Agenda Item 4.4	Special Species Sessions Harbour Porpoise Baltic Proper & Iberian Populations
Document 4.4b	**Draft Proposal for the Inclusion of the Iberian Harbour Porpoise on the Appendices of CMS**
Action Requested	• Review • Provide updates as needed
Submitted by	Secretariat

Secretariat's Note

The 25th Meeting of the Advisory Committee requested that the text for proposals for the Baltic and Iberian populations of the Harbour Porpoise to be listed in CMS Appendices should be discussed in the 26th Meeting of the Advisory Committee. The current draft has been compiled by Whale and Dolphin Conservation.

PROPOSAL FOR THE INCLUSION OF THE IBERIAN HARBOUR PORPOISE (*Phocoena phocoena*) ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

A. PROPOSAL: Inclusion of the Iberian population of the harbour porpoise *Phocoena phocoena* (proposed subspecies *P. p. meridionalis*) on CMS Appendices I and II. The Iberian porpoise has been recognised by the International Council for the Exploration of the Sea (ICES) Working Group on Marine Mammal Ecology (WGMME) as a critical isolated population, representing a demographically significant unit and a unique management unit. It is also recognised as a distinct ecotype and potential subspecies, supported by genetic data (Fontaine et al. 2010, 2014), morphological studies (Smeenk et al., 1992; Donovan and Bjørge, 1995), and its occurrence in a distinct upwelling-related habitat (Fontaine et al., 2014). The Iberian population has been identified as a high priority for conservation due to its low abundance, genetic-distinctiveness, low genetic diversity, and evidence of unsustainably high levels of bycatch mortality in fishing gear. Inclusion on the CMS Appendices is expected to increase the level of protection offered to Iberian porpoises, specifically including further mitigation of fisheries bycatch. Inclusion on Appendix II will support the development of a collaborative and targeted conservation and management plan by Range States, which is necessary to protect this highly-mobile, transboundary species.

B. PROPONENT: [to follow]

C. SUPPORTING STATEMENT

1. Taxonomy

1.1 Class:	Mammalia
1.2 Order:	Cetartiodactyla
1.3 Infraorder:	Cetacea
1.4 Family:	Phocoenidae
1.5 Species or subspecies:	*Phocoena phocoena* (Linnaeus, 1758); subspecies *P. p. meridionalis*
1.6 Scientific synonyms:	No current synonyms
1.7 Common name(s):	UK: harbour porpoise France: marsouin commun Spain: marsopa común Portugal: bôto or boto

2. Overview

The Iberian harbour porpoise, *Phocoena phocoena*, is a small cetacean species that inhabits a region of seasonal upwelling along the Atlantic coasts of Spain and Portugal. The distribution of the species appears to be concentrated around Galicia in north-west Spain, and along the central and northern coasts of Portugal (a geographic region referred to hereon as the north-west Iberian Peninsula, NWIP). The Iberian porpoise is not currently recognised by the IUCN Red List. However, a significant amount of new information on Iberian porpoises has emerged within the last decade, and since the last 2008 Red List assessment was produced. In 2009, the ICES WGMME recognised Iberian porpoises as a critical, isolated, population that represented a demographically significant unit and a unique management unit inhabiting ICES areas 8c and 9a. The Iberian population is genetically-distinct, exhibits low and asymmetric gene flow and, together with animals off north-west Africa, appears to comprise a unique porpoise ecotype (Fontaine et al., 2007, 2010; Llavona Vallina, 2018). Recently, harbour porpoises off Iberia and North-west Africa were proposed as a fourth recognised subspecies in the wider north-east Atlantic region, *Phocoena phocoena meridionalis* (Fontaine et al., 2014). No genetic differentiation is apparent between porpoises from Spain and Portugal, indicating that they comprise a single, widely-distributed population. Regular movements between the two countries are unproven but highly likely, based on genetic data and inferences from typical porpoise home ranges in other regions. The population size of Iberian porpoises is low (<3,000 animals), and estimated annual mortality rates are high (18%). An estimated 11% of annual porpoise mortality in the NWIP was deemed directly attributed to fisheries interactions (Read et al., 2013). However, more recent estimates from Portuguese fisheries suggested a fisheries bycatch of 30.32% of the estimated national population size of 1,531 animals. These values greatly exceed the ASCOBANS recommendation of 1.7% of a population annually and are unsustainably high. The Iberian harbour

porpoise population is proposed for listing on CMS Appendices I and II. The population would benefit from a collaborative transboundary management plan recommended upon its inclusion in a CMS Appendix II listing, and from the strict Range State protections offered by a CMS Appendix I listing, particularly with regard to reducing unintentional mortality from fisheries bycatch.

