contamination has also been linked to higher parasite burdens and reduced pregnancy rates in harbour porpoises (Jepson *et al.*, 2005).

3.9 Following earlier work, a five-year programme was established in 2000 that focused on measuring levels of organochlorines, especially PCBs, in harbour

porpoises and identifying indicators for their effects. As part of this, a tissue archive was established and, subsequently, samples have continued to be collected from stranded and bycatch individuals. Analysis of samples from 1990-2001 indicated a slight but not significant downward trend in total PCB levels in harbour porpoises (Jepson *et al*., 2005), but there is a difficulty caused by potential bias in samples – animals with high levels of pollutants are more likely to die and there are gender and age effects. There are insufficient samples from bycaught (relatively unbiased) animals for trend analysis at present.

3.10 Most of these pollutants are persistent chemicals that have been effectively phased out of use by both action under the OSPAR Convention and, more recently, the EU. However, their chemical stability will lead to them remaining in the marine environment for some time. Much of the work undertaken by the UK on identifying such impacts has contributed significantly to international consideration of the controls for these substances; the sampling scheme will be used to track this phase out and to help identify 'novel' pollutants.

Marine Protected Areas

3.11 There is presently much activity to establish Marine Protected Areas (MPAs) for nature conservation. This activity is driven by legislation including the EU Habitats Directive and the forthcoming Marine Acts. The EU Marine Strategy Framework Directive also requires that a network of sites be established and be used to help meet the overall objectives of that Directive.

3.12 The effectiveness of MPAs in conserving wide-ranging highly mobile species continues to be a source of debate (Evans 2008; Greenstreet *et al*., 2009; Le Quesne *et al*., 2009; Lovvorn *et al*., 2009). Where critical habitat (e.g. feeding and breeding areas used over the long-term by mobile species) can be identified, then an MPA may provide some added protection.

3.13 Harbour porpoise and all other cetaceans in UK waters are wide-ranging animals that change their spatial distribution over many timescales. Harbour porpoise is widely distributed, mainly in continental shelf waters. Satellite telemetry studies have revealed relatively large movements of tagged animals (at the scale of 100s of kilometres), including one from Danish waters into UK waters east of the Shetland Isles, a distance of some 1000 km in several weeks (Teilmann, 2004). Larger scale, long-term changes in distribution are apparent for the North Sea, where the area of highest density of porpoises has shifted several 100 km southwards in the last decade (Evans *et al.*, 2003; Haelters & Jacques, 2006; Hassami, 2006; Thomsen *et al*., 2006; SCANS II, 2008). At smaller scales, Marubini *et al.* (2009) observed large inter-annual fluctuations in relative abundance in an area of the northwest of Scotland. The nature and scale of these variations highlights the difficulty of defining important areas for harbour porpoises.

3.14 The country nature conservation bodies have worked with JNCC to consider the evidence to support the identification of harbour porpoise SACs within a

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UK context. Currently, the UK has 23 designated SACs which list harbour porpoise as grade D (i.e. present but in a non-significant manner), which means that they are not a qualifying feature[2] of the site, and hence no specific management measures are associated with the species on the site. The UK has no designated harbour porpoise SACs at grade C or above. The European Commission has given a strong indication it considers that the UK is insufficient in harbour porpoise SACs at grade C or above.

Disease

3.15 In other parts of the world, death of small cetaceans (although not including harbour porpoise) as a result of morbillivirus infection can be significant and has led to mass strandings (Di Guardo *et al*., 2005; Gulland & Hall, 2007; Fernandez *et al*., 2008; Van Bressem *et al*., in press). The occurrence of such events is thought to have been increasing over the last two decades. As part of the UK stranding scheme, the cause of death is determined where possible. Such determination includes an assessment of the occurrence of certain diseases. In the UK there have been no cases of distemper due to morbillivirus infection in any stranded cetacean examined since 2000 (inclusive).

3.16 Although there has not been a mass stranding as a result of disease, there remain concerns that outbreaks may occur in the future. Screening of stored samples is underway to identify the prevalence of morbillivirus in stranded animals that died as a result of other causes (e.g. bycatch).

Prey availability

3.17 Reduced prey availability has been linked to increased susceptibility to disease, starvation and exposure to contaminants in marine mammals. Insufficient prey leads an individual to utilise their blubber reserves and, consequently, results in a mobilisation of any accumulated contaminants, subsequently leading to increased susceptibility to disease (Reijnders, 2003).

