
THRESHOLD FOR DESIGNATION OF SPECIAL AREAS OF CONSERVATION FOR HARBOUR PORPOISE AND OTHER HIGHLY MOBILE, WIDE RANGING MARINE SPECIES

(Annex 1 to JNCC Committee paper P10Sept08, amended 13 February 2009).

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Summary

The issues around the potential designation of SACs for harbour porpoise *Phocoena phocoena* in UK waters were originally discussed by the JNCC Joint Committee in 2004. At that time it was decided that, on the basis of the then available information, there was no strong case to support SAC proposals specifically for harbour porpoise. Subsequently, more information on harbour porpoise distribution and abundance has become available. Consequently, this paper considers such information and develops a set of criteria for the designation of SACs for harbour porpoise. Although predominantly focused on offshore sites with consideration given to the grading for this species feature on the dSAC Dogger Bank, the findings are also applicable to inshore sites. A summary is also provided on how other EU Member States have designated their harbour porpoise SACs.

SECTION 1: Introduction

1.1 Grading of Annex II species features in SACs

The criteria for selecting SACs for Annex II species are set out in Annex III of the Habitats Directive. They are:

1. size and density of the population of the species present on the site in relation to the populations present within the national territory
 - A: >15% to 100% of national population
 - B: >2% to 15% of national population
 - C: >0% to 2% of national population
 - D: non significant presence (if graded D, no further consideration of additional criteria is required);
2. degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities
 - A: excellent conservation (regardless of ability to restore)
 - B: good conservation (well conserved regardless of possibility to restore OR average or partially degraded condition and easy to restore)
 - C: average or reduced conservation (and all other combinations);
3. degree of isolation of the population present on the site in relation to the natural range of the species
 - A: population (almost) isolated
 - B: population not isolated, but on margins of area of distribution
 - C: population not isolated within extended distribution range;
4. global (overall) assessment of the value of the site for the conservation of the species concerned
 - A: Site supports an outstanding population of the Annex II species in a European context
 - B: Site supports an excellent population of the Annex II species, but of somewhat lower value than grade A sites
 - C: Population of Annex II species is of at least national interest but not significantly above this. This species is not the primary reason for the SAC being selected.

The European Commission employs a system of grading using A, B, C and D for site selection/evaluation purposes. These grades are applied to each of the four elements referred to above. A site for which an Annex II species is identified as a primary reason for selection will need to be graded A or B. For sites graded C, the species will not be a primary reason for selection, but the species will be a 'qualifying feature', requiring conservation objectives and management measures (e.g. appropriate assessment). Where a species is graded 'D' for site it is considered to be a 'non-significant presence' and will not require conservation objectives.

The agreed UK policy for identifying site boundaries is based on overall grade A and B habitats and species only. Grade C habitats and species are added where they occur within those sites, but the site boundaries are not altered or extended to capture grade C features (nor sites proposed only for grade C features). Grade D features have no specific requirements beyond mention of their presence.

In relation to the selection of SACs, Article 4.1 of the Habitats Directive states that '*for animal species ranging over wide areas these sites shall correspond to the places within the natural range of such species which present the physical and biological factors essential to their life and reproduction. 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.*'

While some wide-ranging aquatic species have clearly-defined breeding/nurturing/feeding areas (i.e. areas 'essential to their life and reproduction'), harbour porpoise is naturally widely-distributed in north-west European waters, and relatively little is known about their breeding behaviour. In addition, there are few obvious natural site boundaries for mobile species in the open sea. In practice, therefore, Article 4, and Annex III, have proved difficult to apply to this species.

To address this problem, the European Commission held an expert workshop in December 2000 and published guidance on the designation of SACs for harbour porpoise in 2007 (EC, 2007). While it may not be feasible to achieve a high level of representation of harbour porpoise in the SAC network, the guidance states that '*it is possible to identify areas representing crucial factors for the life cycle of this species. These areas would be identifiable on the basis of:*

- *the continuous or regular presence of the species (although subject to seasonal variations);*
- *good population density (in relation to neighbouring areas);*
- *high ratio of young to adults during certain periods of the year and*
- *other biological elements are characteristic of these areas, such as very developed social and sexual life.'*

The guidance also states that '*defining boundaries for 'sites' in offshore waters which support a given percentage of the national population of some mobile species may be difficult due to the lack of obvious natural boundaries (such as coast, topographical boundaries, etc.) in the open sea. This criterion is also challenging to use in the offshore marine environment where populations may often be distributed across several national boundaries.'*

The EU 2007 guidance considered the issue of SAC for harbour porpoise in the context of the absence of any well-defined natural boundary, and in the context of devising practical selection criteria, where that species would be a primary designation feature (i.e. areas graded A or B). Detailed consideration was not given to a situation where a marine site was being proposed for another (e.g. habitat) feature, and where there was a need to determine whether the occurrence of harbour porpoise on the site should be graded C or D (still taking account of the restriction placed by Article 4 on designating SAC for wide-ranging aquatic species).

This paper develops a protocol that incorporates advice on the A and B grades so that it is comprehensive in relation to harbour porpoise, but the main element relates to the grading of sites for harbour porpoise for which there is an existing well defined site boundary such as an A or B grade habitat feature.

In summary, the protocol provides that:

- i. for areas for which there is no pre-determined boundary, then the four sub-criteria (including the 'other biological elements' issue) should be assessed first. If a Grading of A or B appears justified, then a provisional site boundary could be drawn and the population estimated and an overall score for the element derived;
- ii for areas where a pre-determined boundary does exist, then the four sub-criteria can be scored separately, the size of the population can be estimated and an overall score derived for the element from these. This part of the protocol allows sites to be graded C or D.

In practice, the quality and type of data needed to apply some of the sub-criteria (e.g. young to adult ratio) is more difficult to obtain than for others (e.g. density and population size), and this is why identifying sites for A and B grading has been so difficult, and is impractical at present in offshore waters. Current data is, however, sufficient for determining C and D grading for many sites.

SECTION 2: Harbour porpoise biology and ecology

2.1 Harbour porpoise population structure in UK waters

Although the species is frequently described as “coastal”, harbour porpoises in UK waters are widely distributed over the continental shelf and not particularly concentrated close to the shore. Most harbour porpoise are solitary and any schools are small consisting of less than 8 individuals, however very occasionally they form large, loose aggregations of 50 to several hundred animals (Hammond et al., 2002; Thomsen et al., 2006). In the North Sea and adjacent waters, mean school size is between 1.13 and 1.65 animals (Hammond et al., 2002; Thomsen et al., 2006).

There has been much debate regarding the genetic structuring of harbour porpoises in the eastern North Atlantic. Most studies to date indicate that the differences exist in females rather than males, indicating females are more philopatric than males.

