



## **The deliberate disturbance of marine European Protected Species**

Guidance for English and Welsh territorial waters and the UK offshore marine area

By

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## 4. Marine EPSs – Species-specific guidance

In order to assess the risk of committing a disturbance offence, and in addition to activity-specific characteristics (see previous section), criteria relating to the species that could potentially become exposed to significant disturbance need to be considered. This should include: a) a consideration of the species that could be present in the area affected and could be vulnerable to significant disturbance from the activity; b) the numbers likely to become exposed to disturbance with relation to what would constitute a significant group, per relevant species; and c) the likelihood that the local abundance and distribution of relevant species could become significantly affected. In this section, general information is provided on where individual species can be expected to occur in UK waters, together with guidance on what would constitute a “significant group” In the text below, we have used 2% thresholds for species in favourable conservation status, and a 1% threshold for species where the conservation status is unfavourable or unknown. We also give, in italics, alternate 4% and 2% thresholds, and would welcome views on which of these figures is more appropriate, with reasons for conclusions drawn (see section 2 for the rationale behind the threshold percentages).

General information on natural range, home range patterns, population structure, and spatio-temporal variability in distribution and abundance are provided for each species below in order to help assess what species would be most sensitive to significant effects of disturbance on their local distribution and abundance. It should be noted that Natural England (NE) and Countryside Council for Wales (CCW) have published species-specific guidance for otters, and they are not, therefore, covered in this guidance.

### 4.1. Cetaceans (dolphins, porpoises and whales)

Determining when the ability to survive, breed, or rear or nurture their young or the local abundance or distribution are likely to be significantly affected by disturbance is very difficult for marine EPS, particularly cetaceans. In addition, detecting change beyond natural variability is very difficult for these species since they are wide-ranging and difficult to observe, and there is insufficient data linking human activities to disturbance and to its long-term effects at the species, population or even individual levels. For most species there is also insufficient data on population genetic structure, on demographics, and on natural variability in behaviours, distribution and abundance.

For cetaceans, direct responses to disturbance have included moving away from an area for a period of time, diving behaviour changes (e.g. reduced surfacing time), vocalisation changes and separation of mothers and calves. These are short-term behavioural responses, and it does not imply that these changes will significantly affect the ability of a significant group of animals to survive, breed, or rear or nurture their young (or significantly affect the local distribution or abundance of that species). Indirect responses to disturbance could include disruption of feeding, nursing, mating and socialising, displacement from important feeding areas, displacement of preferred breeding or calving sites, lowered reproductive success, changes to regular migratory pathways, stress, and increased susceptibility to injury and mortality. These are more subtle and will be separated in time and space from the direct behavioural responses and the potential causes, and will therefore be difficult to differentiate

from natural variability. In long-lived, slow-breeding animals, such as cetaceans, the effects of these responses on the viability of populations could take many years to detect.

There is limited evidence linking disturbance to significant adverse effects on cetacean species and their populations. Sound introduced in the marine environment by human activities is one of the key areas of concern with regards to the potential detrimental effects on marine mammals<sup>1</sup>. Effects on marine mammals could range from death and injury, to chronic effects of disturbance, ‘masking’ (obscuring of sounds of interest by interfering sounds), and to the sounds being simply audible. This is because marine mammals are sensitive to sound and use it as a primary sense to communicate, navigate and find food. However, no scientific studies have conclusively demonstrated a link between exposure to sound and adverse effects on a marine mammal population<sup>2</sup>. The only generally-agreed link so far is the impact of some mid-frequency (3 – 10 kHz) sonars on survival in some beaked whale species<sup>3; 4</sup>, following cases of mass-strandings and mortality. Even though the mechanisms leading to the beaked whale mortality are unclear, the consistent pattern in the species affected and implicated sounds leave little doubt as to the cause and effect. Recent observations suggest that animals may develop decompression sickness<sup>4; 5</sup> due to an alteration of the diving behaviour of animals in response to sonar signals (e.g. surface too quickly and/or remain too long at the surface). Other recent research is showing that the repeated exposure of individual bottlenose dolphins to boat interactions may lead to displacement (particularly of more sensitive animals), and potentially to the lowered viability of some coastal populations of this species<sup>6;7; 8</sup>.

The consequences of disturbance at the population level require an understanding of the causal mechanisms between the several stages of the disturbance effect, and, in most cases, this is little known<sup>2</sup>. The first stage relates to the activity itself and characterising the factors of disturbance, which can be carried out mostly without difficulty (e.g. the frequency and duration of a sound source). The second stage relates to linking the source of disturbance to short-term changes in, for example, diving behaviour, vocalisation patterns, etc, for which there is a considerable amount of evidence<sup>9-12</sup>. The third stage relates to the effects of those short-term changes on life-functions (e.g. survival, migration, feeding), where there is little evidence<sup>4-7; 13</sup>. The fourth stage relates to how these can affect population vital rates (i.e. rates of occurrences such as mortality and reproduction that affect changes in the size and composition of a population) and this is unknown.

