European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Conservation status assessment for the species:

S2624 - Sperm Whale (*Physeter macrocephalus*)

UNITED KINGDOM

IMPORTANT NOTE - PLEASE READ

- The information in this document represents the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- It is based on supporting information provided by the geographically-relevant Statutory Nature Conservation Bodies, which is documented separately.
- The 2019 Article 17 UK Approach document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Maps showing the distribution and range of the species are included (where available).
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the UK assessments. Further underpinning explanatory notes are available in the related country-level reports.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; and/or (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species).
- The UK-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

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NATIONAL LEVEL

1. General information

1.1 Member State	**UK**
1.2 Species code	**2624**
1.3 Species scientific name	**Physeter macrocephalus**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Sperm Whale

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2013-2018
2.3 Distribution map	Yes
2.4 Distribution map Method used	Insufficient or no data available
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?		No
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Marine Atlantic (MATL)

4.2 Sources of information

CODA, 2009. Cetacean Offshore Distribution and Abundance in the European Atlantic (CODA). Final Report, 43pp. http://biology.st-andrews.ac.uk/coda/documents/CODA_Final_Report_11-2-09.pdf
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DG Environment. (2017). Reporting under Article 17 of the Habitats Directive: Explanatory notes and guidelines for the period 2013-2018. Brussels. Pp 188 http://cdr.eionet.europa.eu/help/habitats_art17
Evans. D and Marvela, A. (2013). Assessment and reporting under Article 17 of the Habitats Directive: Explanatory notes and Guidelines. 123pp. https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp
Hammond, P. S., Lacey, C., Gilles, A., Viquerat, S., Borjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M. B., Scheidat, M., Teilmann, J., Vingada, J & Oien, N. (2017). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Available here: https://synergy.st-andrews.ac.uk/scans3/files/2017/04/SCANS-III-design-based-estimates-2017-04-28-final.pdf
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http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling protocol_August 2010.pdf.
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Marine Scotland (2014). The protection of Marine European Protected Species from injury and disturbance. Guidance for Scottish Inshore Waters. 2014: http://www.gov.scot/Resource/0044/00446679.pdf
Mazzariol S, Di Guardo G, Petrella A, Marsili L, Fossi CM, Leonzio C, et al. (2011). Sometimes Sperm Whales (Physeter macrocephalus) Cannot Find Their Way Back to the High Seas: A Multidisciplinary Study on a Mass Stranding. PLoS ONE 6(5): e19417. https://doi.org/10.1371/journal.pone.0019417
Reid, J.B., Evans, P.G.H. and Northridge, S.P. (2003). Atlas of cetacean distribution in north-west European waters. Joint Nature Conservation Committee, Peterborough. 76pp.
Robinson, R.A., Learmouth, J.A., Hutson, A.M., Macleod, C.D., Sparks, T.H., Leech, D.I., Pierce, G.J., Rehfisch, M.M. & Crick, H.Q.P. (2005). Climate Change and Migratory Species. BTO Research Report 414
Spitz, J., Cherel, Y., Bertin, S., Kiszka, J., Dewez, A., & Ridoux, V. (2011). Prey preferences among the community of deep-diving odontocetes from the Bay of Biscay, Northeast Atlantic. Deep-Sea Research I, 58:273-283. https://doi.org/10.1016/j.dsr.2010.12.009
Stone, C. J., Hall, K. Mendes, S and Tasker, M. L. (2017). The effects of seismic operations in UK waters: analysis of Marine Mammal Observer data. J. Cetacean Red. Manage 16:71-85
Robert A. Robinson, R. A., Learmonth, J. A., Hutson, A. M., Macleod, C. D., Sparks, T. H., Leech, D. I., Pierce, G. J., Rehfisch, M. M & Crick, H. Q. P., (2005) Climate Change and Migratory Species. A Report for Defra Research Contract CR0302. British Trust for Ornithology, Norfolk.