With respect to females, Walton (1997) reported genetic differences between porpoises from the northern and southern North Sea and between the northern North Sea and the Celtic/Irish Sea; whilst Tolley et al (1999) found differences between the Norwegian and UK North Sea. Similarly, Andersen et al (2001) found differences between the UK North Sea and Norwegian samples and also distinguished additional Danish North Sea and Irish Sea subpopulations.

More recently, harbour porpoises within the eastern North Atlantic have been demonstrated to show geographic structuring as a consequence of limited gene flow along parts of the coast (Tolley & Rosel, 2006). Similarly, genetic analyses by Fontaine et al (2007) indicated that the harbour porpoises of the eastern North Atlantic behave as a ‘continuous’ population that extends from the French coasts of the Bay of Biscay northwards to the arctic waters of Norway and Iceland.

The ASCOBANS/HELCOM population structure workshop held in 2007, concluded that for the North Sea there is some population structure, but the evidence was currently insufficient to define boundaries between any (sub-) populations (ASCOBANS, 2008). In summary and for the purposes of this paper, two potential harbour porpoise subpopulations are recognised as using our waters: the North Sea group, which extends round the Scottish west coast, and the Irish and Celtic Seas group. The southern split between these two groups is located in the English Channel, where the species is generally absent in the central region. The split between the two groups on the west coast is less obvious, but is likely to occur between northern Ireland and Scotland where relatively few sightings were made during SCANS II. It is proposed that these two potential sub-populations be adopted as the biologically-meaningful populations for the purpose of evaluating the importance of individual areas for SAC selection with respect to harbour porpoise.

2.2. Harbour porpoise mobility

Harbour porpoises are a highly mobile species, with individuals moving on a widescale over a short time as well as large scale population movements over longer (e.g. decadal) time scales.

In the USA, individual harbour porpoises have been reported to occupy ranges of up to 11,290 km² covering much of this area within a month, but generally they tend to concentrate their movements in small areas of approximately 290 km² (Johnston *et al.*, 2005). These areas often approximated to particular topographic and oceanographic features and were believed to be associated with prey aggregations (Raum-Suryan and Harvey, 1998; Johnston *et al.*, 2005; Keiper *et al.*, 2005). In Danish waters, harbour porpoises have been shown to concentrate their movements in slightly larger areas, ranging from approximately 400 to 1600 km² (Teilmann et al., 2004). Satellite telemetry work has revealed relatively large movements of tagged animals, including several from Danish waters into UK waters east of the Shetland Isles (Teilmann et al., 2004), a distance of over 1000km. More recently, Marubini et al (in press) have demonstrated that the relative abundance of harbour porpoises showed no consistent trend between years (over a 5 year period) in the Minches to the west of Scotland. These authors further showed that relative abundance fluctuated significantly, with increases and/or decreases of as much as four-fold between consecutive years. Similarly in German waters, no apparent seasonal trends were observed in abundance or the proportion of calves

present over a three year period (Thomsen et al., 2007). However, most studies on the movements of harbour porpoises have been undertaken in complex nearshore environments where movements are constricted by the presence of land. Movements and behaviour may therefore differ in the offshore environment where no such restrictions exist. This is however unknown at present.

At a greater spatial and temporal scale, changes in population distribution have become apparent in the North Sea, where the centre of porpoise distribution has shifted southwards over the last decade (Evans et al., 2003; Haelters & Jacques, 2006; Hassami, 2006; Thomsen et al., 2006; Hammond & McLeod, 2006).

2.3. Biological versus national population

Under the Habitats Directive, SACs are to be designated on the basis of national population. Where a species regularly moves across national boundaries, the 2007 guidance states *‘recent progress in the use of geostatistical techniques to identify densities and distribution centres in space and time for mobile species such as cetaceans and birds can support the site selection process for mobile species.’*

Article 3 of the Habitats Directive also states *‘each Member State shall contribute to the creation of Natura 2000 in proportion to the representation within its territory of the natural habitat types and the habitats of species’* with guidance indicating that between 20% and 60% of the national population of an Annex II species should be included within a Member State’s contribution to Natura 2000.

For highly mobile species such as harbour porpoise, the ‘national population’ is much less relevant, ecologically, than a biologically-meaningful population. Although geostatistical referencing can be used to designate sites on the basis of national population, it assumes that the artificial division of biological populations along national boundaries will translate into adequate conservation for the species and maintenance of favourable conservation status at the national level. For a highly mobile, wide ranging species such as harbour porpoise, this is an unrealistic assumption unless existing data can demonstrate continued and regular usage of the site over a long time period. Even then, movement of individuals may result in a site being considered unfavourable in future assessments due purely to normal animal behaviour. For example, the Moray Firth bottlenose dolphin SAC was graded unfavourable (no change) in the 2006 assessment which has subsequently been changed to unfavourable (recovering) in light of improved understanding of the species use of the SAC and the surrounding waters (Thompson et al., 2006; Wilson, 2008).

Consequently, it is proposed that, for the purposes of evaluating the relative importance of areas for harbour porpoise, the context should be the biologically meaningful population and not the national population. This was also the approach recently adopted by the UK for reporting favourable conservation status of cetaceans under the Habitats Directive.

SECTION 3: Examples of the criteria used for the designation of SACs for harbour porpoise by other Member States

Approaches were made to Ireland, France, Germany, Denmark, Sweden, Finland, the Netherlands, Belgium, Spain and Portugal. No response has so far been received from Portugal and the Netherlands whilst an extremely limited response was received from France. Belgium are not currently considering designation of any SACs for harbour porpoises as their temporal and spatial occurrence is too variable in Belgium waters (Jan Haelters, pers. comm.). Neither are Finland considering designation of sites for harbour porpoises due to the limited numbers observed (only 2 to 3 observations per year) (Penina Blankett, pers. comm.). Spain are not considering SACs for harbour porpoises at this time (Ana Canadas, pers. comm.), but have provided details with respect to their bottlenose dolphin designations.

3.1 Republic of Ireland

The Blasket Islands cSAC has been proposed for harbour porpoises on data indicating higher densities than surrounding areas. This site is likely to be graded C (David Lyons, pers comm.).

Initially potential sites, including the Blasket Islands, were identified from sightings records held by the Irish Whale and Dolphin Group (IWDG). Subsequently, with 12 months of survey work over a single year, Berrow et al. (2007) estimated that densities were highest between July and September (0.71 to 3.39 animals km⁻²) within the Blaskets Islands cSAC. This equates to approximately 0.5% of Ireland's national estimated harbour porpoise population. This excludes Northern Ireland. Similar survey work is being conducted through 2008 at seven other potential sites. The densities within the Blaskets Islands cSAC are considered likely to be representative of those used as a threshold density for designation, although completion of the 2008 survey work is expected to develop this further.

3.2 Sweden

Two sites have been identified as Natura 2000 sites in the Skagerrak which list harbour porpoises (grade D), Vranoskargarden and Koster-Vaderofjorden. This was based solely on sightings data. Currently, surveys using static acoustic techniques are being undertaken at present to establish regularity of presence in these areas (Christina Rappe, pers. comm.).