Activities that are likely to be relevant to this guidance will have the potential to affect more than one species of cetacean. Cetaceans occur throughout UK waters, some species are more frequently found on the continental shelf or in areas of deep water, while others occur both inshore and offshore. Appendix IV lists the most common cetacean species in Annex IV (to the Habitats Directive) that occur in UK waters. The Favourable Conservation Status (2007 reporting round under Article 17 of the Habitats Directive) for all species (except those rare and vagrant for which assessment were not made) is included as well as population size estimates where these are available. For cetaceans, the FCS assessments resulted in approximately half of all the species assessed being considered as ‘favourable’, while for the other half the conservation status was assessed as ‘unknown’ (mainly as a result of the fact that either there were no recent population estimates that encompassed a species natural range in UK and adjacent waters, and/or there was no evidence to assess trends in population abundance).

Despite the increased survey efforts of the last two decades, current knowledge of the spatio-temporal distribution of cetacean species in UK waters (and indeed European waters) is limited. The most comprehensive information, including maps of species occurrence at a coarse scale and some details on the spatio-temporal distribution and relative abundance of the most common cetacean species can be found on the [JNCC Atlas of cetacean distribution in the north-west European waters](#). The Atlas was produced using data both from dedicated and opportunistic sightings surveys. There are several words of caution regarding the use of this dataset. Particularly, for the monthly distribution maps (only available online at <http://www.jncc.gov.uk/page-3987>), any inter-annual variation within the period covered will be hidden (since data were collected over a period of two decades). In addition, monthly coverage is patchy and the consequences of wide variation in search effort are less likely to be masked at such a relatively fine temporal scale. Further information can be found on the BERR's [Strategic Environmental Assessments](#).

## Common species in UK waters

FCS is favourable (2% threshold, *alternative 4% threshold in italics*)

### **Bottlenose dolphin (*Tursiops truncatus*)**

Bottlenose dolphins occur throughout UK waters, in inshore coastal waters, on the continental shelf and further offshore. The current abundance estimate<sup>17</sup> is of 8,000 individuals for UK and adjacent waters (shelf only). A genetic study has indicated that bottlenose dolphins in the north Atlantic occurring in offshore waters belong to a large oceanic population<sup>18</sup>. Conversely, and although coastal populations around the UK are not genetically isolated, there is some evidence for geographic structuring<sup>19</sup> and this should be taken into consideration when estimating the number of animals in a significant group. The abundance in UK coastal inshore waters has been reported as between 300 and 500 individuals<sup>20</sup>, comprising mainly of residents in two areas (Moray Firth: 129 [95% CI = 110-174] and Cardigan Bay: 213 [95% CI = 183-279]), and these populations should be considered separately. In the North Sea, however, bottlenose dolphins range considerably beyond the boundaries of the Moray Firth<sup>21; 22</sup>. In addition, small groups appear to be resident or near-resident in waters off Cornwall, Dorset and the Western Isles of Scotland<sup>23-25</sup>. While offshore bottlenose dolphins probably undertake long-distance movements and have large and variable home-ranges, in many inshore areas such as the ones referred here, animals maintain definable, long-term multi-generational home ranges, i.e. individually identified animals will persistently occur in a relatively discrete area (i.e. observed several times during one year, or year after year), hence will be more prone to repeated exposure to chronic disturbance.

Using the 2% (4%) threshold (of the population abundance estimates), which we have considered to be a reasonable yardstick for this species, 2-4 (4-8) animals, and 160 (320) animals could be considered a significant group for coastal and for offshore populations, respectively. Bottlenose dolphins commonly form schools of 2-25 animals, but occasionally number several tens or low hundreds, particularly in offshore deeper waters.

In some areas, a certain degree of seasonality in bottlenose dolphin abundance has been observed, even though animals might be present in every month of the year<sup>14; 22</sup>.

**Harbour porpoise, *Phocoena phocoena***

In the UK, this species is found widely distributed mainly in continental shelf waters. Larger scale changes in distribution are apparent for the North Sea, where the porpoise highest density area seems to have shifted southwards in the last decade<sup>17; 26-29</sup>.

The current abundance estimate (SCANS II<sup>17</sup>) is of 328,200 individuals for UK and adjacent waters (shelf only). In north-west Europe, there may be a number of harbour porpoise sub-populations (as supported by genetic studies), for example in the British part of the North Sea and Western Scotland, and in the Irish Sea/Celtic Seas<sup>30-32</sup>. The sum of the abundance estimates for SCANS II survey blocks encompassing these areas give a total of 232,299 for North Sea, adjacent areas and Western Scotland, and 95,843 for Irish Sea / Celtic Sea. Using the 2% (4%) threshold (of the population abundance estimates), which we have considered to be a reasonable yardstick for this species, a total of 4,600 (9,300) and 1,900 (3,800) animals per year could be considered, in our opinion, to be a significant group for the region of the North Sea, adjacent area and Western Scotland and the region of the Irish Sea and Celtic Sea, respectively. So, for example, an activity in the Irish Sea that would be likely to expose over 1,500 (3,000) animals to disturbance would be likely to disturb a significant group of this species. This is based on current knowledge of genetic structuring of this species within UK waters. If future evidence comes to light that further structuring occurs, then separate population size estimates should be used for each of the populations identified, and significant groups adjusted accordingly.