3 Migrations

3.1 Kinds of movement, distance, the cyclical and predicable nature of the migration

The harbour porpoise is a highly-mobile, extensive-range cetacean species (Fontaine et al., 2007). This species has not been the subject of either photo-identification or tagging work in the NWIP, mainly due to its small dorsal fin and elusive nature. Consequently, the movement of individuals across national jurisdictional boundaries has not been explicitly demonstrated. Nevertheless, such movements are strongly implied by:

- The concentration of Iberian porpoise strandings and sightings along the Atlantic NWIP coast of south-west Galicia and northern/central regions of Portugal, which supports the existence of a single area of continuous distribution across the two countries related to the upwelling region (Lens, 1997).
- Observations from La Guardia in south-west Galicia, produced one of the highest porpoise sighting rates from 53 monitored shore-based Galician sites (Pierce et al., 2010). Its location, in close proximity to the border with Portugal, supports a high likelihood of transboundary movements.
- Variations in the number of porpoise sightings between years, months and subareas, are indicative of movements between areas (Vingada and Eira, 2017a; Llavona Vallina, 2018).
- The results of genetic studies which, based on samples from both Spain and Portugal, have identified a single, genetically-distinct Iberian population and strongly support mixing of porpoises between the two countries (Fontaine et al., 2014; Llavona Vallina 2018).
- The existence of asymmetric gene flow from the Iberian population towards the European North Atlantic (northern Bay of Biscay) and African populations, which supports long-distance transboundary and even inter-continental movements (Fontaine et al., 2010, 2014).

3.2 Proportion of the population migrating, and why that is a significant proportion

There are currently no available data to indicate what proportion of the Iberian population makes regular movements across the Spain–Portugal border, or further, longer-range, transboundary movements. However, since porpoises occur along the NWIP coasts year-round (Sequeira, 1996; Pierce et al., 2010; Díaz López and Methion, 2018), comprise a single genetic population (Llavona Vallina, 2018), and appear to have a continuous Atlantic distribution between Galicia and central Portugal (Lens, 1997; see Section 4.1), it is reasonable to suppose that such movements are regularly undertaken. Additionally, the data from satellite-tracked harbour porpoises off eastern Canada and Greenland provide some indications of the likely scale of potential transboundary movements off the Iberian Peninsula:

- Individual tagged porpoises had mean daily travel rates of up to 58.5 km/day in eastern Canada (Read and Westgate, 1997), while off Greenland the mean daily travel rates of 30 porpoises was up to 53 km/day during June (Nielsen et al., 2018). One porpoise in Canada moved over 300 km in just 21 days, while those from Greenland made extensive spatial movements of several thousand kilometres during deployments that averaged 250 days. The core concentration of Iberian porpoises occurs along approximately 600 km of coastline between Faro Punta Roncadoira on the north coast of Galicia and Nazaré in central Portugal (see Section 4.1). Iberian porpoises are therefore potentially capable of moving linearly from end-to-end of their core range in just a few months.
- Read and Westgate (1997) found that the home range of individual porpoises was large (~50,000 km^2), while Johnston et al. (2005) found that over the course of a month harbour porpoises ranged across areas of 7,738 to 11,289 km^2. Block AB of the 2016 Small Cetaceans Abundance in the North Sea and Adjacent Waters (SCANS) survey had a surface area of 26,668 km^2 (Hammond et al., 2017), spanned the Spain-Portugal border, and encompassed the majority of the known core range of the Iberian porpoise population (see Sections 4.1 and 4.2). Since the area of this entire

survey block was less than the documented home range sizes of individual porpoises, it may be expected that a relatively high portion of the Iberian porpoise population undertakes transboundary movements between Spain and Portugal.