3.3 Germany:

Three selection criteria were considered for designation of sites:

- continuous or regular presence over May to August (coverage in autumn and winter was very low by comparison to the spring/summer data),
- high population density (approximately >2 individuals km⁻²) and
- a high ratio of mother-calf pairs (60% of sightings).

No justification for the density threshold used has been provided. In the North Sea, only one site, Sylt Outer Reef, qualified under these criteria (Gilles et al., 2008). The densities recorded at this site were 2.7 animals km⁻² in 2002 and 3.7 animals km⁻² in 2003.

Despite these results, Germany has also designated two other harbour porpoise SACs in the North Sea: Dogger Bank and Borkum Reef. Densities recorded at these sites were 1.0 and 1.5 animals km⁻² in 2002 and 2003 respectively for Dogger Bank, and 0.4 animals km⁻² at Borkum Reef for both years.

The Dogger Bank site was designated for its sandbanks habitat, but is also graded B for harbour porpoises (Population B, Conservation B, Isolation C, Global B). This was on account of the site having a higher density of animals present than surrounding North Sea areas and it was considered to represent a calving area (Figure 1; Jochen Krause, pers. comm.).

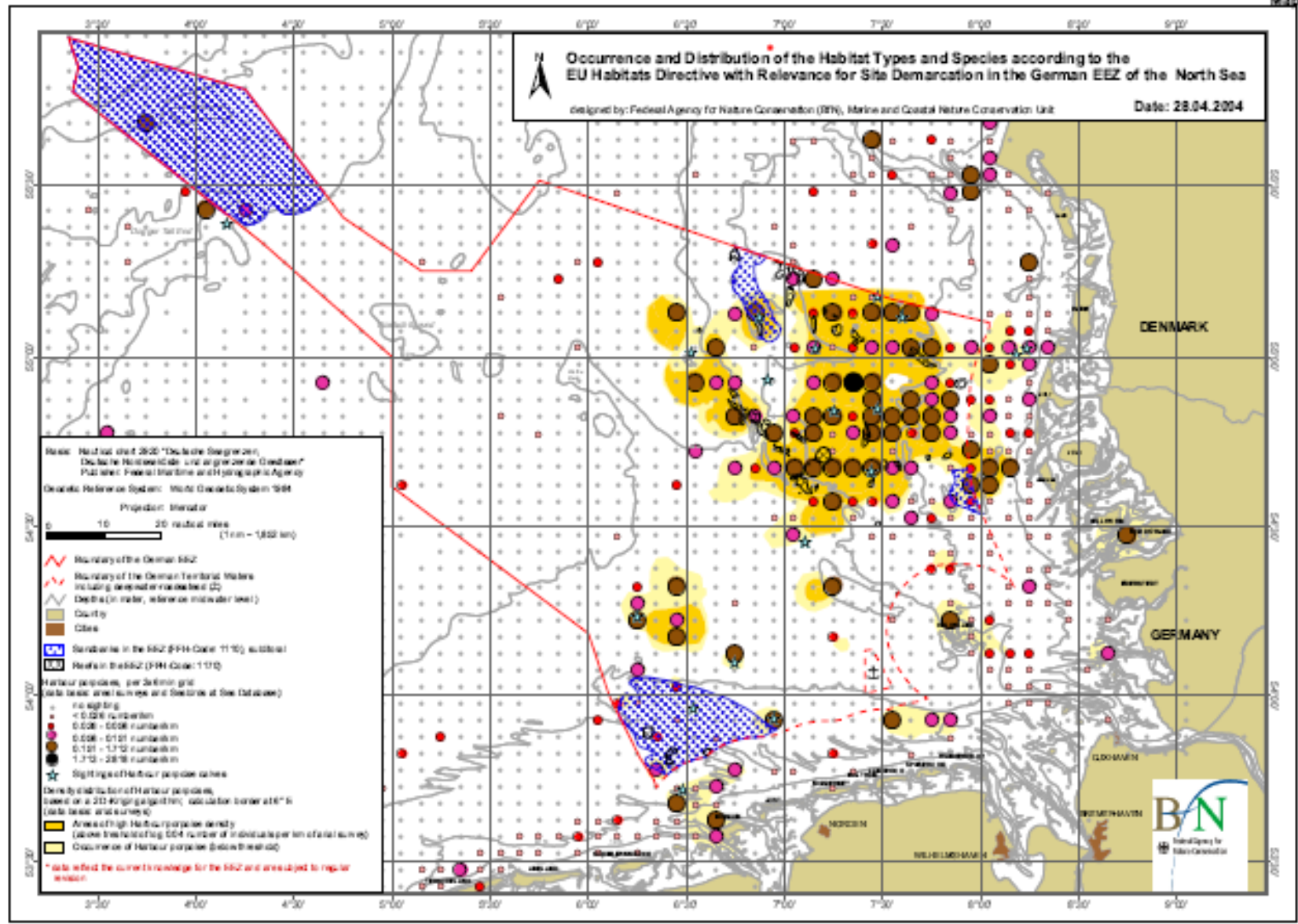
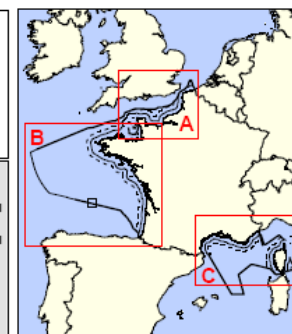
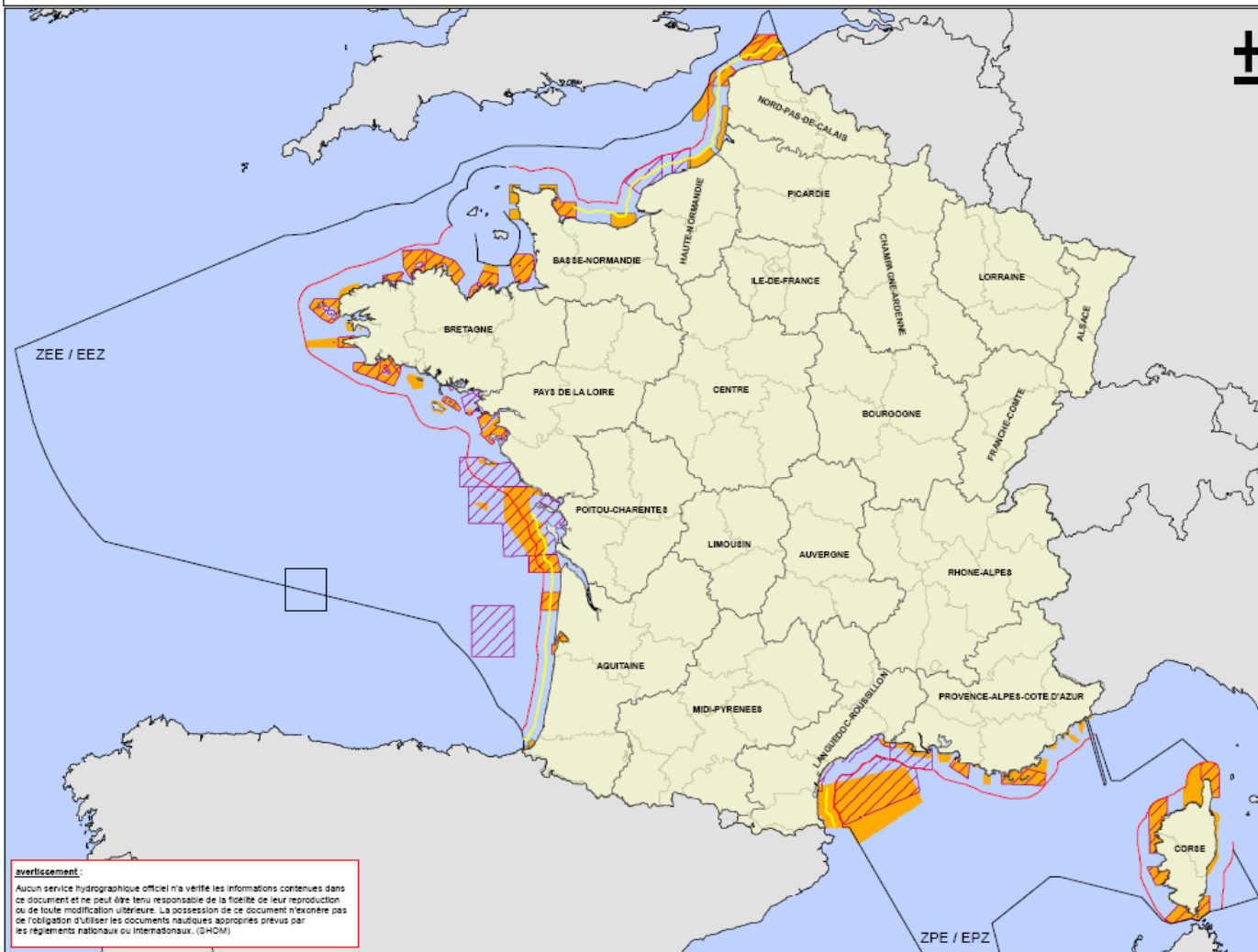