5. Range

5.1 Surface area (km²)	640376	
5.2 Short-term trend Period	1979-2018	
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used	Based mainly on expert opinion with very limited data	
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²)	640376
	b) Operator	
	c) Unknown	
	d) Method	Range estimated for the current period matches the range given in the 2013 reporting round (excluding analytic differences).

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5.11 Change and reason for change in surface area of range	Use of different method	
	The change is mainly due to:	Use of different method
5.12 Additional information	Range estimated for the current period matches the range given in the 2013 reporting round (excluding analytical differences). This range is considered sufficient and includes all significant ecological variations to ensure survival of the species. Areas within the range are utilised to a lesser or greater extent.	

6. Population

6.1 Year or period	2016	
6.2 Population size (in reporting unit)	a) Unit	number of individuals (i)
	b) Minimum	3455
	c) Maximum	108313
	d) Best single value	19343
6.3 Type of estimate	95% confidence interval	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	
	b) Minimum	
	c) Maximum	
	d) Best single value	
6.5 Type of estimate		
6.6 Population size Method used	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Unknown (x)	
6.9 Short-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.10 Short-term trend Method used	Insufficient or no data available	
6.11 Long-term trend Period		
6.12 Long-term trend Direction		
6.13 Long-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.14 Long-term trend Method used		
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size	
	b) Operator	
	c) Unknown	x
	d) Method	
6.16 Change and reason for change in population size	No change	
	The change is mainly due to:	

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6.17 Additional information	The estimate of population size (6.2) is given as a point estimate (6.2d) with the corresponding 95% confidence intervals (6.2b&c). This is the first reliable abundance estimate following a dedicated survey covering UK waters for this species.

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (for long-term survival)?	Unknown
	b) Is there a sufficiently large area of unoccupied habitat of suitable quality (for long-term survival)?	
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on expert opinion with very limited data	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Unknown (x)	
7.5 Short-term trend Method used	Insufficient or no data available	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information		

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Geotechnical surveying (C09)	M

Threat	Ranking
Geotechnical surveying (C09)	M
Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change (N07)	M

8.2 Sources of information	
8.3 Additional information	

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	No
	b) Indicate the status of measures	
9.2 Main purpose of the measures taken		
9.3 Location of the measures taken		
9.4 Response to the measures		

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9.5 List of main conservation measures

9.6 Additional information	This species is not an Annex II species under the Habitats Directive, therefore conservation measures stipulated in the Directive are not required. This is reflected in the UK response to field 9.1 (with no measures listed under field 9.5) However, the UK has been committed to supporting several international agreements and conventions on the conservation of marine mammals and the marine environment in general. For example: The Convention on Migratory Species; the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). The UK Government funds a national strandings scheme, ongoing since 1990, which aims to: collate, analyse and report data for all cetacean strandings around the coast of the UK; determine the causes of death in stranded cetaceans, including bycatch and physical trauma and; undertake surveillance on the incidence of disease in stranded cetaceans in order to identify any substantial new threats to their conservation status. These considerations for this species most closely equate to the following five measures in the EU conservation measures list: Reduce impact of mixed source pollution (CJ01) Reduce impact of military installations and activities (CH01) Control/eradication of illegal killing, fishing and harvesting (CG04) Reduce bycatch and incidental killing of non-target species (CG05) Adapt/manage exploitation of energy resources (CC02).

10. Future prospects

10.1 Future prospects of parameters	a) Range	Good
	b) Population	Unknown
	c) Habitat of the species	Unknown
10.2 Additional information	These results are based on the current conservation status for each parameter combined with the future trend for each parameter. The future trend is an estimate of how the parameter is likely to progress into the future, using the current trend as a baseline and considering the balance between threats and measures to assess how these are likely to affect that trend over the next two reporting cycles (12 years). For sperm whale, the future trend of Range is assessed as Overall Stable. As the current conservation status for Range is Favourable for this species, the future prospects are considered Good. The future trend and consequently the future prospects for the Population and Habitat parameters are assessed as Unknown; this is due to there being insufficient data to establish current trends for these parameters.	