4. Biological data (other than migration)

4.1 Distribution (current and historical)

Overview

The Iberian harbour porpoise population inhabits the cold-water upwelling zone along the Atlantic coasts of Spain and Portugal (Figures 1 and 2: Donovan and Bjørge, 1995; Sequeira, 1996; Read, 2016; Fontaine, 2016; Hammond et al., 2017).

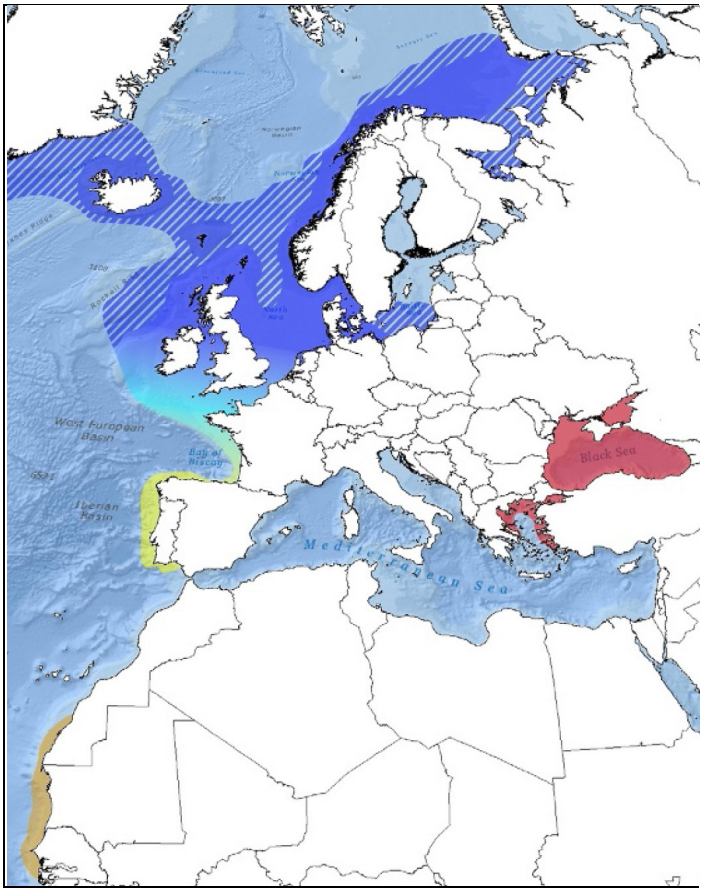

Figure 1. Eastern North Atlantic distribution of three harbour porpoise subspecies (from Fontaine, 2016). Blue=North Atlantic (*P. p. phocoena*; Yellow=Iberian (*P. p. meridionalis*); orange=North-west African (*P. p. meridionalis*); red=Black Sea (*P. p. relicta*); graded blue to yellow=contact zone between Iberian and North Atlantic porpoises.