Figure 1: Germany's North Sea SACs at Dogger Bank, Sylt Outer Reef and Borkum Reef



PROJETS DE SITES EN MER (DIRECTIVES OISEAUX ET HABITATS-FAUNE-FLORE)
SITES PROJECTS AT SEA (BIRDS AND HABITATS-FAUNA-FLORA DIRECTIVES)



Sites Natura 2000 en mer
Natura 2000 at sea sites

- Directive Oiseaux
Birds Directive
- Directive Habitats-Faune-Flore
Habitats-Fauna-Flora Directive

Droits historiques de pêche
Historics fisheries rights

- Reg. CE 2371/2002

Délimitations maritimes
Maritime boundaries

- ZEE/ZPE
EEZ/EPZ
- Mer territoriale (12 milles)
Territorial sea (12 miles)



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système géodésique : WGS 84
 ellipsoïde associé : IAG GRG 1980
 projection : Mercator

sources des données :
 DIREN/AAMP (périmètres Natura 2000 en mer);
 SHOM (contrat 20/2008 (limites réglementaires en mer);
 GEBCO (bathymétrie);
 FAO/IGN (découpage administratif)

conception et mise en forme géomatique :
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Figure 2: Proposed French marine Natura 2000 sites

3.4 Denmark

'Designating protected areas for harbour porpoises implies identifying areas of high porpoise density with particular focus on the distribution during the breeding season' (Teilmann et al., 2008).

The primary data used to identify key areas for harbour porpoise was the satellite tracking of 63 animals between 1997 and 2007. 20 days continuous presence by individuals in an area was considered as a threshold for identification of a key area, and assumes that due to the high level of tagging that the satellite locations are representative of the population distribution. Additionally, high density areas were identified from aerial and ship surveys. Because area coverage was high and even, Denmark used a kernel density technique to identify high density areas rather than a specific density threshold. For the North Sea, three sites have been identified as being of high importance: German Bight, Horns Rev and the Tip of Jylland. A fourth, Skagerrak, has been identified as being of medium importance. There was a recommendation for additional satellite tagging work to confirm area usage for the North Sea, particularly the Dogger Bank area in light of Germany's B grade SCI for harbour porpoises which borders Danish waters. Unfortunately, Teilmann et al (2008) do not present the actual densities of harbour porpoises at these sites.

3.5 France

Recently France released proposals for Natura 2000 sites, of which 28 SACs list harbour porpoise as a qualifying feature (Figure 2). In the English Channel, 10 are graded D (non-significant presence) and a further 3 at least C (documentation suggests greater than D but does not provide the grading, clarification has been requested but not yet provided). In the Atlantic, a further 15 are graded at least C (documentation as above). No specific designation thresholds were used, instead local authorities made decisions based on best available information whilst waiting for further studies to be completed (Laurent Germain, pers comm.).

3.6 Spain

Although Spain are not considering the designation of sites for harbour porpoises, they did provide information on the designation criteria used for bottlenose dolphins. Bottlenose dolphins in the Strait of Gibraltar and the Alboran Sea are generally wider ranging than their inshore UK counterparts, and may therefore be considered similar in nature to harbour porpoises with respect to the designation of SACs.

Canadas et al (2005) used spatial modelling which incorporated data on the environment with abundance estimates to generate spatial predictions of relative density based on the preference for habitats and feeding areas defined by combinations of environmental covariates. Four suggested SAC were identified, one of which has recently been approved by the Spanish Government.

It should be noted that this was an extremely large and expensive piece of work undertaken with EU Life funding

3.7 Summary of approaches

Those Member States surveyed have approached the designation of SACs for harbour porpoises in differing ways. Of the methodologies used, there is no single approach that is obviously better than any other that could be adopted by the UK as an example of best practice. Each approach has been chosen in response to the amount and type of data available. Currently the UK do not have data sets similar to that held by Denmark, Germany, Ireland or Spain whilst in France no consistent approach for designation was apparent.

SECTION 4: Proposed UK designation criteria for harbour porpoise

4.1 Information availability leading to 2004 JNCC Joint Committee decision

Bravington et al., (2002) used the harbour porpoise data contained within the Joint Cetacean Database (JCD, see <http://www.jncc.gov.uk/page-1554>) to try to identify hot spots for this species. Although some evidence of high use areas were found in the central/southern Irish Sea, north Minches and east of the Moray Firth and Firth of Forth, no persistent areas of high porpoise density were found. Evans & Wang (2003) also used the JCD data set and additional Seawatch Foundation sightings records to identify potential harbour porpoise sites. Four areas where harbour porpoises occurred regularly during the year and at above-average densities over the summer months were identified. These were: east coastal waters of Shetland, eastern Minch and adjacent waters; southern Cardigan Bay and northern Pembrokeshire coast; and the north Devon coast. They also identified a number of other areas with above-average densities but where occurrence was less regular, one of which was east of the Wash but not as far offshore as Dogger Bank.

