Definition of Favourable Conservation Status for Harbour porpoise

Defining Favourable Conservation Status Project

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Contents

About the DFCS project

Natural England's Defining Favourable Conservation Status (DFCS) project is defining the minimum threshold at which habitats and species in England can be considered to be thriving. Our FCS definitions are based on ecological evidence and the expertise of specialists.

We are doing this so we can say what good looks like and to set our aspiration for species and habitats in England, which will inform decision making and actions to achieve and sustain thriving wildlife.

We are publishing FCS definitions so that you, our partners and decision-makers can do your bit for nature, better.

As we publish more of our work, the format of our definitions may evolve, however the content will remain largely the same.

This definition has been prepared using current data and evidence. It represents Natural England's view of FCS based on the best available information at the time of production.

Introduction

This document sets out Natural England's view on Favourable Conservation Status (FCS) for **harbour porpoise** in England. FCS is defined in terms of three parameters: natural range and distribution; population; extent and quality of habitat necessary for long-term maintenance of populations.

Section 2 provides the summary definition of FCS in England. Section 3 covers contextual information, section 4 the metrics used and section 5 describes the evidence considered when defining FCS for each of the three parameters. Section 6 sets out the conclusions on favourable values for each of the three parameters and Section 7 provides checks for species listed within the Nature Directives. Annex 1 lists the references.

This document does not include any action planning, or describe actions, to achieve or maintain FCS. These will be presented separately, for example within strategy documents.

The guidance document Defining Favourable Conservation Status in England describes the Natural England approach to defining FCS and is due to be published soon.

2. FCS in England

Harbour porpoise within the eastern North Atlantic are generally considered to behave as a continuous population extending from the French coasts to the arctic waters of Norway and Iceland (IAMMWG 2015), notwithstanding some genetic differences and differences in the areas used.

Small Cetaceans in European Atlantic waters and the North Sea (SCANS) surveys in 1994, 2005, and 2016 indicate that porpoise densities varied from 0 to 0.888 per km² in English waters. Special Areas of Conservation (SACs), identified for harbour porpoise because they are some of the areas within the top 10% most persistently dense areas in UK, extend into English waters.

Favourable Conservation Status in England for harbour porpoise is to maintain the harbour porpoise range, extent of habitat throughout English waters, and at population densities within (or above) the average densities reported across relevant strata from the three SCANS surveys. When assessed using the IUCN Red List criteria in a GB context, the species is considered to be of 'Least Concern'.

FCS parameter	Favourable status	Confidence
Range and distribution	All English SCANS areas are known to be occupied	**High**
Population	Densities within (or above) the average densities reported across relevant strata from the three SCANS surveys.	**High**
Habitat	There is sufficient habitat, with pressures at levels that do not affect populations, with harbour	**Moderate**

	porpoise prey in sufficient amounts to support the population throughout English waters.		

Species definition and ecosystem context

3.1 Species definition

Harbour porpoise (*Phocoena phocoena*)

3.2 Species status

Red list status

An assessment of the threat of extinction.

- Global: Least Concern *Source:* IUCN 2019. The IUCN Red List of Threatened Species. Version 2019-2. http://www.iucnredlist.org.
- European: Vulnerable *Source:* Temple & Terry 2007
- GB: Not assessed

Conservation status

- Strictly protected under Annexes II and IV of the Habitats Directive
- Strictly protected species under Appendix II of 'Convention on the Conservation of European Wildlife and Natural Habitats' (Bern Convention, 1979) 1982.
- Species of Principal Importance under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.

3.3 Supporting habitats

Harbour porpoise are restricted to the temperate and sub-arctic seas of the northern hemisphere. They are found primarily, but not exclusively, over continental shelves, in waters between 20 m and 200 m deep. Harbour porpoise are thought to be opportunistic feeders and their habitat preference is mainly linked to prey availability. Various studies have shown densities are highest at locations where their chances of encountering prey are high (Heinänen & Skov 2015[1]). The density of prey is determined by many variables (for example: seabed sediments, water depth and hydrodynamics) and this variation has been found in each harbour porpoise Management Unit as shown in Figure 1 (Heinänen & Skov 2015).