Most harbour porpoise schools are small, consisting of less than 8 individuals, however, they do, at times, form large, loose aggregations of 50 to several hundred animals, mostly for feeding or migration<sup>33</sup>. In the North Sea and adjacent waters, mean school size estimates were between 1.13 and 1.65 animals<sup>26; 34</sup>. An activity that would disturb a significant group of animals of this species would have to be one that lasted for a considerable long period of time.

Tag data has suggested that seasonal movement patterns of individual harbour porpoises are discrete and that these are not temporally coordinated migrations<sup>35</sup>. Around the UK, seasonal movements are difficult to infer from the existing rather patchy monthly survey effort. Some degree of spatial fidelity of individuals animals has been suggested by genetic studies for harbour porpoises, particularly females<sup>31; 36</sup> but this has not so far been corroborated by long-term field studies.

**White-beaked dolphin, *Lagenorhynchus albirostris***

Abundant on the continental shelf around west and north Scotland and in the northern North Sea<sup>20; 37; 38</sup>. This species is found mostly in continental shelf waters with depths between 50 m and 100 m, and rarely out to the 200 m isobath<sup>20; 37</sup>. They are much less common in the southern North Sea, the English Channel and Irish Sea, and rarely recorded in deep waters offshore in contrast to its congener, the white-sided dolphin<sup>38</sup>. Although present year-round over the continental shelf in near-shore UK waters, the species has been observed most frequently between June and October<sup>37; 39-41</sup>.

The UK waters may hold a significant proportion of the total population of the north-east Atlantic. It is possible that there is a discrete population in the North Sea and around north-west Britain<sup>37</sup>. Current estimated abundance in UK and adjacent waters (shelf only) is of 22,400 individuals and so a total number of approximately 450 (900) animals per year could, in our opinion, be considered as a significant group. The highest densities in the SCANS II

survey (summer of 2005) occurred in the waters of western Scotland (0.32 animals/km<sup>2</sup>, Coefficient of variation (CV) = 0.91), but this could be highly variable seasonally and inter-annually. White-beaked dolphins are usually found in schools numbering less than 10 individuals, but schools of up to 50 are not uncommon, and aggregations can comprise 100-500 animals in northern parts of their range and also in the North Sea<sup>39; 42</sup>.

### **Minke whale, *Balaenoptera acutorostrata***

Mainly distributed off western coasts of Britain and Ireland in continental shelf waters, and throughout the north-western and central North Sea<sup>37; 17; 20</sup>. They occur also beyond the continental shelf edge. Sightings in coastal areas occur mainly in the summer<sup>27</sup> although the number using particular areas may vary considerably between seasons and years.

A total abundance of 16,400 individuals was estimated for UK and adjacent waters (shelf only)<sup>17</sup>. Four differentiated subpopulations of *B. acutorostrata* in the north Atlantic (west Greenland, central north Atlantic-east Greenland-Jan Mayen area, NE Atlantic, and North Sea) have been identified through genetic, diet and contaminant studies<sup>43; 44</sup>. However, in UK waters, no subpopulations have been identified so far, for example, there does not seem to be any structuring between minke whales in east and the west coast of Scotland (Pia Anderwald, pers comm.). Therefore a total number of 330 (650) animals per year could, in our opinion, be considered as a significant group. Minke whales are usually seen singly or in pairs although, when feeding, they sometimes form larger aggregations that can number 10-15 individuals<sup>20</sup>.

### **Fin whale, *Balaenoptera physalus***

The fin whale is the most abundant large baleen whale species in the North Atlantic. Around the UK, fin whales are mostly seen in deep waters beyond the edge of the continental shelf and during the summer and autumn<sup>20; 38</sup>. However, there are also winter records from shelf waters southwest of Britain, including juveniles<sup>27</sup>. Acoustic data show that fin whales are present year round in UK waters<sup>45</sup>.

The best estimate for the eastern north Atlantic (Norway to the north and east of Iceland) is 4,100 (CV=0.21) individuals calculated from surveys between 1996 and 2001, and for the central north Atlantic (including the Faroes and some waters within the UK 200 nm limit) is 25,800 (CV=0.13) for the year 2001<sup>46</sup>. However, the relationship between whales that occur in UK waters and the wider north Atlantic is unclear at the moment. A set of possible hypotheses range from one population covering the whole North Atlantic to five or more separate populations. Assuming that the central North Atlantic animals could be part of a separate population, and best represents the population, of which the UK animals form part, then a total of 500 (1000) animals per year could be, in our opinion, considered as a significant group. A comparatively non-social species, most sightings of fin whales are of single animals or pairs. However, it is likely that small clusters of 1-2 animals are part of a larger aggregation, which in some parts of its range can number hundreds of individuals spread over a wide area.