JNCC and CCW subsequently commissioned two independent reviews of the foregoing analyses to identify the strengths and weaknesses of the analyses, reach conclusions about the robustness of the methods and assumptions behind them, and of the interpretations drawn from them. These independent reviews considered that the analytical methods employed by Bravington et al. (2002) were robust and the results would be likely to reflect areas of higher than average porpoise density. They noted that 'regularity' of occurrence (as opposed to simply high density), was rather weakly reflected in the data analyses carried out. Also, the datasets used in the Bravington analysis would largely preclude the identification of high density areas in coastal localities.

The independent reviewers considered that, in contrast, the analysis undertaken by Evans & Wang (2003) could favour coastal localities (which contributed over 60% of the data analysed). Moreover, they considered that the analytical methods employed by Evans & Wang (2003) should have been weighted to take account of differences which could be expected to occur between the frequency of sightings recorded from moving vessels and from stationary vessels; they also observed that Evans & Wang (2003) data could have been biased towards known porpoise-sighting areas. A probable consequence of such bias would be that the results would show higher densities of harbour porpoise for coastal sites (where records were largely from land-based static observation points) than for offshore sites (where records were largely from boats). The reviewers also considered that the Evans and Wang analysis may have 'over-interpreted' the significance of the results in terms of identifying important areas.

Following these analyses, the Joint Committee concluded that there was not a strong case for proposing a SAC for harbour porpoise in any UK sea area on the basis of (the then) available information with the exception of the north Pembrokeshire Coast/south Cardigan Bay area, where the case appeared stronger. However, they did not consider the issue of harbour porpoise use of proposed habitat SACs away from the coast as that issue had not arisen as a material consideration in relation to any of the sites being proposed or recommended at that time.

4.2 Consideration of offshore bottlenose dolphin SACs

In 2005, consideration was given to the designation of offshore SACs in UK waters for bottlenose dolphins (Reid, 2004). From the information contained with the JCD, significant differences between sightings rates in near-shore and offshore were noted, with sightings rates in offshore waters being much lower. Only in the vicinity of the Wyville Thomson and Ymir Ridges to the north-west of Scotland were offshore sightings rates similar to those observed for the Moray Firth and Cardigan Bay, already designated as SACs for this species.

Despite there being survey effort in the Wyville Thomson and Ymir Ridge area for all months of the year, the JCD indicates that animals were recorded in this offshore "cluster" in only four months (September to December), compared with 10 and 12 months respectively in the Moray Firth and Cardigan Bay. Additionally, it was not possible to clearly identify an area that might represent the physical and biological

factors essential to bottlenose dolphin life and reproduction in this offshore area. Similar to Bravington et al. (2002), this study highlighted that the JCD needs to be used in concert with information on the regularity of occurrence and other biologically relevant data if it is to be used to inform evaluations of the relative importance of areas for SAC purposes.

4.3 Improved understanding of harbour porpoise distribution and abundance

Since the Bravington et al (2002) and Evans & Wang (2003) reports, more data on harbour porpoise distribution and abundance have been collected, most notably during the SCANS II survey undertaken in July 2005. However, none of these data was collected specifically to address the issue of SAC identification. The primary reason for proposing the Dogger Bank as an SAC is for its Annex I shallow sandbank habitat. However, harbour porpoises are the most abundant cetacean in the North Sea and are known to occur within the proposed boundaries of the dSAC.

4.4 Designation criteria for harbour porpoise SACs

As regards the need to demonstrate that proposed sites are ‘essential to the life and reproduction’ of the harbour porpoise, Johnston et al (2002) and EU Guidance (2007) proposed that three key criteria are used for the assessment of potential SAC sites in the absence of any clearly definable boundaries:

- Continuous or regular presence of the species (subject to seasonal variations)
- Good population density (in relation to neighbouring areas)
- High ratio of young to adults during certain times of the year

The EC Guidance (2007) also proposes a fourth criterion:

- other biological elements that are characteristic, such as very developed social and sexual life

However, no guidance has been provided on how any of these relate to the grading of site features, nor how they relate to the established principle that the relative importance of areas for supporting Annex II species should be taken into account. As such, each of these criteria will be considered with respect to the data available for UK waters and divisions for particular gradings suggested. These divisions will then be applied specifically to the data available on harbour porpoise at the proposed dSAC at Dogger Bank.

4.4.1 Continuous or regular presence of harbour porpoise (subject to seasonal variation)

Using the continuous or regular presence of bottlenose dolphins at sites that have already been designated or proposed for designation for this species as a guide: sites designated specifically for bottlenose dolphins (e.g. Moray Firth and Cardigan Bay SACs) with a continuous presence for 10-12 months of the year were graded A or B, whilst sites (e.g. the proposed site at the Wyville Thomson and Ymir Ridges) with a continuous presence over 4 months of the year were graded D.

When survey effort covers 12 months of the year, and using the above examples, the suggested divisions for harbour porpoise grading of presence are:

- 1-4 months of the year continuous presence: D grade
- 5-9 months of the year continuous presence: C grade
- 10-12 months of the year continuous presence: A/B grade

Although effort is not equivalent for all months of the year, a recent reanalysis (Pinn, unpublished) of the JCD data set (1973-1999) by month indicated the presence of harbour porpoises in the Dogger Bank area between March and November (inclusive). Following the above divisions, the presence of harbour porpoise at Dogger Bank dSAC for 9 months of the year indicates a C grade.

4.4.2 Population density of harbour porpoises (in relation to neighbouring areas)

Denmark, Germany and Ireland have used this criteria as the key criterion for site identification. Ireland has undertaken this work on the basis of the entire national population whilst Germany and Denmark have undertaken it with respect to their national waters but on a regional sea scale. For example, Germany compared abundance of harbour porpoises on their North Sea sites to their national waters of the North Sea and Baltic sites to their Baltic Sea national waters.

The UK Interagency Marine Mammal Working Group, comprised of the nature conservation agencies, with advice from the Sea Mammal Research Unit (University of St Andrews), have indicated that abundance comparisons should be undertaken in the context of the biological population. This goes a step beyond what Denmark and Germany have done and would mean placing, for example, proposed North Sea sites in the context of the North Sea as a whole and not UK national waters. Such information could be derived indirectly from effort related sightings rates (e.g bottlenose dolphins at Wyville Thomson and Ymir Ridges) with appropriate statistical analysis. Additionally, the abundance of harbour porpoises at a particular site should be significantly above the expected or background level to increase the grade above D (Johnston et al., 2002).