Sources: *3rd UK Habitats Directive Reporting 2013; Heinänen & Skov 2015*

[1] DHI Analysis: http://jncc.defra.gov.uk/pdf/JNCC_Report%20544_web.pdf

3.4 Ecosytem context

The harbour porpoise is the most widely distributed and numerous of all cetacean species in UK waters, present in all months of the year. The species is opportunistic, feeding on a wide variety of small shoaling fish including herring, cod, haddock and sandeel but will also eat gobies, squid, octopus and crustaceans. Due to their small size, they have a larger body surface to volume ratio than larger cetaceans, meaning they have a limited ability to store energy in our cold waters. As a consequence, they must forage almost constantly, without long periods of fasting, and require up to 10% of their body weight in fish per day (Kastelein and others 1997; Lockyer and others 2003; Wisniewska and others 2016).

Sources: *3rd UK Habitats Directive Reporting 2013; Heinänen & Skov 2015; Kastelein and others 1997; Lockyer and others 2003; Wisniewska and others 2016*

Metrics

4.1 Natural range and distribution
SCANS strata (or blocks). SCANS surveys are ship and aerial surveys to determine small cetacean abundance in the North Atlantic. They are broad scale, of low resolution and undertaken approximately once every 10 years during July. These surveys provide a snapshot of small cetacean abundance, but also provide a picture of their distribution.
4.2 Population
Average density per km^2 of SCANS strata
4.3 Habitat for the species
Km^2 of English inshore waters to 12 nm

Evidence

5.1 Current situation

Natural range and distribution

Harbour porpoise can be found throughout English waters, although use of their range and distribution varies seasonally and there can be prominent inter-annual changes.

Sightings beyond the shelf are documented, but harbour porpoise tend to be more concentrated on the continental shelf. They are a highly mobile species and, although some genetic differences have been noted, the population ranges from the French coasts of the Bay of Biscay northwards to the arctic waters of Norway and Iceland. Satellite telemetry work in Danish waters has shown an individual moving more than 1000 km from Danish waters to east of the Shetland Islands.

Results from SCANS III (Annex 2) show harbour porpoise present in all English strata (Hammond and others 2013).

Local densities of animals can be much higher than these broad scale surveys, as evidenced by regular baseline surveys undertaken by the marine industry sector.

To facilitate conservation and management, UK waters have been separated into three distinct harbour porpoise management units (MUs see Figure 1).

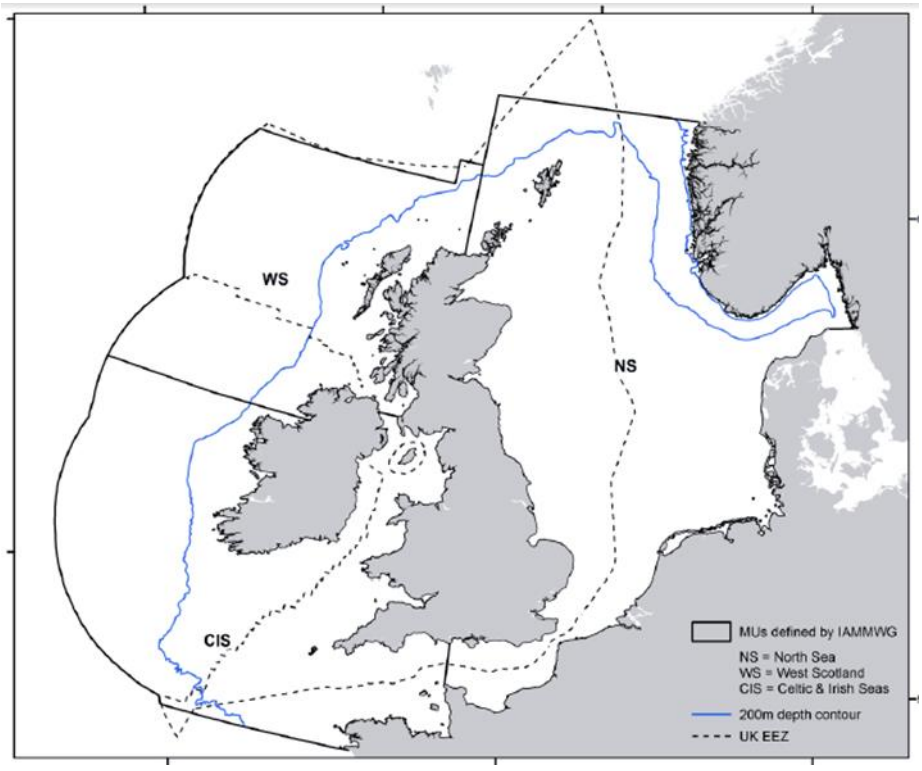

Figure 1 – UK Management Units for harbour porpoise (IAMMWG 2015[2])