11. Conclusions

11.1. Range	Favourable (FV)
11.2. Population	Unknown (XX)
11.3. Habitat for the species	Unknown (XX)
11.4. Future prospects	Unknown (XX)
11.5 Overall assessment of Conservation Status	Unknown (XX)

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11.6 Overall trend in Conservation Status	Unknown (x)
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable and (ii) the current Range surface area is approximately equal to the Favourable Reference Range. Conclusion on Population reached because: (i) the FRP is unkown; and (ii) the short-term trend direction in Population size is unknown. Conclusion on Habitat for the species reached because: (i) the area of habitat is sufficiently large but (ii) the habitat quality is unknown for the long-term survival of the species; and (iii) the short-term trend in area and quality of habitat is unknown. Conclusion on Future prospects reached because: (i) the Future prospects for Range are good; but (ii) the Future prospects for Population are unknown; and (iii) the Future prospects for Habitat for the species are unknown. Overall assessment of Conservation Status is Unknown because two or more of the conclusions are Unknown. Overall trend in Conservation Status is based on the combination of the short-term trends for Range - stable, Population - unknown, and Habitat for the species - unknown.

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit b) Minimum c) Maximum d) Best single value
12.2 Type of estimate	
12.3 Population size inside the network Method used	
12.4 Short-term trend of population size within the network Direction	
12.5 Short-term trend of population size within the network Method used	
12.6 Additional information	

13. Complementary information

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13.1 Justification of % thresholds for trends