Using annual effort related sightings rates (eg JCD data) placed in the appropriate biological context, and using the above examples, the suggested divisions for grading population sightings rates of harbour porpoise in relation to neighbouring areas are:

- No statistically significant difference in sightings rate for the proposed site and neighbouring areas: D grade
- Statistically significant difference at $p < 0.05$: C grade
- Statistically significant difference at $p < 0.01$: B grade
- Statistically significant difference at $p < 0.001$: A grade

The JCD monthly effort related sightings rates were as high as 2.08 animals per hour, although they were usually lower (regularly ranging from 0.01 to 1.59 animals per hour) for the Dogger Bank area. Comparison of the annual sightings rate data for the dSAC at Dogger Bank, the North Sea excluding the dSAC and the North Sea as a whole indicate no significant difference (Figure 3) and, as such, suggest that dSAC is no more important for harbour porpoises than other parts of the North Sea. Using the above divisions, this indicates that a D grading would be most appropriate for this criteria.

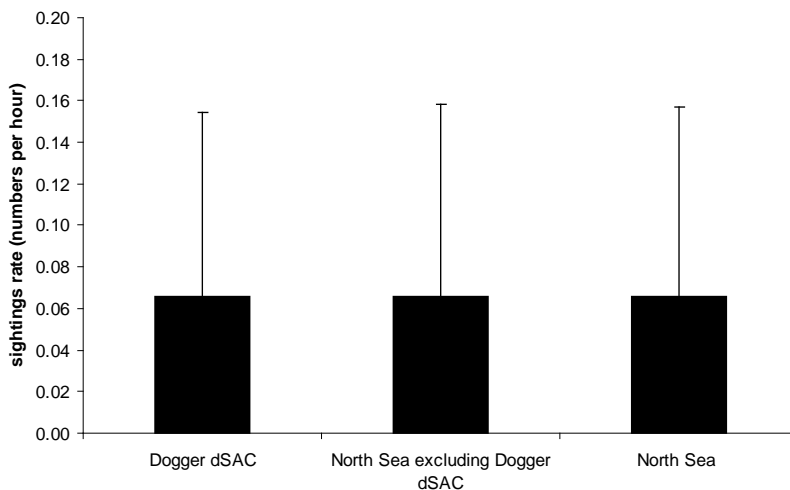


Figure 3: Comparison of mean sightings rates for Dogger dSAC and the North Sea from the annual JCD data (error bar shows standard deviation).

dSAC Dogger Bank covers an area of approximately 15,057km², which represents 2.6% of the North Sea area excluding the Channel. 2.6% of the North Sea population therefore represents the expected or background level of the proposed site and the nominal division between grading it a C (>2.6%) or D (<2.6%).

Considering the North Sea population as a whole, relatively crude estimates based on the relevant SCANS survey block indicate that approximately 2.5% of the North Sea harbour porpoise population was present within the dSAC in June/July 1994 and 4.6% in July 2005. As such, only the 2005 survey indicates a greater than average density in the North Sea. The variance (CVs) of these estimates, however, indicate that the differences observed are not significant (Phil Hammond, pers. comm.) and consequently a D grading for density would be most appropriate.

It should be noted that the proposed UK site is linked to a proposed Dutch site and a designated German site, giving a total area of coverage of approximately 21,500km². The German site is graded B for harbour porpoises, but the site boundaries are based on the distribution of sandbanks habitat. From the density surface modelling undertaken using the two SCANS datasets (SCANS II, 2008), the UK dSAC on Dogger held an equivalent density or proportionally higher density of harbour porpoises than did the designated German SAC (Figure 4). Similar estimates to those undertaken for the proposed UK site, indicate similar proportions of the North Sea population utilising the various sites (Table 1). All these estimates indicate that a grade D would be most appropriate for the UK, Dutch and German sectors of the Dogger Bank. It should be noted that Germany do not use the SCANS data when deciding on the designation of Dogger Bank, but instead used site specific aerial survey work in 2002 and 2003.

Table 1: Proportion of North Sea harbour porpoise population using the proposed and designated SACs on Dogger Bank.

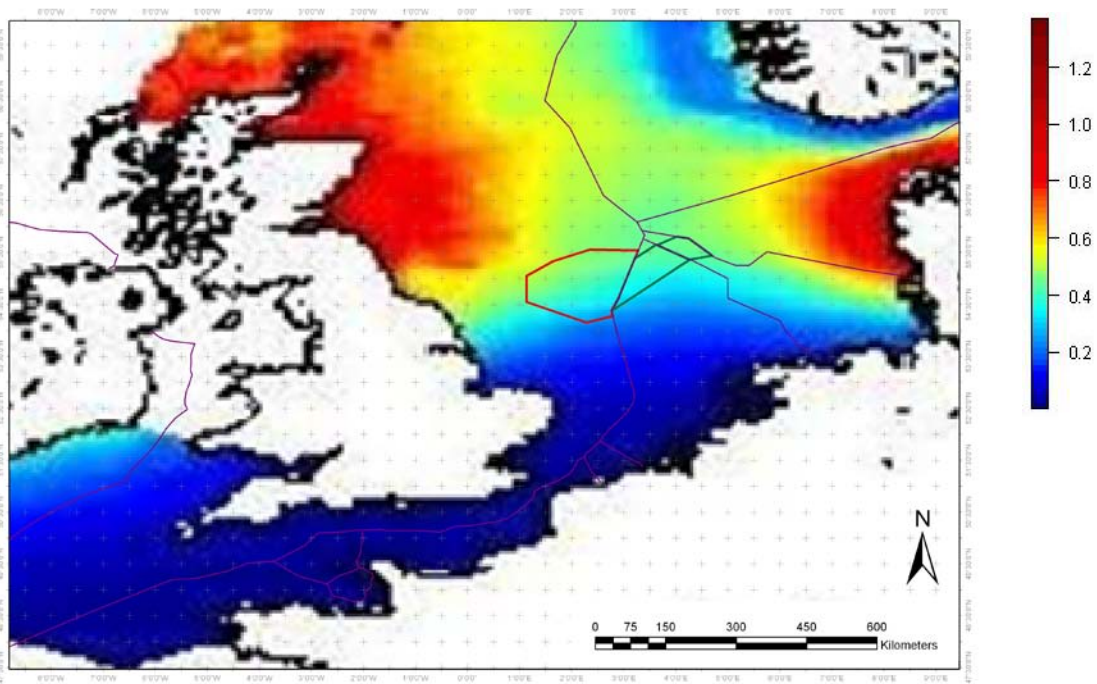
	Area of site (km ²)	% area coverage of North Sea	% of North Sea population 1994	% of North Sea population 2005	% area of country's EEZ in North Sea
UK dSAC	15,057	2.6	2.5	4.6	6.0
Dutch dSAC	4,694	0.8	0.8	1.5	8.0
German SAC (grade B)	1,694	0.3	0.3	0.5	5.9
Total (international site)	21,445	3.7	3.6	6.6	-