Heinänen & Skov (2015) used data from within the UK Joint Cetacean Protocol (JCP), which includes data from SCANS and other large scale UK surveys from 1994 to 2011, to create

[2] Management Units for cetaceans in UK waters http://jncc.defra.gov.uk/page-6943

predicted annual density layers for harbour porpoise over an 18 year period (1994 to 2011) and showed that distribution is likely to differ between years and seasons due to changing oceanographic conditions. This analysis was used to help identify SACs for harbour porpoise within each MU, and identified distinct areas which are predicted to be relatively more persistently dense within each MU (Figure 2). The analysis also identified potential seasonal preferences within each MU, though further work is required to better understand these preferences.

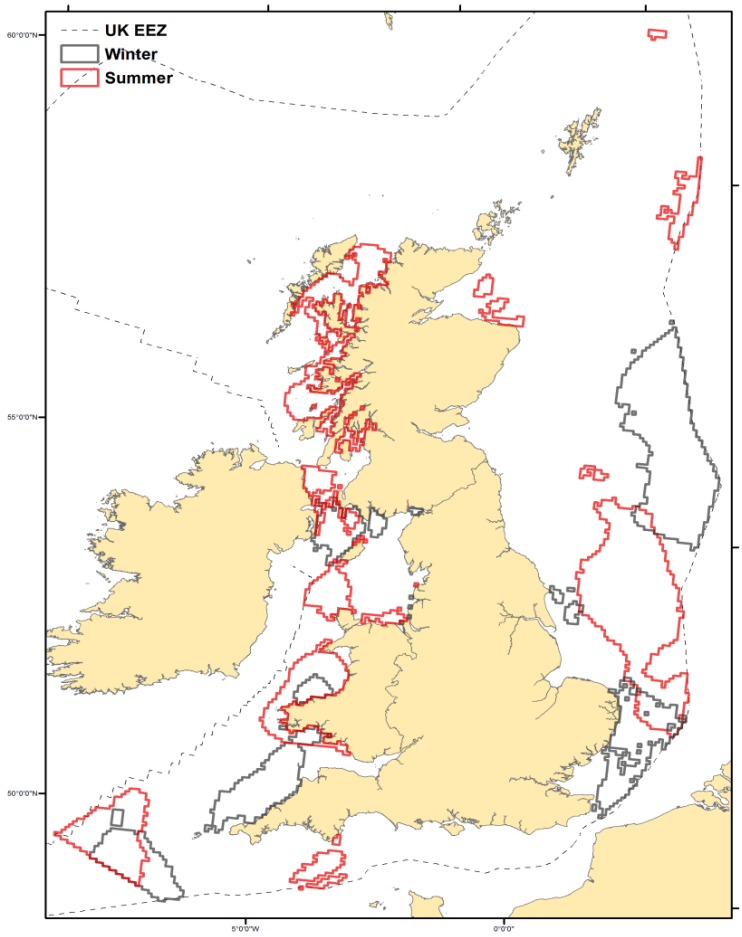

Figure 2: Areas persistently containing the top 10% of harbour porpoise predicted density by season identified from the at-sea dataset. There were no winter data for West Scotland (after Heinänen & Skov 2015).

Population

Total North Atlantic Population: The absolute abundance of harbour porpoise is derived by the SCANS surveys using distance sampling techniques across the full range of the harbour porpoise in the North Atlantic (see survey area in Annex 2). The figures are provided with 95% confidence intervals, which sets the range within which the true abundance will lie.

The total absolute abundance estimates from the SCANS III survey:

- SCANS III (2016) TOTAL: **466,569 (345,306 – 630,417)** (Hammond and others 2017)

As well as estimates of absolute abundance, the SCANS surveys provide density figures per block (stratum).

Densities of porpoises per km^2 in English relevant blocks from SCANS III:

- Block C (The Channel): 0.213 per km^2
- Block D (Celtic and Irish sea); 0.118 per km^2
- Block F (Liverpool and Morecombe bay) : 0.086 per km^2
- Block L (Thames Estuary): 0.607 per km^2
- Block O (North Sea): 0.888 per km^2

Habitat for the species

Harbour porpoise are found throughout English and UK waters in a variety of habitat types. As harbour porpoise are currently found across their whole recorded range, the extent of habitat for this species is assumed to be equivalent to its range.