13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

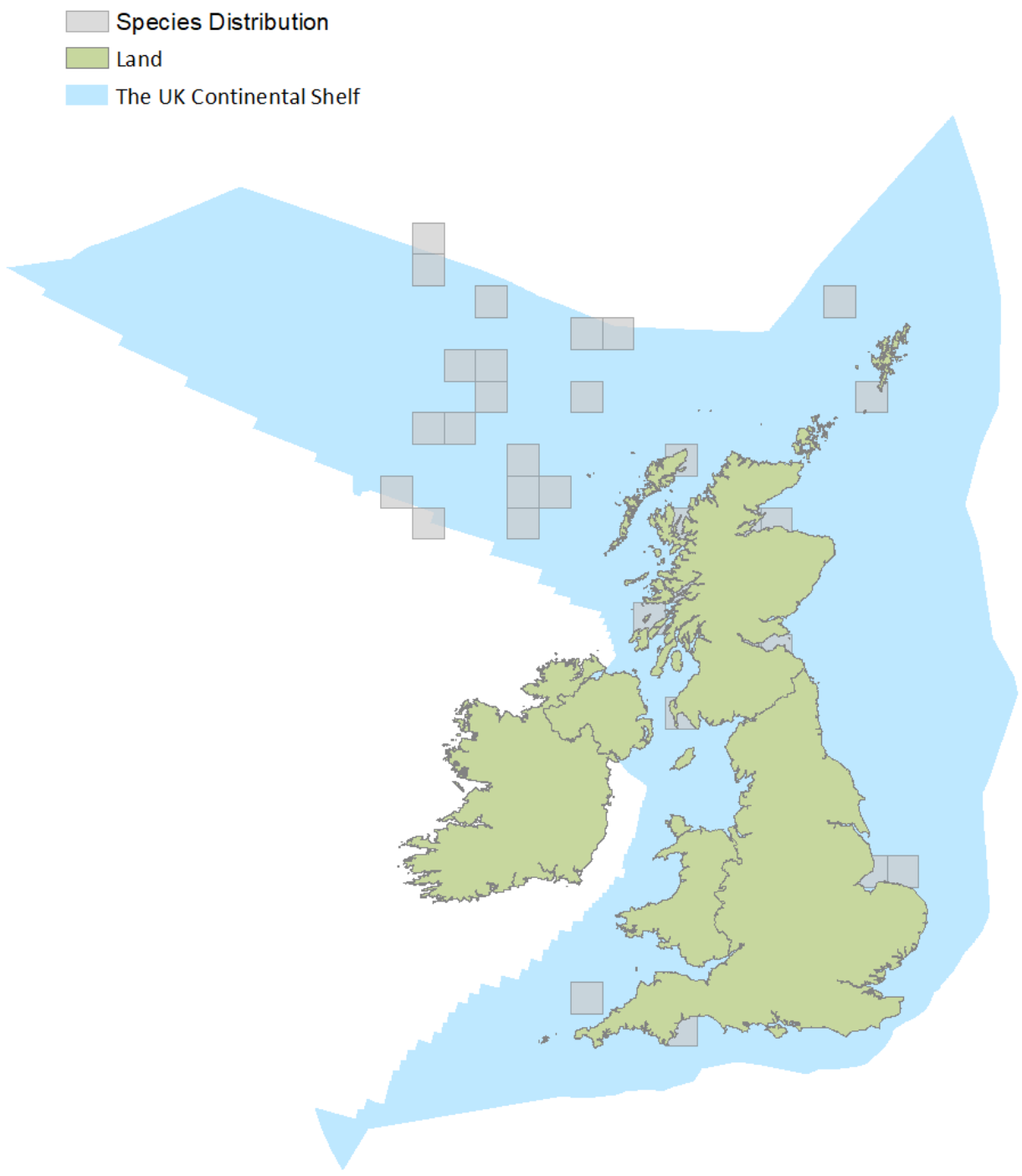

Figure 1: UK distribution map for S2624 - Sperm Whale (*Physeter macrocephalus*).