4.4.3 High ratio of young to adults during certain times of the year

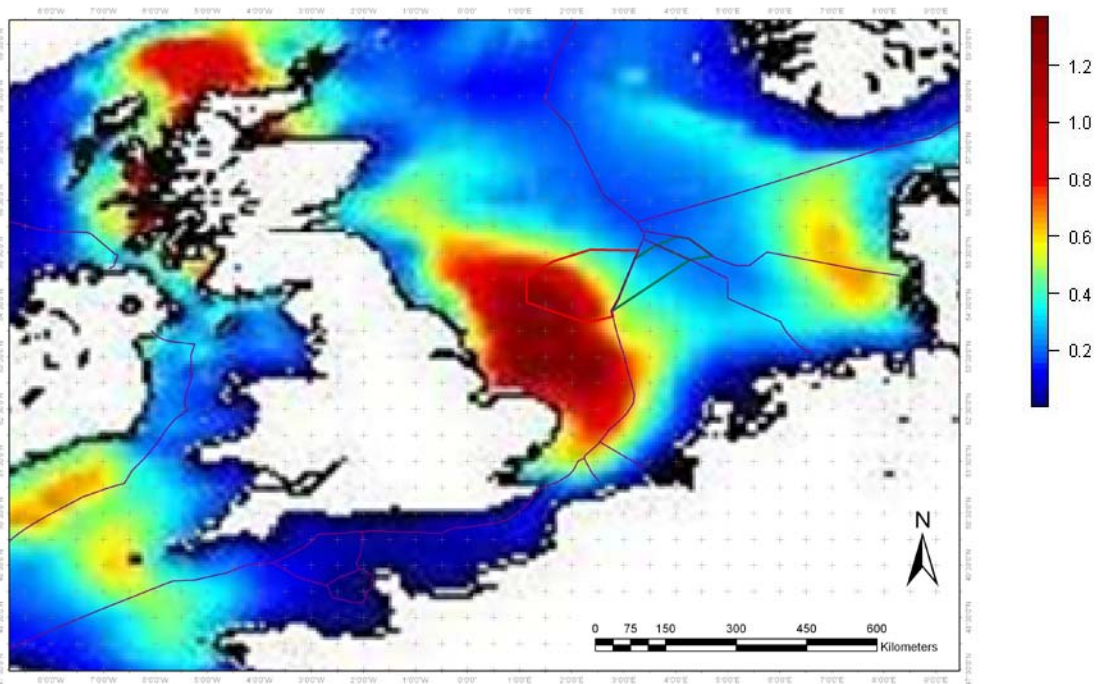
The main calving period for harbour porpoises in the North Sea is June and July although calves have been observed from May through to August (Lockyer, 1995; Hasselmeier et al., 2004; Evans, 2008). Additionally, calves are dependant on the mother for up to 10 months (Lockyer, 2003). Therefore, with respect to breeding, nurturing and rearing of young, the entire year is important for harbour porpoises and there is no single period that can be separated out as being more important than the remainder of the year.

Harbour porpoise calves are found all over the North Sea, with particularly high proportions of mother calf pairing in the German waters in the Sylt Arrum area (Sonntag et al., 1999). These authors analysed the SCANS 1 data for calf to porpoise ratios and reported values of 5.4% throughout the North Sea whilst in the Sylt Amrum area, specifically, it averaged 14.0%. This area has now been designated as a harbour porpoise SAC. The German SAC on Dogger has been designated, in part, as an identified calving ground. The data behind this appears to be the sighting of a single calf on the Dutch side of the border (Figure 1, Meike Scheidat, pers. comm.).

The JCD data held by JNCC and that collected during SCANS II that is currently available are not amenable to analysis of this type. It is proposed that unless additional local sightings data exists from which a high ratio of sightings of mother calf pairs can be estimated, this is a criterion that can not currently be applied to proposed UK sites.



a.



b.

Figure 4. Harbour porpoise density (no. porpoises km⁻²) in the North Sea and west of Britain in relation to national boundaries and the proposed Dogger Bank Natura sites in UK, Dutch and German waters in **a.** July 1994 and **b.** July 2005.

4.4.4 Other biological elements that are characteristic, such as very developed social and sexual life

The EU 2007 guidance gives no further consideration to this criterion and no behavioural observations have been undertaken in the Dogger Bank area. However, although there is an acknowledged difficulty associated

with defining habitats for harbour porpoises, generally these are associated with feeding and prey aggregations. Currently, there are no known areas where the species display specific behaviours.

4.5 Proportion of the European population:

Article 3 of the Habitats Directive states '*each Member State shall contribute to the creation of Natura 2000 in proportion to the representation within its territory of the natural habitat types and the habitats of species*' with guidance indicating that between 20% and 60% of the national population of an Annex II species should be included within a Member State's contribution to Natura 2000.

One of the fundamental problems that has faced Member States in relation to applying the grading criteria to Annex II marine mammals and, in particular, in assessing the relative importance of areas in terms of population size, was the absence of pre-determined boundaries. This forced consideration to focus on the criteria of relative regularity of use, density, and young to adult ratios, and other biological characteristics. However, inadequate consideration has hitherto been given to the scenario where a SAC may be proposed for another feature (as in the case of the Dogger Bank being proposed for subtidal sandbanks) but where harbour porpoise (or other Annex II marine mammals) also occur.

In this scenario, there is already a boundary for the primary designated feature (sandbanks in the case of Dogger Bank) within which it may be possible to calculate an estimate of the proportion of the population using the site. An estimate of the harbour porpoise population of Dogger Bank indicates that it can be expected to support 3-4% of the North Sea population for at least part of the year. Because the population density is not significantly higher than the North Sea average, this proportion is not significantly higher than would be the case for other areas of similar size in the North Sea. However, because of the large size of the site, the population supported is, nonetheless, quite substantial in both the UK (approximately 5% of UK population) and European context.

A suggested approach to considering proportional population size issues in concert with the criteria on regularity of use, density, young/adult ratios and other biological elements is to treat these all as sub-components of the Annex III criterion for 'size and density', scoring each separately and then reaching an overall conclusion. In practice this could be approached in two different ways:

- i) for areas for which there is no pre-determined boundary, then the four sub criteria as described by the 2007 EU guidance should be assessed first. If a grading of A or B appears justified, then a provisional site boundary could be drawn, and the population estimated (if the data allow that) and an overall score derived;
- ii) for areas where a pre-determined boundary exists (eg a boundary determined by a geographical configuration such as a bay, or as a result of the area being identified for another (primary) feature), then the four sub criteria as described by the 2007 EU guidance can be scored separately, the size of the population can be estimated (if the data allow) and an overall score derived from those.