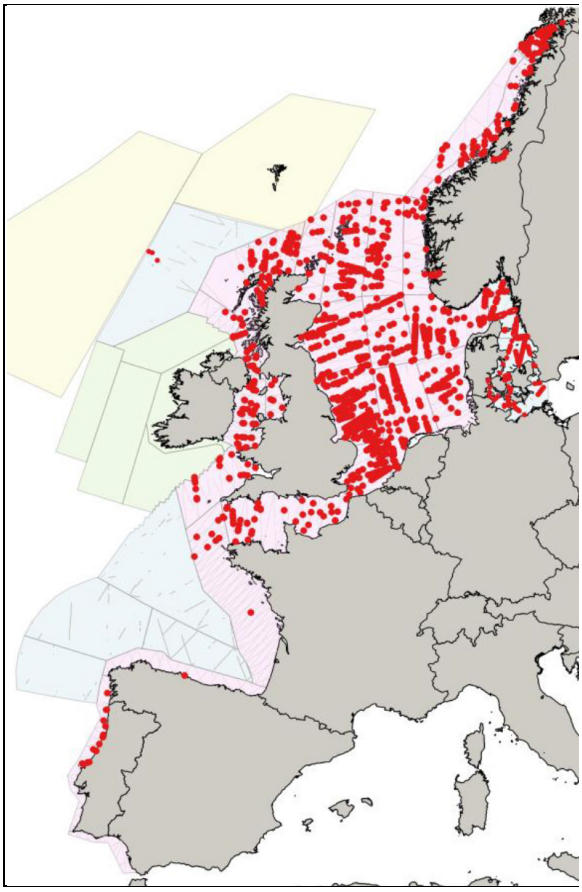

Figure 2. Sightings of harbour porpoises during the SCANS III survey in 2016. From Hammond et al. (2017).

Historical distribution

Historically, the Iberian population probably occurred in a continuous distribution with the wider European North Atlantic population that is currently found from the French Bay of Biscay coast northwards to Iceland (Fontaine et al., 2007, 2010). Genetic studies revealed shallow genetic divergence between Iberian porpoises and those occurring north of the Bay of Biscay (Tolley and Rosel, 2006; Fontaine et al., 2007). This was initially considered to be the result of habitat fragmentation induced by the recent climate warming after the Little Ice Age (LIA; Fontaine et al. 2007, 2010). However, subsequent work by Fontaine et al. (2014) found deep mtDNA divergence between porpoises from the European North Atlantic, the Iberian/North-west African upwelling regions, and the Black Sea, indicating that they had evolved independently from each other for a substantial amount of time. The latter two populations appear to have

shared a common ancestor prior to splitting from the European North Atlantic population. Fontaine et al. (2014) proposed that this common ancestor arose from a movement of porpoises into the Mediterranean Sea from the Atlantic during colder climatic conditions associated with the last glacial maximum. Subsequent warming caused porpoises from the western Mediterranean to move back out into Atlantic waters, leading to the relictual Iberian and North-west African populations using habitats where sufficient productive upwelling occurs to support their energetic requirements. Consequently, the current Iberian population arose due to the contraction of suitable cold-water productive habitat during postglacial warming, leaving fragmented porpoise populations from a much wider historical distribution.

Spain

The vast majority (86%) of porpoise strandings reported in Spain between 1978 and 1994 occurred along the western Galician coast (Lens, 1997), and comparatively few occurred along the Biscay coast (López et al., 2002). This distribution is also supported by recent sightings data. Boat transect surveys along the entire northern Spanish coast in 2006/07 did not record any porpoises, and only two sightings were recorded during shore monitoring (López et al., 2013). During five years of shore-based monitoring in Galicia, Pierce et al. (2010) found that porpoises were recorded in 1.6% of coastal observation periods and were widely-distributed, with the highest sighting frequencies recorded off Faro Punta Roncadoira on the north coast of Galicia, Faro Cabo Vilán near Cabo Fisterra (the westernmost point of Galicia), and La Guardia located close to the border with Portugal. Although clearly widespread in Galician coastal waters, boat surveys indicate that the south-west Galician coast is of particular importance for porpoises (Spyrakos et al., 2011; Fernández et al., 2013; Llavona Vallina, 2018). Despite a wide distribution of multi-faceted survey effort off Galicia between 1998 and 2009, porpoise sightings (n=35) were recorded only between Cabo Fisterra and the Portuguese border (Fernández et al., 2013). Surveys in this region (Ría of Arousa) between 2014 and 2017 recorded 70 porpoise encounters (338 animals), with sightings distributed throughout the study area (Díaz López and Methion, 2018). Porpoises appear to be rare off southern Spain in the Gulf of Cádiz (Sociedad Española de Cetáceos, 2006), and are generally absent from the Strait of Gibraltar and the western Mediterranean Sea (Frantzis et al., 2001). A small number of porpoise sightings in the northern Aegean are thought to originate from the isolated Black Sea population (Frantzis et al., 2001; Fontaine, 2016).