The 50km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

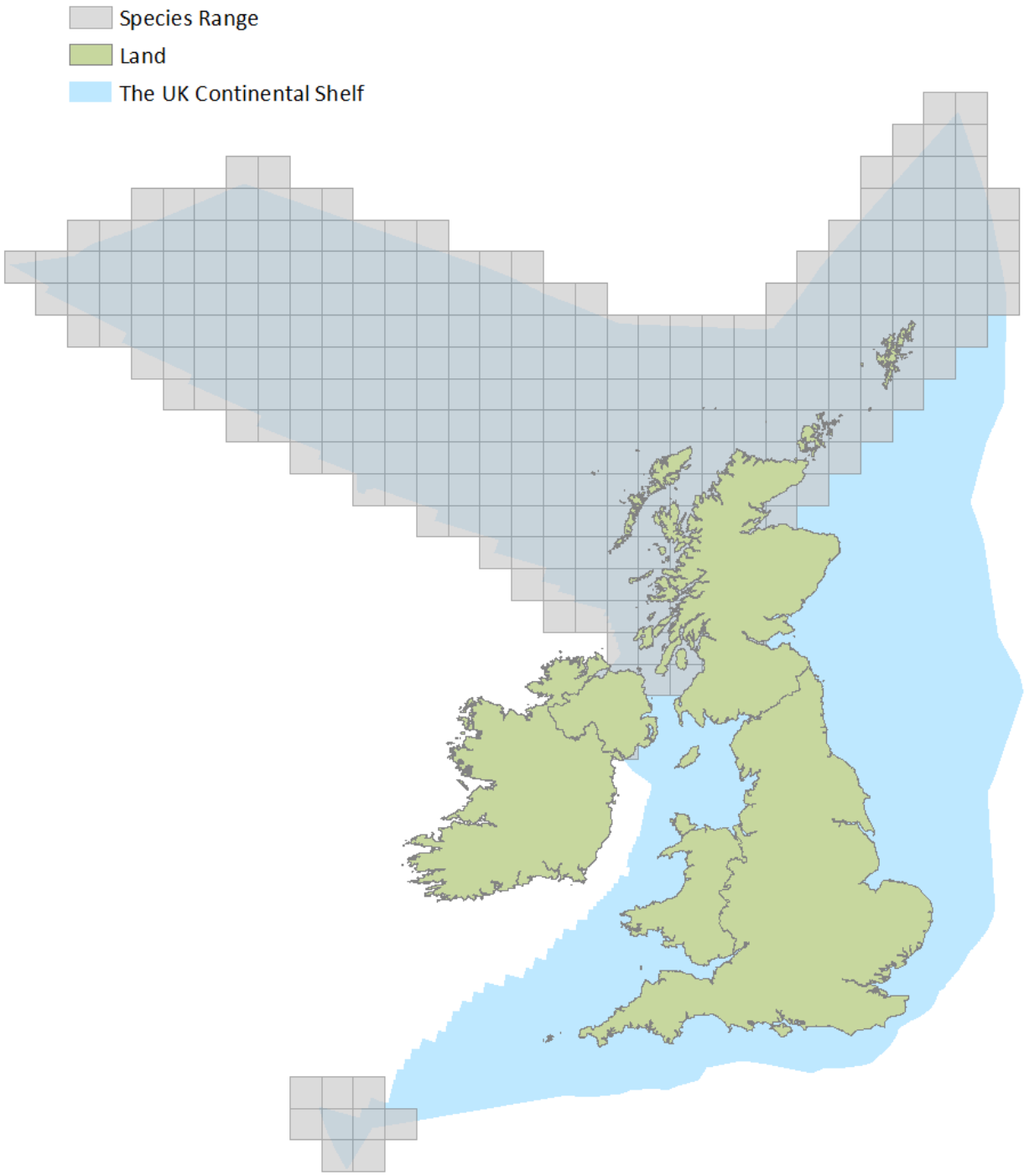

Figure 2: UK range map for S2624 - Sperm Whale (*Physeter macrocephalus*).

The 2013-2018 range was based on interpolation of distribution data from the 2003 and previous Article 17 reports. The 2013-2018 range estimate also took into account the distribution data shown in Reid et al. (2003) which incorporated sightings data from a range of sources spanning 1979-2001. For the current report, the 2013-2018 range was mapped using a grid of 50x50km resolution and projected to ETRS LAEA 5210.

Explanatory Notes

Species name: Physeter macrocephalus (2624)

Field label	Note
2.1 Sensitive species	This refers to sensitivities around publishing distribution data.
2.3 Distribution map	The distribution map obtained is a poor representation of sperm whale distribution in UK waters, largely due to lower survey effort in deep-waters where the species is most prevalent. The distribution map (Annex A) is based on actual sightings of sperm whale, covering the UK Exclusive Economic Zone (EEZ) and UK Continental Shelf area (hereafter referred to as 'UK waters') between 2013 and 2018. This collates sightings data from the SCANS-III, National Biodiversity Network (NBN), SeaWatch Foundation, MARINElife and ORCA datasets and includes both effort related sightings and opportunistic sightings collected from land ship and aerial platforms during this period. Sperm whales are predominantly a deep-water species, occurring most commonly off the continental shelf, though there are occasional sightings in shelf waters. Survey effort in offshore areas is lower and as a result the distribution is inferred from relatively few sightings. Some recorded sightings are considered to be anomalies and not a true part of the species range based on expert knowledge, such as sperm whales recorded in the shallow southern North Sea and the western Channel. This distribution is therefore not considered representative and the range map presented in Annex B is thought to be a better depiction of their likely distribution in UK waters.
2.5 Additional maps	Predicted core range for sperm whales in UK waters (Annex B). Although the species may occasionally occur outside of this area in the UK, the range presented illustrates where the species occurs most commonly and consistently. No evidence of change since 2013 reporting round. Due to insufficient available data, the modelling approach (see Paxton et al., 2016) used for the more common species could not be applied to sperm whale. Instead, the 2013 range was based on interpolation of distribution data from 2013 and previous Article 17 reports. The 2013 range estimate also took into account the distribution data shown in Reid et al. (2003) which incorporated sightings data from a range of sources spanning 1979-2001.