Sources: *Hammond and others 2002, 2013 and 2017; IAMMWG 2015; Heinänen & Skov 2015; OSPAR IA, 2017.*

Confidence: *High.*

5.2 Historical variation in the above parameters

Very little is known about historical population levels and distribution prior to the first SCANS survey in 1994 (see Annex 2 for general SCANS information and data). There is also very little information on historical habitat extent.

Natural range and distribution

Results from SCANS II (2005) suggested a southerly shift in harbour porpoise distribution into the southern North Sea compared to SCANS I (1994), although the overall range remained the same. This pattern of distribution change has also been supported by numerous papers from other European countries (e.g. Kiszka and others 2004; Haelters and others, 2011; Camphuysen, 2011; Camphuysen and Siemensma, 2011).

More sightings were made throughout the English Channel in 2016 during SCANS III than previously. Results also suggest that there are lower densities compared to 1994 and 2005 within similar areas of the Celtic and Irish Sea but it must be noted that the Irish Observer programme data (green blocks in Annex 2) have not yet been added in to any assessment (Hammond and others, 2017). The spread of sightings into most of the Channel over the past two decades indicates that harbour porpoise distribution has expanded, probably from the North Sea and the Celtic Sea, and now encompasses the entire Channel.

Population

The areas surveyed by SCANS reflect expectations of different densities, but are also designed to facilitate survey logistics. As a consequence the areas surveyed have changed for each SCANS survey (see Annex 2). As different areas were surveyed during each SCANS survey, and the SCANS III survey did not include Irish waters, the density figures cannot simply be compared across surveys or across strata (see Annex 2). In reality densities per km^2 will vary spatially and temporally within these strata.

The total absolute abundance estimates for the two earlier SCANS surveys are provided below:

- SCANS I (1994) TOTAL: **407,177 (288,920 - 573,838**) - revised in Hammond and others 2017
- SCANS II (2005) TOTAL: **519,864 (343,521- 786,730)** - revised in Hammond and others 2017

It should be noted that SCANS I and SCANS II results were originally presented in previous papers (Hammond and others, 2002 and 2013 respectively), but there has been further work to understand the responsive movement of animals to ships, which required corrections to the original figures.

Using density figures per stratum, density over smaller areas can be estimated. There have been two abundance estimates with complete coverage of the UK EEZ. The first was derived from SCANS II in 2005 (revised in 2017). The second estimate was derived from the SCANS III survey in 2016. The estimate for the UK population in 2016 is less than the revised 2005 estimate, but the confidence intervals overlap considerably. The reduction in abundance is driven by lower estimates of density in the Celtic and Irish Seas from the 2016 SCANS III survey. However, with only two data points, it is not possible to undertake a meaningful trend analysis. Harbour porpoise are highly mobile and the apparent decrease may represent a redistribution of animals out of UK waters. Table 1 below shows the estimates for UK waters.

Table 1: UK estimates for harbour porpoise abundance

Survey	Year	UK waters abundance estimate	Lower 95% CI	Upper 95% CI
SCANS-II	2005	237,087	165,800	339,025
SCANS-III	2016	197,579	163,294	239,063

In addition, there are three SCANS abundance estimates available for the North Sea (see Figure 3 below), which suggests the population is stable in this region.