FCS is unfavourable or unknown (1% threshold, *alternative 2% threshold in italics*)

### **Common dolphin, *Delphinus delphis***

In the north-east Atlantic this species is the most numerous offshore cetacean species<sup>20; 38</sup>. Mainly distributed off western coasts of Britain and Ireland in continental shelf waters and beyond the continental shelf edge<sup>20; 38; 47</sup>. Common dolphins are known to occur only in a portion of UK waters and this is highly variable both seasonally and inter-annually. The species occurs notably in the Celtic Sea and western approaches to the English Channel and off southern and western Ireland. Small numbers are also found close inshore in the Sea of the Hebrides. It has been observed occasionally in the northern North Sea, mainly in summer months.

There is no reliable UK estimate for this species at present. There are no known local populations in UK waters, and those animals occurring in UK waters are part of a wider north-east Atlantic population. SCANS II covered all European Atlantic continental shelf waters in June/July 2005 and estimated total abundance in the area as 63,366 (CV=0.46). However, this species is also widely distributed offshore and the number of animals in the continental shelf area may vary substantially seasonally and from year to year. Therefore, the animals occurring in UK waters are part of a population likely to be in their 100,000s, and so a total number of 1,000 (2,000) animals per year could, in our opinion, be considered as a significant group. Common dolphins are gregarious animals, with average school sizes observed in north-west European waters of between six and 20<sup>20</sup>, though large schools of dozens or even hundreds have frequently been recorded.

#### **White-sided dolphin, *Lagenorhynchus acutus***

Around the British Isles, this species is most abundant along the shelf edge and the deeper waters beyond, especially in the north-west<sup>20; 38; 47-49</sup>. It is known to use only a portion of UK waters and this is highly variable both seasonally and inter-annually. *L. acutus* is also seen in shelf waters around Scotland, in the North Sea and south-west Britain, mainly in summer<sup>27</sup>. The species tends to be most abundant in the Faroe Bank Channel, Faroe-Shetland Channel and the Rockall Trough<sup>38; 48; 49</sup>.

There is no reliable population estimate for this species at present. Nevertheless, the animals occurring in UK waters are part of a population likely to be in their 10,000s and so a total number of over 100 (200) animals per year could, in our opinion, be considered as a significant group. The SCANS II survey estimated a total abundance of 27,227 (CV=0.38) for *Lagenorhynchus* species in UK and adjacent waters (shelf only) in the summer of 2005. This species is very gregarious, with observed school sizes frequently numbering in the tens to hundreds, sometimes up to 1,000, particularly offshore. Within large aggregations, clusters of 2-15 animals can often be distinguished<sup>50</sup>.

#### **Risso's dolphin, *Grampus griseus***

Risso's dolphins are mainly distributed off western and northern coasts of Britain and Ireland and along the continental shelf<sup>20</sup>, with a few records from waters immediately over the shelf break. Risso's dolphins are known to use only a portion of UK waters and this is highly variable both seasonally and inter-annually. There seems to be more sightings on the continental shelf between May and October<sup>27</sup>. Greatest numbers have been observed from western Scotland with the waters around the Outer Hebrides forming an obvious concentration. There are other clusters of sightings in the southern Irish Sea, in the St George's Channel, off north Wales and the Isle of Man, and off south-west Ireland.

As a comparatively uncommon species, there have been no attempts to estimate Risso's dolphin abundance over wide areas in the north-east Atlantic. Nevertheless, the animals occurring in UK waters are likely to be part of a population ranging in size from 500 animals to the low 1,000s, as for populations in the north-west Atlantic. At least 142 individuals were identified over two summers in the north-western Minch off western Scotland, with 52 of these being re-sighted in both summers<sup>15</sup>. This species forms small to medium-sized schools, typically ranging from 2-50 animals. School size in UK waters has been recorded ranging from 6 to 12 animals. However, single individuals have been recorded as well as temporary aggregations of several hundreds or even thousands in some regions of the world<sup>51</sup>. Using the 1% (2%) threshold (of the population abundance estimates), which we have considered to be a reasonable yardstick for this species, around 5 (10) animals could be considered a significant group. In practice this means that in coastal areas where these animals are found one should assume that a significant group could be present at any time.

### **Killer whale, *Orcinus orca***

Killer whales are known to use only a portion of UK waters and this is highly variable both seasonally and inter-annually. Around the British Isles, the main area of distribution is the north and west; killer whales are found along the shelf edge, especially north of Shetland, in inshore waters around the Northern and Western Isles and in the northern North Sea<sup>20</sup>. The waters north and west of the UK as well as the area of North Sea between Shetland and Norway are likely to be important feeding grounds<sup>52; 53</sup>. Sighting rates in coastal waters are higher in summer<sup>27</sup>. The seasonal pattern of sightings around Shetland may reflect feeding movements between inshore waters (summer) and offshore waters (winter)<sup>54</sup>. They are occasionally seen in the south-west, but generally absent from the southern North Sea, Irish Sea and English Channel<sup>27</sup>. There are also a few records from deep water further offshore<sup>38; 47</sup>.