Species name: Physeter macrocephalus (2624) Region code: MATL

Field label	Note
5.3 Short term trend; Direction	Range for the current report (640,376km2) is equal to the range presented in the 3rd reporting round (638,244km2).
5.5 Short term trend; Method used	Due to insufficient available data, the modelling approach (see Paxton et al., 2016) used for the more common species could not be applied to sperm whale. Instead, the 2013 reported range was based on interpolation of distribution data from the 2003 and previous Article 17 reports. The 2013 range estimate also took into account the distribution data shown in Reid et al. (2003) which incorporated sightings data from a range of sources spanning 1979-2001 (see Article 17 2013 report for sperm whale for further detail). The distribution data collated for the current report was compared with the predicted range from the 2013 report. As there was no discernible difference between the 3rd (2013) and 4th (2019) reporting rounds, the range is considered stable.
5.10 Favourable reference range	The favourable reference range is approximately equal to the surface area given in Section 5.1.
5.11 Change and reason for change in surface area of range	Range is considered stable but there is a minor difference in the range value between this report and the 3rd reporting round (2013). The difference is due to the use of a slightly different grid template and does not represent an actual difference in the species range between reporting rounds.

6.1 Year or Period	This is when the SCANS-III survey was conducted (Hammond et al. 2017).
6.2 Population size	SCANS-III block estimates of abundance have been pro-rated across UK waters. Minimum and maximum are the lower and upper 95% confidence intervals respectively. The best single value is the point estimate.
6.6 Population size; Method used	The SCANS-III survey was designed to provide robust estimates of cetacean abundance. The survey provides coverage of UK EEZ waters. The area west of the EEZ out to the UK Continental Shelf boundary was assumed to have the same density of animals as the adjacent survey block from SCANS-III. The resulting estimates are considered statistically robust.
6.10 Short term trend; Method used	This is the first time that an assessment of sperm whale abundance has been possible from a single survey with complete coverage of UK waters (shelf and offshore) (Hammond et al. 2017). Although the 3rd report did give a value for sperm whale abundance, there is low confidence in the estimate. The estimate was derived from the CODA survey in 2007 (CODA, 2009); in the UK, this survey only covered offshore waters west of Scotland. The density value from this survey for the offshore area was used to calculate abundance in this area. However, the lower 95% confidence interval of the density estimate for this offshore area was applied to adjacent areas within the sperm whale range (accounting for a large portion of the range), to give a minimum estimate for sperm whale abundance in UK shelf waters. The estimate was combined with the offshore estimate to give an overall figure for sperm whale abundance in UK waters of 673 (95% CI: 340 - 1,334). This method is not considered a robust estimate of sperm whale abundance in UK waters and is not directly comparable with the current estimate derived from the SCANS-III survey in 2016 (Hammond et al., 2017). As there is only one reliable abundance estimate for this species it is not possible to assess whether sperm whale abundance has changed in UK waters over the short term. A minimum of three population estimates are required before trends can be explored. Due to the wide confidence intervals surrounding abundance estimates for this species, even with three estimates the statistical power to detect anything beyond a dramatic change is likely to be limited. This is the first reliable population estimate for sperm whale which cover UK waters.
6.15 Favourable reference population	This is the first reliable abundance estimate following a dedicated survey covering UK waters for this species. The 3rd UK Article 17 report set an FRV for fin whale abundance. This was based on the population estimate, derived from the CODA (2007) survey. However, this estimate it is not as robust as the estimate derived from the SCANS III survey and the values are not comparable. Given there is only one reliable population estimate and a lack of reliable trend information it is not possible to state whether the current population represents a favourable reference population. The FRP is therefore currently Unknown.
7.1 Sufficiency of area and quality of occupied habitat	As data relating to habitat quality is limited for this species, the assessment of this parameter is based on the conclusions for range and population as a proxy for habitat. Although sperm whale range is considered stable, with only one reliable estimate it is not possible to explore trends relating to their abundance at the UK scale and must conclude that the population parameter for this species is Unknown. As the population parameter is Unknown, we cannot conclude that the supporting habitat is sufficient.