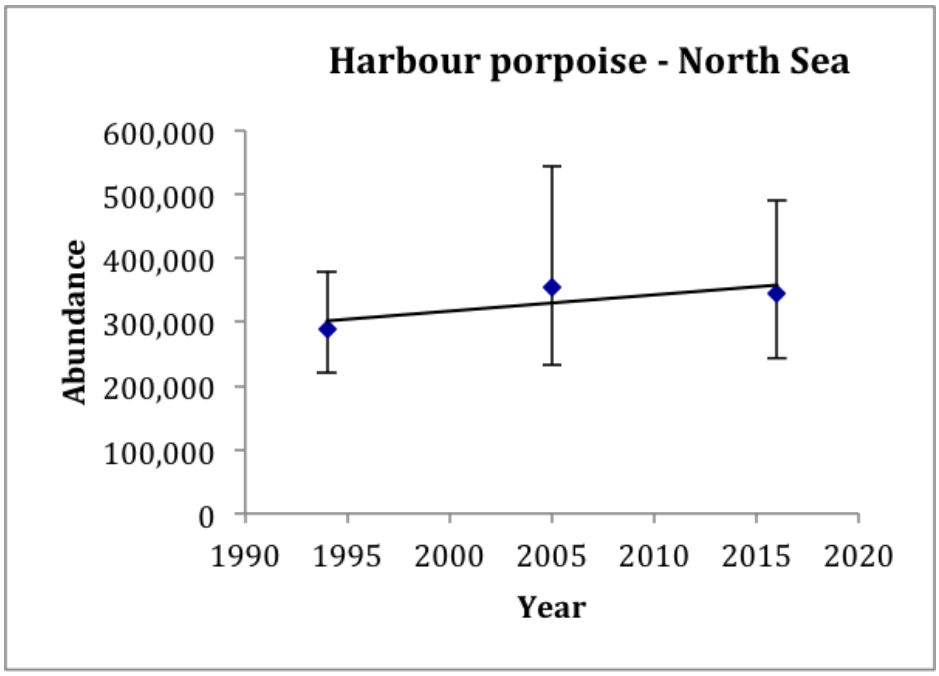

Figure 3: Trend line fitted to harbour porpoise abundance estimates in the North Sea AU. Bars show 95% confidence intervals (Taken from OSPAR IA, 2017)

Sources: *3rd UK Habitats Directive Reporting 2013; Heinänen & Skov 2015; Kiszka and others 2004; Haelters and others 2011; Camphuysen 2011; Camphuysen and Siemensma 2011.*

Confidence: *Low.*

5.3 Future maintenance of biological diversity and variation of the species

Overall, the limited data available suggests that range and distribution, population and, therefore, supporting habitat are stable and sufficient for future maintenance of the species. However, there is evidence of threats from a number of anthropogenic pressures including contaminants, underwater noise, bycatch, removal of prey species and other indirect pressures (for example abrasion from fishing which affects the quality of habitats on which prey rely) which need to be managed to avoid adverse consequences for the population. The evidence currently available does not suggest that these pressures are affecting populations of harbour porpoise, however, there are large uncertainties around the available data.

Recent evidence on the impact of PCBs on porpoise is of concern. Murphy and others (2015)[3] identify potential reproductive failures in porpoise as a result of PCB exposure, and Jepson and others (2016) [4] identify a risk to harbour porpoise from accumulated PCBs which is above a threshold for the onset of physiological effects. PCB pollution is likely to have caused the catastrophic decline in certain orca populations in the North Atlantic (Jepson and others, 2016).

Industry noise (for example, pile driving during the construction phase for renewables infrastructure) is a known cause of disturbance/displacement of harbour porpoise (for example, Dahne and others 2013). This pressure may also affect hearing through injury which could have an indirect influence on foraging efficiency. The influence of this pressure is indirect with evidence of recovery/return once the pressure is removed. Exposure to this pressure is limited both spatially and temporarily, although it may be regionally significant. There is also potential collision risk with submerged installations, although evidence of risk is limited.

Vessel traffic is widespread in the marine environment, particularly in the continental shelf region. Evidence indicates that harbour porpoise avoid heavy traffic areas (Dyndo and others 2015) and react to shipping noise through behavioural changes, including displacement. Shipping noise has also been linked to reduced foraging (Wisniewska and others 2018). Although when acting independently not all sources of noise are a risk to harbour porpoise, the cumulative impact of activities can affect distribution and communication of animals. There has been much research within Europe aiming to better understand the non-lethal impacts of cumulative noise on harbour porpoise (e.g. Nabe-Nielsen and others 2018).

Read (2006) reported that harbour porpoise are one of the species most at risk from bycatch from bottom set gill and tangle net fisheries. Management is in place to reduce bycatch (and there is ongoing bycatch monitoring and a Defra bycatch strategy being developed), but further work is required to reduce bycatch rates to meet the ASCOBANS resolution (No 5, 2006) [5] and ultimately to reduce bycatch to zero (MSFD M6 bycatch indicator (unpublished)).

A lack of food has a direct and immediate influence on the individual. Starvation is identified as an important cause of death for harbour porpoise in UK waters, with 13% of harbour porpoise examined by UK Cetacean Strandings Investigation Programme (CSIP) having a cause of death of starvation (CSIP annual reports). It should be noted, however, that prey depletion can result from both natural and anthropogenic causes. No link has been specifically identified between

[3] http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0131085
[4] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4725908/
[5] http://www.ascobans.org/sites/default/files/document/AC13_14_DraftRes5_

commercial fishing practices and the cases of harbour porpoise starvation recorded through CSIP.