3.18 Harbour porpoise feed on a wide variety of fish and within a wide variety of habitats, generally focusing on the most abundant local species. The predominant prey type appears to be bottom-dwelling fish, although shoaling fish such as mackerel and herring and small species such as sandeel are also taken (Santos & Pierce, 2003; Pierce *et al*., 2007). Whilst any reduction of food supplies as a consequence of fishing activity might be expected to have an impact on harbour porpoise populations, there is no evidence of a causal link between a reduction in prey caused by fishing activity and a decline in porpoise numbers.

3.19 It has been noted that, for north-east Scotland during the spring season, an increase in the proportion of stranded porpoises for which starvation was the cause of death correlated to a decline in proportion of sandeels in the diet (MacLeod *et al*., 2007a, 2007b). However, the biological significance of this

[2] Even when not a qualifying feature, porpoises are afforded protection by legally-required wider measures (see Annex 1), such as those relating to bycatch and disturbance.

correlation is uncertain, and considerably more research covering a larger area would be needed before causal links can be ascertained and generalised (MacLeod *et al*., 2007a, 2007b; Thompson *et al*., 2007).

3.20 The health status and stomach contents of harbour porpoises are assessed by post-mortem as part of both the cetacean stranding and bycatch schemes, Currently, JNCC staff are attempting to influence the review of the Common Fisheries Policy to ensure nature conservation needs are taken fully into account. Such needs include the assurance that fishery management takes full account of the needs of predators dependant on fish stocks being harvested by humans.

Climate change

3.21 The impact of climate change on marine mammals remains poorly understood. For cetaceans, direct impacts are likely to be observed in species that require a specific range of temperatures in which they can survive, whilst indirect impacts include prey availability affecting distribution and abundance as well as susceptibility to disease and contaminants. However, there are many confounding effects (e.g. human exploitation of the prey resource) and any changes observed may simply be the cetacean species responding to short-term regional variability in the prey resource rather than long-term climate change. As a result, there has been a great deal of speculation and conjecture but little substantive evidence at this time (Macleod *et al*., 2007a; Thompson *et al*., 2007).

Surveillance to assess conservation status

3.22 The amalgamation of the 1979-1999 European Seabirds at Sea data (that includes NCC/JNCC data) with 1973-1997 Seawatch Foundation effort-related sightings data and data from a July 1994 survey of the Celtic and North Seas formed the Joint Cetacean Database which enabled the production of JNCC's *Atlas of Cetacean Distribution in North-West European Waters* (Reid *et al*., 2003). This represented the most up-to-date statement on the distribution and relative abundance of all 28 species of cetacean recorded in UK waters in the latter part of the 20th century. It formed the baseline against which favourable conservation status assessments were made for cetacean species in 2007 under the Habitats Directive.

3.23 Since production of the Atlas, two further large-scale (and costly) surveys (SCANS II and CODA) examining the distribution and abundance of cetacean species, including harbour porpoise, have been undertaken, both with JNCC as a partner and with significant Defra funding. These have increased our knowledge of harbour porpoise abundance, distribution and movement at a variety of temporal and spatial scales. At much smaller spatial scales, cetacean surveillance is also undertaken on a regular basis by a wide variety of agencies, research bodies and voluntary organisations (e.g. Robinson *et al*., 2007; Weir *et al*., 2007; Macleod *et al*., 2009; Marubini *et al*., 2009; Shucksmith *et al*., 2009). To enable much of this additional work to be utilised in future assessments, JNCC staff are leading the development of the Joint

Cetacean Protocol. This will be a web-based portal for effort-related sightings data, and will enable our knowledge of distribution and relative abundance to remain current, thereby ensuring that up-to-date information is available when needed.

3.24 The cetacean surveillance and monitoring programme should be sufficiently robust such that significant natural seasonal variation in distribution and abundance can be determined. Our knowledge of biological parameters (growth rates, age at sexual maturity, reproductive rates, mortality and diet) and distribution of (sub-)populations of harbour porpoise in UK waters will need to be improved. The functional responses of cetaceans to environmental change through physiological and behavioural mechanisms are poorly understood and may differ at the (sub-)population level. Elucidation of such information should enable us to begin to identify when significant changes occur as a result of environmental variation and, ultimately, contribute to our understanding of the impact climate change might have on harbour porpoises.