8.1 Characterisation of pressures/ threats	General information for sperm whales: Pressure ranking for sperm whale is mainly based on expert opinion and data from post mortem of stranded animals, which indicate sources of mortality for this species. Between 2001-2017, 21 post mortem examinations were conducted on sperm whales. The main cause of death was live stranding (74%), with an unusual mortality event (UME) of 6 juvenile/subadult males stranding between 22nd January - 4th February 2016 in the Wash region of the east coast of England. This was part of a larger UME, with 30 sperm whales stranding across Germany, Netherlands, UK, France and Denmark over a 6-week period. The cause of the UME has not been established, however, a study in the Mediterranean concluded that navigational errors do occur within the species, rendering them in regions where feeding is limited and other pressures may have an increased effect due to a compromised state (Mazzariol et al, 2011). Starvation (16%), entanglement (5% although cause not confirmed) and physical trauma due to boat strike (5%) were also found as causes of death in the species (UK Cetacean Stranding Investigation Programme annual reports (Deaville 2011:2017).
8.1 Characterisation of pressures/ threats	N07 Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiot, etc.) due to climate change: Application of pressure: Used to identify risk from climate change. There is no current evidence for the effects of climate change on sperm whales. Sperm whales are deep diving foragers and primarily feed on cephalopods, mostly squid (Spitz et al., 2011). Climate change is proposed to affect the abundance and distribution of squid species, however given the cosmopolitan distribution and migratory nature of sperm whales, this change may result in changes in migration routes and therefore allow for adaptation to changing conditions. For example, inter-annual variation in sperm whale strandings on the North Sea coast was proposed to be related to shifts in the North Atlantic Oscillation that could affect squid prey species (Robinson et al., 2005). The species may have flexibility in their migratory routes/feeding areas and adjust them in response to a change in prey distribution.
8.1 Characterisation of pressures/ threats	C09 Geotechnical surveying: Application of pressure: Used where there is evidence that this pressure alone, has a pressure or threat rating of Medium or above. Evidence suggests sperm whales are sensitive to impulsive noise and the species distribution overlaps with seismic activity in UK waters (Stone, 2015; Stone et al., 2017). The displacement impact of this pressure is indirect with evidence of recovery/return once the pressure is removed. However, direct impact may also result in injury from close proximity to activity. Exposure to this pressure is limited both spatially and temporarily, although it may be regionally significant when occurring.
9.5 List of main conservation measures	CH01 Reduce impact of military installations and activities: To reduce the risk of noise impact on marine mammals, the UK Ministry of Defence (MOD) has a Statement of Intent with UK Statutory Nature Conservation Bodies concerning conduct in relation to marine disturbance. The MOD has developed a real-time alert procedure for naval training operations. This enables localised information on cetacean sightings to be incorporated into the training schedule and for operations to be relocated if necessary.
9.5 List of main conservation measures	CG04 Control/eradication of illegal killing, fishing and harvesting: The Habitats Directive is transposed into UK law under the Habitat Regulations (HR) for England and Wales (as amended) and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended), which make it an offence to kill, injure, capture or disturb European marine protected species. Similar legislation exists for Scottish and Northern Irish inshore waters.