Climate change may cause a change in abundance. The impacts, whilst largely unknown, could be mediated through changes in prey distribution and abundance. Porpoise are opportunistic and will target a variety of prey species depending on availability. This may mean they can adapt to changes in their local prey species.

Natural range and distribution

Although there is limited information on the impact of future changes in climate and anthropogenic activity, the current range across the North Atlantic is considered sufficient for future maintenance of the species. There is no definitive evidence that the range is not stable and there is no evidence of habitat constraints. However, the known pressures may reduce the ability of porpoise to access their entire range at all times.

Population

Overall, data from the North Sea suggests the population is stable. There is little evidence to conclude that the wider population is not stable, and a lack of information at a local scale to suggest any difference in English waters. As such the current population is considered sufficient for future maintenance of the species.

Habitat for the species

The mix and extent of habitats required for harbour porpoise in English waters is unknown. Our understanding of 'habitat quality' and its availability to harbour porpoise across UK waters remains limited. Heinänen & Skov (2015) did show that harbour porpoise exhibit a preference for specific depths, currents, hydrographic variables and sediment types, but their distribution varies considerably across years and seasons, and appears to be driven by prey availability. However, data relating to prey preference is limited. As a result, the assessment of habitat quality for harbour porpoise is informed by the conclusions for range, distribution and population as a proxy for habitat.

It has been judged that as long as harbour porpoise are not significantly prevented from access to their most important habitats (mainly those identified within SACs), and those habitats remain healthy enough to provide prey, the population (and FCS) will be maintained (IAMMWG 2016).

Sources: 3rd UK Habitats Directive Reporting 2013; Hammond and others 2002, 2013 and 2017; IAMMWG 2015 & 2016; Heinänen & Skov 2015; Jepson 2016; Read, 2006; MSFD M6 bycatch indicator (unpublished); Dahne and others 2013; Dyndo and others 2015; OSPAR IA (2017) Abundance and distribution of cetaceans; Wisniewska and others 2018 Nabe-Nielsen and others; 2017 CSIP annual reports http://ukstrandings.org/csip-reports

Confidence: High (Range and distribution and population) Moderate (supporting habitat).

5.4 Potential for restoration

A number of anthropogenic pressures and threats have the potential to impact harbour porpoise in the North Atlantic, as described in section 5.3. Activities such as offshore wind farm construction, shipping and naval activity all have potential to disturb and displace harbour porpoise over various temporal and spatial scales. Managing activities is therefore necessary to maintain access to their full range and prevent significant impacts at the population level. The UK is currently developing a porpoise and dolphin conservation strategy to address these threats

in UK waters by the production of conservation action priorities. Defra has created a bycatch strategy to look at new/alternative ways of monitoring and mitigating bycatch. Pingers are already in use to alert animals to nets, but restricted to over 12m boats via the EU Regulation 2004/812. However, they are proven to work for harbour porpoise (Palka and others 2008). There are also mechanisms to minimise noise from offshore construction – e.g. bubble curtains (Dahne and others 2017), but there are limitations with their use and a lot of alternative mitigation options are still in development.

Any habitat restoration would involve restoration of populations of prey species and their habitat requirements. However, harbour porpoise prey requirements and their habitat needs are not understood. Research would be required before habitat restoration could take place.

Sources: *Dahne and others, 2017; Palka and others, 2008*

Confidence*: Moderate*

Conclusions

6.1 Favourable range and distribution
The species is regarded as in Favourable Conservation Status when all English SCANS strata are known to be occupied.
6.2 Favourable population
Densities within (or above) the average densities reported across relevant strata from the three SCANS surveys. Existing population levels are considered to represent favourable status in the absence of any significant evidence to the contrary.
6.3 Favourable supporting habitat
As range, distribution and population levels appear to be stable, the current extent of habitat, all English waters, is assumed to be the favourable habitat. Supporting habitat will be favourable when there is sufficient habitat with pressures at levels that do not affect populations that has harbour porpoise prey in sufficient amounts to support the population throughout English waters.

Checks

7.1 Natural range
A shift in distribution was seen between the first two SCANS surveys (1994 and 2005) from the northern North Sea to the southern North Sea and English Channel. This pattern of distribution appears to have persisted to 2016 (SCANS III).
7.2 Population
The limited evidence available suggests that the population is stable, and there is a lack of information at a local scale to suggest trends are any different in English waters.