The killer whales occurring in UK waters are likely to be part of a wider north Atlantic population; but their precise relationship is not known, neither is the population size. The most recent sighting surveys in the eastern north Atlantic (mainly from Iceland to the Faroes) indicate a population of between 3500 and 12500 individuals<sup>55</sup>, while around 3100 individuals were estimated for the area comprising the Norwegian and Barents Seas<sup>56</sup>, as well as Norwegian coastal waters. A total number of around 50 (100) animals per year could, in our opinion, be considered as a significant group. Most sightings in UK waters are of singles or pods of less than eight individuals (mean = 4.6), although aggregations of up to one hundred have been observed<sup>49; 57</sup>. Although very unlikely in UK waters, for this species it is possible that the same individuals of a group representing 1% (2%) of the population would be present in an area at the same temporal and spatial scale of the activity in a way that repeated exposure would occur. In some coastal parts of the world, killer whales form stable pods and reside for periods of time in certain core areas where they return each year to socialise and to feed on migrating salmon<sup>58</sup>. However, there is currently no evidence for such "residency patterns" in UK waters. Individual killer whales have been documented to move over very large areas, with ranges up to tens of thousands of km<sup>2</sup> for animals of both resident and transient populations<sup>59</sup>.

### **Long-finned pilot whale, *Globicephala melas***

The long-finned pilot whale is known to use only a portion of UK waters (off the continental shelf) and this is highly variable both seasonally and inter-annually. Generally an oceanic species that comes closer to the shore seasonally, notably in the southwest approaches and the

Moray Firth (winter). Greatest numbers have been observed to the north of Scotland and south-east of the Faroes, as well as along the shelf edge from southern Ireland south to the Bay of Biscay<sup>20; 38; 47; 53</sup>.

There is no recent population estimate for this species. Due to the difficulties of estimating some parameters such as school size from ship-based surveys, a robust estimate of the total north Atlantic population cannot be made. The best estimate published is of 778,000 (CV = 0.30) individuals from a survey undertaken in 1989 which covered most of the northern and north-east Atlantic range<sup>60</sup>. However, there have been no comprehensive estimates of abundance for this species since then. Genetic studies have indicated that there is very little variability in mitochondrial DNA in pilot whales throughout the north Atlantic, and no significant differences between those sampled from the western Atlantic, Iceland and the eastern Atlantic<sup>61</sup>. Assuming a population size of 100,000, a total of 1,000 (2,000) animals per year could, in our opinion, be considered as a significant group. This species mostly occurs in large pods. Mean pod size recorded on sighting surveys in the north-east Atlantic was 20<sup>62</sup>. During surveys off north and west Scotland, mean school size was found to be 11.5 (maximum 400)<sup>49</sup>.

Individual pilot whales may move over very large areas. A juvenile animal fitted with a satellite-monitored radio tag in the Gulf of Maine was tracked for at least 3,144 km during three months<sup>63</sup>.

### **Sperm whale, *Physeter macrocephalus***

Occurs to the north and west of the British Isles and Ireland mainly in waters deeper than 500m<sup>20; 38; 47</sup> although very occasionally may come onto the shelf, particularly in winter<sup>27</sup>. Sperm whales have been recorded in UK waters off the continental shelf in all months of the year, with a peak in mid summer<sup>38; 45; 47</sup>. Acoustic surveys carried out in spring and autumn over a period of 5 years detected higher densities in spring in the Faroe-Shetland Channel, while no apparent differences were noted in the Rockall Trough<sup>64</sup>.

There is no reliable abundance estimate for this species in UK waters at present, but sperm whales occurring in UK waters are likely to be part of a wider north Atlantic population<sup>65</sup> whose total current size is unknown. Abundance estimates exist for selected regions, mostly based on surveys carried out in the summer. For the north-east Atlantic, the estimates<sup>55; 66</sup>, corrected for animals missed on the trackline<sup>67</sup>, gave an abundance of 6013 (CV=0.32) individuals for an area north of Norway and Iceland and 1772 (CV=0.18) for a larger area around Iceland and the Faroes. Only males (both mature and sub-adult) are found in UK waters as females rarely occur in cooler temperate or subpolar latitudes<sup>68; 69</sup>. It is reasonable to assume that there are at least 10,000 sperm whales in the north Atlantic, hence 100 (200) animals could, in our opinion, be considered as a significant group. Male sperm whales are likely to occur in aggregations that may number tens of animals, although they will usually be spread over a large area.

Sperm whales undertake large-scale latitudinal and longitudinal migrations; some individuals can range over thousands of kilometres in one year, particularly males.