As regards the scoring of population size, in view of the variability of the data, and the mobile nature of the species, it is suggested that population estimates should normally be at the upper end of the range indicated in Annex III. Suggested gradings are:

Above 60% of biologically meaningful population: A grade
Above 10% of biologically meaningful population: B grade
Above 1% of biologically meaningful population: C grade

For the Dogger Bank area, this would indicate a C grade.

4.6 Harbour porpoise as qualifying feature in the Dogger Bank dSAC – applying the criteria

Under Criterion 1 of Annex III, if the EU (2007) sub-criteria and the associated protocol set out above is followed for the Dogger Bank, the scoring would be:

Regularity of presence	= grade C
Density	= grade D
Young to adult ratio	= unknown
Other biological elements	= grade C
Proportional population size	= grade C

Overall score for Annex III criterion 1 ‘size and density as proportion of national population’ = C

A grade C for ‘size and density of population’, requires consideration to be given to the remaining criteria laid out in Annex III: degree of conservation of features of the habitat, degree of isolation and a global assessment.

Criterion 2: degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities

There is an acknowledged difficulty associated with defining habitats for cetaceans. In general, harbour porpoise occurrence is better correlated with prey density rather than any particular habitat type. Within the context of the North Sea, Dogger Bank is probably the most important area for sandeels today (CEFAS, 2007) and, as such, supports an important European commercial fishery for the species. As Dogger Bank dSAC is an important area for the dominant prey species of harbour porpoises, indirectly, it can be considered important for harbour porpoises.

The harbour porpoise prey resource in the Dogger Bank region is subject to commercial fishing and therefore the recommended grading is III: average or partially degraded condition. Due to limited understanding of the reason for the habitat usage by harbour porpoise it is difficult to determine how easy restoration to excellent condition would be. Therefore a recommended grading is III: restoration difficult or impossible.

Although the importance of the dSAC with respect to the life and reproduction of harbour porpoises is unknown, the use of the area indicates that the habitat is favourable. When grade III for the first sub-criterion and grade III for the second sub-criterion are combined the overall grade for the criterion is C: average or reduced conservation.

Criterion 3: degree of isolation of the population present on the site in relation to the natural range of the species

As a wide ranging species, harbour porpoises cannot be considered isolated and therefore a grade C (population not isolated within extended distribution range) is the only appropriate grading of this criterion for Dogger Bank.

Criterion 4: global (overall) assessment of the value of the site for the conservation of the species concerned

Because its very size, the proposed SAC at Dogger Bank means it supports at least several thousand harbour porpoises for the majority of the year, equivalent to some 3-4% of the biological population of the North Sea and approximately 5% of the UK population. Consequently, this site should be graded C overall.

	Size & density as proportion of biological population	Conservation of features	Isolation of population	Global assessment
Dogger Bank	C	C	C	C

SECTION 5. Summary of criteria for designation of harbour porpoises gradings in potential SACs

Annex III of the Habitats Directive outlines the four criteria under which SAC designation is decided for Annex II features. These, however, have proved difficult to apply to highly mobile species that cross national boundaries such as the harbour porpoise. In addition to the Annex III criteria, the EU guidance (2007) outlines four additional sub-criteria for consideration. The specific application of these criteria for consideration of harbour porpoises as a qualifying feature of SACs is given below.

For UK waters, there are in effect two scenarios under which designation of sites for harbour porpoise can be considered: i) for areas for which there is no pre-determined boundary, and ii) for areas where a pre-determined boundary exists (eg a boundary determined by a geographical configuration such as a bay, or as a result of the area being identified for another (primary) feature).

Criteria to be considered are:

1. size and density of the population of the species present on the site in relation to the populations present within the national territory

When survey effort covers 12 months of the year, the suggested divisions for harbour porpoise grading of presence are:

1-4 months of the year continuous presence: D grade

5-9 months of the year continuous presence: C grade

10-12 months of the year continuous presence: A/B grade

Using annual effort related sightings rates placed in the appropriate biological context, the suggested divisions for grading population sightings rates of harbour porpoise in relation to neighbouring areas are:

No statistically significant difference in sightings rate for the proposed site and neighbouring areas: D grade

Statistically significant difference at $p < 0.05$: C grade

Statistically significant difference at $p < 0.01$: B grade

Statistically significant difference at $p < 0.001$: A grade

In relation to young/adult ratios, insufficient data exist to relate ratios identified for particular areas to the national average. It will be up to the individual nature conservation bodies to score this criterion on the basis of the available information for individual sites and to justify their conclusions. In many instances, the score is likely to be 'unknown'.

In relation to proportional population size, indicative gradings are:

Above 60% of biologically meaningful population : A grade

Above 10% of biologically meaningful population : B grade

Above 1% of biologically meaningful population: C grade

The above grading thresholds are only indications. The final grading for Criterion 1 of Annex III, and indeed the gradings given to each of the sub-criteria, will need to be determined through careful consideration of the available information.

2. degree of conservation of the features of the habitat which are important for the species concerned and restoration possibilities

There is an acknowledged difficulty associated with defining habitats for cetaceans, but it is assumed that these are usually associated with feeding and prey aggregations.

The harbour porpoise prey resource at a potential site may be subject to commercial fishing. Additionally, the bycatch of harbour porpoises may be a significant factor in some areas which will need to be taken into account. Where fishing is likely to impact harbour porpoises either directly or indirectly, the recommended grading is III: average or partially degraded condition. Due to limited understanding of the reason for the

habitat usage by harbour porpoise, it is difficult to determine how easy restoration to excellent condition would be. Therefore, a recommended grading is likely to be III: restoration difficult or impossible. The overall degree of conservation of the habitat is therefore likely to be graded C at any potential site unless local data indicate otherwise.

3. *degree of isolation of the population present on the site in relation to the natural range of the species*

As a wide ranging species, harbour porpoises cannot be considered isolated and therefore a grade C would normally be the only appropriate grading of this criterion.

4. *global (overall) assessment of the value of the site for the conservation of the species concerned*

Due to the wide ranging nature of harbour porpoises, particularly in relation to the size of potential SAC sites, our lack of knowledge on calving areas in UK waters combined with placing the population within the context of the biological population, it is unlikely that any potential site will be graded higher than C. However, where significant local data exists beyond that contained within the JCD and SCANS II survey, it may be that a higher grade is appropriate.

5.1 Implications for existing or proposed SACs

On present evidence (based on the JCD and SCANS II data), it appears unlikely that any site other than Dogger Bank, and possibly a site in the north Pembrokeshire coast/south Cardigan Bay area, will achieve a C grade for Criterion 1 of Annex III. However, it is possible that where significant additional local data exists, further analysis may reveal density or young/adult ratio regular hotspots in areas not yet considered. The north Scotland/Minch area (Figure 4) is one which potentially warrants further investigation. In light of the mobility of harbour porpoises on a seasonal and annual basis, it is suggested that such local data should cover a period of at least 5 years.

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