4. The UK approach to harbour porpoise conservation

4.1 The UK approach to conserving harbour porpoises has not changed since the strategy was published in 2000. As far as can be ascertained, this is effective at this time. Conservation efforts concentrating on threat/impact reduction coupled with wider surveillance as a mechanism to assess progress and effectiveness are most likely to achieve success. In order to meet the requirements of the Habitats Directive and also obligations under ASCOBANS, assessing and maintaining the favourable conservation status of harbour porpoises will therefore require:

i. identifying and evaluating the risk of key threats to the favourable conservation status of harbour porpoise;

ii. monitoring of the key threats (primarily bycatch through the bycatch monitoring scheme, but also through the stranding scheme to identify any novel threats);

iii. implementing measures to reduce identified threats and monitoring their effectiveness;

iv. undertaking wider surveillance and assessment of the species to prioritise threats in a population context;

v. identifying SACs where they accord with the relevant terms of Article 4.1 of the Habitats Directive[3] and carefully considering management measures within sites and the wider implications outside sites.

4.2 This will require significant international cooperation to succeed, which is being progressed through both the International Council for Exploration of the

[3] 'For aquatic species which range over wide areas, such sites will be proposed only where there is a clearly identifiable area representing the physical and biological factors essential to their life and reproduction'

Sea (ICES) and ASCOBANS. Once the cetacean surveillance and monitoring programme has been in place for a number of years, we will be in a better position to reassess our approach to harbour porpoise conservation and its effectiveness.

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Annex 1. Requirements of the Habitats Directive and other obligations

Habitats Directive

Article 2 of the Habitats Directive requires that '*measures taken pursuant to this Directive shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*' which includes the harbour porpoise.

Article 3 of the Habitats Directive requires that Member States contribute to a coherent European ecological network of special areas of conservation (SACs) which should include sites for harbour porpoise. Article 4(1) states that '*for aquatic species which range over wide areas, such sites will be proposed only where there is a clearly identifiable area representing the physical and biological factors essential to their life and reproduction.*'

Article 11 requires that *'Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2.*'

Article 12(1) states that '*Member States shall take the requisite measures to establish a system of strict protection for the animal species* (including harbour porpoise) *prohibiting:*

(a) all forms of deliberate capture or killing...
(b) deliberate disturbance...
(d) deterioration or destruction of breeding sites or resting places.

In 1994, the offence of 'deliberate disturbance' was introduced by the various Habitats Regulations that implement the Directive. In 2007, the Offshore Marine Regulations were introduced, which extended this offence beyond 12nm.

Article 12(4) requires the establishment of '*a system to monitor the incidental capture and killing of animal species listed in Annex IV(a)*' and take appropriate measures to ensure that this does not have '*a significant negative impact on the species concerned*.' Additionally, Council Regulation 812/2004 requires the monitoring cetacean bycatch levels and also the use of acoustic deterrent devices ('pingers') in specified fisheries and areas.

EU Council Regulation 812/2004

This regulation lays down measures concerning incidental catches of cetaceans in fisheries and also amends regulation (EC) No. 88/98. The measures pertinent to the UK include:

- the coordinated monitoring of cetacean bycatch through compulsory onboard observers for given fisheries
- the mandatory use of acoustic deterrent devices ('pingers') in certain fisheries

The two main species affected by fishing in UK waters are the harbour porpoise and the short-beaked common dolphin.

ASCOBANS

The UK also has obligations under the Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS). The Agreement aims to

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co-ordinate and implement conservation measures internationally for small cetaceans. The Agreement requires Parties to make efforts towards reducing bycatch in fishing nets, pollution and disturbance by recreational and seismic activities as well as monitoring abundance and distribution of small cetacean species.

The ASCOBANS conservation and management plan requires that '*each party shall endeavour to establish efficient system for reporting and retrieving bycatches and stranding specimens and to carry out … full autopsies in order to collect tissues for further studies and reveal possible causes of death and to document food composition.'*.

ASCOBANS has recently developed the North Sea Conservation Plan for harbour porpoises. The primary focus of the Plan is on those threats that affect the conservation status of the population, noting legitimate concerns that there may also be threats on the welfare of the individual animals. This plan was formally adopted at the 2009 Meetings of the Parties. The obligations of ASCOBANS are complimentary to the legal requirements of the Habitats Directive and, therefore, implementing them will aid the UK in ensuring the favourable conservation status of harbour porpoise and other small cetaceans.