### **Less common species in UK waters**

FCS not assessed, 1% threshold, *alternative 2% threshold in italics*

## Beaked whales

Three species of beaked whale are sighted in UK waters: northern bottlenose whale (*Hyperoodon ampullatus*), Sowerby's beaked whale (*Mesoplodon bidens*) and Cuvier's beaked whale (*Ziphius cavirostris*); and at least three further species of beaked whale can also be expected to occur, albeit very rarely.

Around the UK, northern bottlenose whales are recorded mostly beyond the shelf edge to the north-west of Scotland<sup>20; 38; 47</sup>. This species is thought to migrate north in spring, returning south in autumn and most sightings in UK waters have occurred during the summer months. However, in Faroese waters, where peak sightings and catches also occur in late summer, the species is known to be present throughout the year<sup>20</sup>. Northern bottlenose abundance was estimated as 27,900 animals (CV=0.67, 1995) and 28,000 (CV=0.22, 2001) (uncorrected, negatively biased) from ship surveys around Iceland and Faroes in the summer<sup>70</sup>. However, neither survey covered the entire summer range of the species, which extends farther south of Iceland and the Faroes at this time of year. A total of 280 (560) animals per year could, in our opinion, be considered as a significant group. The average school size of bottlenose whales sighted in the Atlantic Frontier was 2.4 animals<sup>38</sup>.

For other beaked whale species, currently there are no abundance estimates for the north-east Atlantic. In the western Atlantic several estimates have been made for *Mesoplodon* spp. grouped and Cuvier's beaked whale, and these are all in the dozens or the low hundreds. However, due to the cryptic nature of these species (deep diving, occurrence in small groups) the estimates carry substantial negative bias. Nevertheless, the populations of individual species are likely to be small. Therefore, where animals of these beaked whale species are known to occur one should assume that a significant group could be present at any time. Sowerby's beaked whale is the commonest *Mesoplodon* species in the north-east Atlantic, being the most frequently seen and stranded. There have only been a few confirmed sightings in UK waters, all in western areas, but it seems probable that most sightings of unidentified mesoplodonts were of this species. These records are mostly from deep water just beyond the shelf edge, to the north-west of Scotland<sup>20; 47</sup>. The average school size of *Mesoplodon* spp. in the Atlantic Frontier was 2.3 animals<sup>38</sup>. Cuvier's beaked whale, is frequently recorded in the Bay of Biscay and further south, and there have been a few confirmed sightings in UK waters (off west Scotland and in the northern North Sea), all in the summer<sup>20; 27</sup>.

Although site fidelity has been reported for several species of beaked whales in some parts of the world<sup>71-73</sup>, this is not known to occur in UK waters. The number of beaked whales using particular areas in UK waters may vary considerably between seasons and years, but some species might be present in waters off the continental shelf throughout the year.

## Other baleen whales

The humpback whale, *Megaptera novaeangliae*, occurs in deep waters beyond the continental shelf to the west of Britain, this region probably forming part of their migration route. Sightings of the species usually come from waters >200m to the north and west of Scotland

<sup>49</sup>. The sei whale, *Balaenoptera borealis*, tends to be found further offshore than fin whales, in water depths of 500m to 3000m<sup>20</sup>. Their migration route is thought to pass along the edge of the continental shelf to the west of Britain and Ireland<sup>74</sup>. In UK waters, this species is most frequently recorded in the Faroe-Shetland Channel and adjacent waters, also occasionally in deep waters west of Scotland, but only rarely in shelf waters of western Britain. In the north-east Atlantic, the blue whale, *Balaenoptera musculus*, distribution appears to be centred on Iceland. This species is a rare visitor to UK waters, most recently being recorded in deep waters in the Faroe-Shetland Channel and the Rockall Trough<sup>45; 49</sup>.

For humpback whales, a total abundance of 14,000 individuals was estimated in 2001 for an area around Iceland and 600 for Norway<sup>75</sup>. No current population estimates exist for sei whales in the north Atlantic although sightings surveys undertaken in the late 1987 and 1989 indicate a possible abundance of 13,500 individuals<sup>62</sup>. Abundance of blue whales around Iceland was estimated at around 400 individuals<sup>75</sup>. A total of 140 (280) animals per year could, in our opinion, be considered as a significant group for both humpback and sei whales; for blue whales this would be reduced to 4 (8) animals. All are comparatively non-social species, with most sightings being of single animals or pairs. However, it is possible that small clusters of one or two individuals are part of larger aggregations, which in some parts of their range can number hundreds of individuals spread over a wide area.

All these species of baleen whales are highly migratory, generally feeding at high latitudes in the summer and moving to lower latitudes to breed in warmer waters in the winter. Humpback whales are regularly recorded by acoustic monitoring between November and March, mostly from north of Scotland to west of Ireland, and less frequently to the southwest of the British Isles<sup>45</sup>. In the summer, a very small number of humpbacks are found in British shelf waters, particularly around the Northern Isles and also in western areas from the Hebrides to the English Channel<sup>20</sup>. Sei whales are mainly observed north and west of Scotland between May and October, although sightings have also been made in the south western approaches, between Ireland and south west England<sup>49</sup>. Whaling records from the early 20<sup>th</sup> century show a similar seasonal pattern, with most catches made along the shelf edge from June to August. All data sources indicate that there are high inter-year variations in occurrence of this species. Acoustic monitoring to the west of the British Isles continental shelf has indicated a peak occurrence of blue whales during November and December<sup>45</sup>.