Annex 1: References

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Annex 2: Scans surveys

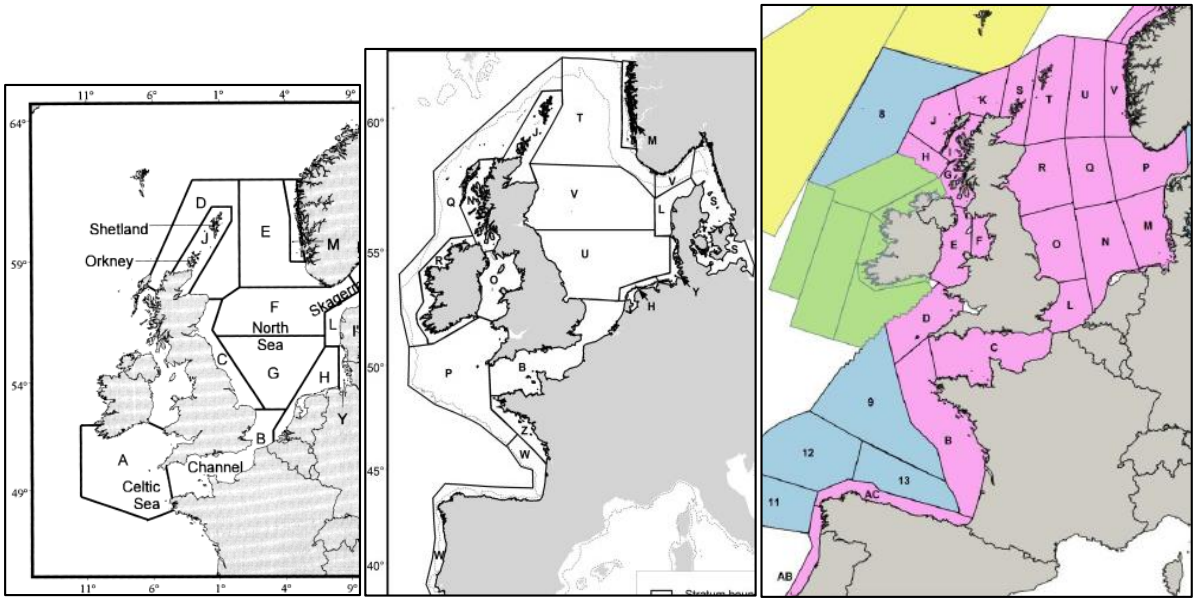

Figure 2 - SCANS 1 (left), **SCANS II** (middle), and **SCANS III** (right) stratum. Green and yellow areas are other surveys (e.g. green is the Irish OBSERVE survey programme)

1) In SCANS I (1994), (Hammond. and others 2002)[6] provides density estimates per km^2 for the following stratum which include areas of English waters:
   - Block A (Celtic Sea): 0.18 per km^2
   - Block B (Thames Estuary and Chanel): 0
   - Block C (Coastal North Sea): 0.387 per km^2
   - Block G (Southern North Sea): 0.340 per km^2
   - Irish Sea not represented

2) In SCANS II (2005), (Hammond. et. al 2013) [7] provides density estimates for the following stratum:
   - Block U (Southern north sea): 0.598 per km^2 ,
   - Block B (Thames estuary and Channel): 0.331 per km^2
   - Block P (Celtic and Irish sea): 0.367 per km^2
   - Block O (Irish Sea): 0.335 per km^2

3) In SCANS III (Hammond and others. 2017), Densities of porpoises per km^2 in English relevant blocks vary from:
   - Block C (The Channel): 0.213 per km^2
   - Block D (Celtic and Irish sea); 0.118 per km^2
   - Block F (Liverpool and Morecombe bay) : 0.086 per km^2
   - Block L (Thames Estuary): 0.607 per km^2
   - Block O (North Sea): 0.888 per km^2

[6] SCANS 1: https://synergy.st-andrews.ac.uk/scans3/files/2016/05/Hammond-et-al.-2002.pdf
[7] SCANS II reanahttp://www.sciencedirect.com/science/article/pii/S0006320713001055

Further information

Natural England evidence can be downloaded from our **Access to Evidence Catalogue**. For more information about Natural England and our work see **Gov.UK**. For any queries contact the Natural England Enquiry Service on 0300 060 3900 or e-mail **enquiries@naturalengland.org.uk** .

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