9.5 List of main conservation measures	CG05 Reduce bycatch and incidental killing of non-target species: The UK is implementing the European Council Regulation EC 812/2004, which lays down measures concerning incidental catches of cetaceans in fisheries, and more generally the bycatch obligations within the Habitats Directive. Since 2004, a dedicated bycatch monitoring scheme has been in place, managed by the Sea Mammal Research Unit at University of St Andrews, with both dedicated and non-dedicated onboard observers collecting data on bycatch numbers.
9.5 List of main conservation measures	CC02 Adapt/manage exploitation of energy resources: Guidance for the protection of marine European Protected Species from deliberate injury, killing and disturbance has been drafted (JNCC 2010a; Marine Scotland, 2014). Marine Industries generate a variety of noise through activities such as geophysical surveys (e.g. seismic surveys (JNCC 2017)), construction (e.g. pile driving (JNCC 2010b)) and decommissioning (e.g. use of explosives (2010c)). As part of the licencing procedures, developers and operators are required to utilise JNCC guidelines to minimise the risk of injury to cetaceans when undertaking such activities (JNCC 2010b, 2010c; JNCC 2017). The guidelines advise on conducting marine mammal observations prior to and during the activity and, where suitable, utilising procedures such as soft start (gradual introduction of the sound) to reduce and avoid direct harm to animals. A review of the marine mammal observer data demonstrated the effectiveness of soft start approach (Stone et al, 2017).
9.5 List of main conservation measures	CJ01 Reduce impact of mixed source pollution: The impact of chemical pollution on sperm whales remains an issue (Jepson et al, 2016), however, establishing measures beyond the historic ban on PCB use, has not been achieved to date. Further information is required to understand where exposure is occurring to be able to identify appropriate measures.
10.1 Future prospects of parameters	10.1a Range: The conclusion for range is good because the overall assessment of this parameter is favourable and there is no evidence in Section 8 Pressures and Threats that risk is increasing in the next 12 years (two reporting round), which is the identified temporal measure in the guidance. 10.1b Population: Insufficient information to assess the status of this parameter. Although the pressures impacting this parameter are not thought to be increasing and there are no threats identified which are likely to impact in the next 12 years, the uncertainty surrounding the current status of this parameter make it impractical to predict future prospects. The future prospects of this parameter are therefore assessed as unknown. 10.1c Habitat of the species: Insufficient reliable information to assess the status of this parameter. Although the pressures impacting this parameter are not thought to be increasing and there are no threats identified which are likely to impact in the next 12 years, the uncertainty surrounding the current status of this parameter make it impractical to predict future prospects. The future prospects of this parameter are therefore assessed as Unknown.
11.1 Range	There is no evidence to suggest range has changed since the last reporting round (2013) and therefore the range assessment remains Favourable.
11.2 Population	The FRP is Unknown. Therefore, the current abundance cannot be compared to the FRP and the conclusion for population is Unknown.
11.3 Habitat for the species	Range is Favourable but population is Unknown. Therefore, the quality of habitat for the species cannot be inferred in the absence of population information.
11.4 Future prospects	There are two or more Unknown results (population and habitat), therefore, future prospects are Unknown given a lack of evidence on which to base an assessment.
11.5 Overall assessment of Conservation Status	There are two or more Unknown results (population, habitat and future prospects), therefore, the overall assessment of conservation status is Unknown.

11.7 Change and reasons for change in conservation status and conservation status trend	The assessment has changed from Favourable in the 3rd reporting round (2013) to Unknown due to a revised approach to dealing with limited data and interpretation of the guidance relating to the Favourable Reference Values (FRVs). According to the Art17 reporting guidance (DG Environment, 2017) assessment of the population parameter is based on how the current estimate compares with the Favourable Reference Population (FRP). A population is considered 'Favourable' if the species abundance estimate is not below the FRP. Due to data limitations, cetacean FRPs were set based on the best UK abundance estimates made as close in time as possible to when the Habitats Directive was adopted. This approach was taken in the UK 3rd reporting round (2013) and was supported by the Article 17 Guidance at the time (Evans and Marvela, 2013). However, the UKs interpretation of the FRP concept has changed between reporting rounds and concludes that information on trends needs to be understood to set an FRP. A minimum of three data points is required to explore trends and considering the large confidence intervals associated with cetacean abundance estimates, the statistical power to detect anything beyond a dramatic change is likely to be limited from only three estimates. Where less than three data points are available, identification of trends is not possible. The change in the overall conclusion is therefore driven by this change in approach between the reporting rounds.