### **Uncommon or vagrant species**

It is highly unlikely that the following species would be exposed to disturbance in UK waters, since they are uncommon or vagrant in this region: northern right whale, striped dolphin, false killer whale, pigmy sperm whale, Fraser's dolphins, beluga whale, narwhal, and melon-headed whale.

## **4.2. Turtles**

Five species of marine turtle are listed in Schedule 2 of the HR and Schedule 1 of the OMR. The leatherback turtle *Dermochelys coriacea* is the only species considered to be a regular visitor around the British Isles albeit a rare one. Leatherback turtle records make up over 90% of all identified turtle sighting and stranding records (ca. 60 turtles per year); it is the only species that exhibits physiological adaptations to allow it to function in temperate waters, such as those around the UK. UK waters are not currently considered to be part of the normal

geographical range of any other turtle species. Therefore the leatherback is the only species that should be considered in terms of significant disturbance. Leatherbacks feed exclusively on jellyfish and other gelatinous zooplankton which form ephemeral aggregations in space and time<sup>76; 77</sup>; these turtles do not simply migrate between their tropical nesting site and a single foraging area but consistently cruise the oceans in search of new foraging opportunities exploring also the northern latitude waters which offer a rich jellyfish habitat and thus occasionally enter UK waters. Given the apparent low density of leatherbacks within UK waters, their highly migratory nature and the fact that the animals found in UK waters are part of a wide West Atlantic population numbering 10s of thousands of animals, it is highly unlikely that a significant group of animals would be adversely affected or that their local abundance or distribution would be significantly affected.

### **4.3. Sturgeon, *Acipenser sturio***

The European sturgeon migrates along the Atlantic coast of Europe from the Bay of Biscay to the Bristol Channel and the North Sea. However, because of the small size of the population, *A. sturio* is now a rare visitor to Northern European waters. The last known areas for European sturgeon reproduction are in France; in the Garonne and Dordogne rivers.

It is unlikely that any activity in the UK would cause significant disturbance to the sturgeon. Factors that could potentially cause significant disturbance include habitat degradation (particularly spawning grounds and nursery areas) and physical obstacles to migration. Since the sturgeon is not currently known to breed in UK waters, the first factor is highly unlikely to occur in practice, while the second would only come within the scope of Regulation 39 if an activity had the potential to cause adverse effects in a way that would have population level consequences. For this to happen, the potential factor of disturbance would need to affect a large enough area and be present over a large enough period of time to expose a certain proportion of the overall population to the disturbance. Given the size and connectivity of the marine environment compared to terrestrial habitats, and the very low density of *A. sturio* in UK waters, it is very unlikely that a significant group of animals would be adversely affected, or that their local abundance or distribution would be significantly affected.

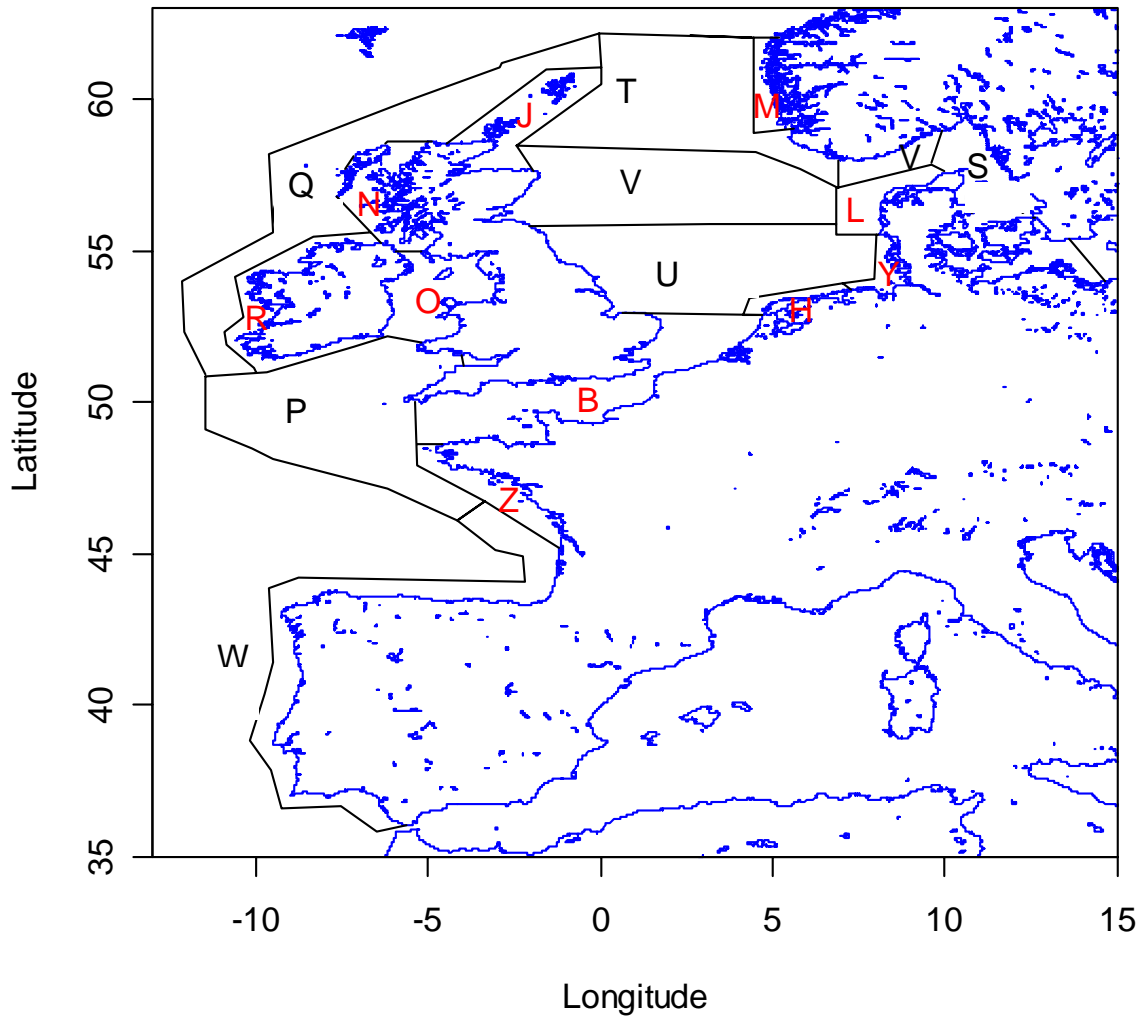


Figure 1. SCANS II survey region divided into the survey blocks.

Table 1. Animal abundance and density (animals/km<sup>2</sup>) estimates from the SCANS II shipboard and aerial surveys per block (see Figure 1 to locate blocks). Figures in parentheses are Coefficients of Variation (CVs).

Species	Shipboard surveys			Aerial surveys		
	Block	Animal abundance	Animal density	Block	Animal abundance	Animal density
HP	V	47 131 (0.37)	0.294 (0.37)	B	40 927 (0.38)	0.331 (0.38)
	Q	10 002 (1.24)	0.067 (1.24)	J	10 254 (0.36)	0.274 (0.36)
	U	88 143 (0.23)	0.562 (0.23)	N	12 076 (0.43)	0.394 (0.43)
	T	23 766 (0.33)	0.177 (0.33)	O	15 230 (0.35)	0.335 (0.35)
	P	80 613 (0.50)	0.408 (0.50)			
MW	V	4 449 (0.45)	0.028 (0.45)	B	1 202 (0.96)	0.0097 (0.96)
	Q	1 856 (0.46)	0.012 (0.46)	J	835 (1.02)	0.0223 (1.02)
	U	3 519 (0.69)	0.022 (0.69)	O	1 073 (0.89)	0.0236 (0.89)
	T	1 738 (0.52)	0.013 (0.52)			
	P	1 719 (0.43)	0.009 (0.43)			
WB	V	7 862 (0.37)	0.049 (0.37)	J	682 (0.86)	0.0182 (0.86)
	Q	2 030 (0.60)	0.014 (0.60)	N	9 731 (0.91)	0.3177 (0.91)
	U	493 (0.48)	0.003 (0.48)	O	75 (0.80)	0.0016 (0.80)
	T	1 525 (0.56)	0.011 (0.56)			
BD	V	123 (4.83)	0.08 (4.83)	B	395 (0.74)	0.0032 (0.74)
	Q	1 128 (0.68)	0.75 (0.68)	J	412 (0.86)	0.0110 (0.87)
	T	117 (0.79)	0.09 (0.79)	N	246 (1.04)	0.0080 (1.05)
	P	5 370 (0.49)	2.72 (0.49)	O	235 (0.75)	0.0052 (0.75)
CD	Q	1 454 (0.81)	0.010 (0.81)	B	14 349 (1.66)	0.1159 (1.66)
	P	11 141 (0.61)	0.056 (0.61)	N	2 322 (0.61)	0.0758 (0.61)
				O	366 (0.73)	0.0081 (0.73)
<i>Lag</i> sp.	V	6 460 (0.35)	0.040 (0.35)			
	Q	7 736 (0.29)	0.052 (0.29)			
	U	405 (1.00)	0.003 (1.00)			
	T	12 627 (0.80)	0.094 (0.80)			

HP: harbour porpoise; MW: minke whale; WB: white-beaked dolphin; BD: bottlenose dolphin; CD: common dolphin; *Lag* sp.: refers to white-beaked dolphin and white-sided dolphin combined due to difficulty in distinguishing the two species in the field.

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