Portugal

Initial information on porpoise distribution in Portugal originated from strandings, with over 86% of porpoise strandings occurring in the upwelling regions along the northern and central Portuguese coasts, and most (67%) around Aveiro and Figueira da Foz (Sequeira, 1996). Since then, a more expansive dataset has shown that strandings occur all along the Portuguese coastline, particularly between Viana do Castelo in the north and Nazaré in central Portugal (Ferreira et al., 2017; In Prep.). Between 1978 and 2015, 347 porpoise strandings were reported in central and northern Portugal, with 43 in 2014 alone (Ferreira et al., In Prep.). The SCANS survey in 2016 recorded porpoise sightings from the border with Galicia south to Peniche, but had no sightings south of that region (Figure 2; Hammond et al., 2017). However, sightings recorded from a variety of platforms since 2008 support an occurrence all along the Portuguese coast, with a main area of concentration located between Porto and Nazaré, and a second hotspot occurring between Vila do Conde and Caminha near the border with Galicia (Figure 3; Vingada et al., 2011; Araújo et al., 2015; Vingada and Eira, 2017a). Aerial surveys along the Portuguese coastline produced predicted occurrence maps that suggest annual fluctuations in porpoise occurrence, particularly in southern Portugal (Araújo et al., 2015). Shore-based surveys at the Douro River mouth (near Porto) in northern Portugal during 2017 included repeated sightings of a leucistic animal, that suggests some site-fidelity of the species at that location (Gil et al., In Press). Porpoises are scarcer in southern Portugal (Araújo et al., 2015; Vingada and Eira, 2017a), but survey work has revealed regular sightings off Costa de Setubal and Costa Sudoeste, which may be important in maintaining connectivity between regions (Araújo et al., 2015; Vingada and Eira, 2017a). Few records exist from the Gulf of Cádiz coast. However, during 2009, 22 porpoise sightings were recorded along the western Algarve coast of southern Portugal (Cape São Vicente to Lagos), indicating that Iberian porpoises do also inhabit that region (Castro, 2010).

Figure 3. Sightings of harbour porpoises from aerial census, platforms of opportunity and coastal surveys in Portuguese waters, 2010–2015. Adapted from Vingada and Eira (2017a).

Distribution limits

An area of very low density occurs along the southern Bay of Biscay coast that may represent the northern limit of distribution of the Iberian population. In that region, warmer oligotrophic waters are considered to represent an ecological barrier to porpoise movements, and result in the current separation of the Iberian population from the rest of the eastern North Atlantic population (Fontaine et al., 2007, 2010, 2014). Recent work by Fontaine et al. (2017) suggests a genetic contact zone between North Sea and Iberian ecotypes occurring in the region between the northern Bay of Biscay and south-west England, but any gene flow is likely to be one-directional (northwards). The southern distribution of Iberian porpoises extends to at least the Algarve coast of Portugal (Sequeira, 1996; Castro, 2010; Araújo et al., 2015; Vingada and Eira, 2017a) and the Spanish coast in the Gulf of Cádiz (Sociedad Española de Cetáceos, 2006), although the scarcity of sightings in this region suggests low densities. Porpoises are currently absent from the Strait of Gibraltar and the Mediterranean, with the exception of occasional vagrants (Frantzis et al., 2001; Fontaine, 2016). A survey of the waters between the Gulf of Cádiz and Mauritania did not record any porpoises north of Agadir in Morocco (30°N; Boisseau et al., 2007), although three strandings were reported between Agadir and the Straits of Gibraltar over a 29 year monitoring period between 1980 and 2009 (Masski and De Stéphanis, 2015). Harbour porpoises do occur in the upwelling system off the north-west coast of Africa between (at least) latitudes 14° and 30°N (Senegal, Mauritania, Western Sahara and Morocco: Cadenat, 1949; Fraser, 1958; Bayed and Beaubrun, 1987; Smeenk et al., 1992; Donovan and Bjørge, 1995; Robineau and Vely, 1998; Boisseau et al., 2007). The lack of intensive survey effort in the region between the Iberian Peninsula (Strait of Gibraltar) and Agadir (Morocco) limits understanding of the potential connectivity between African and Iberian porpoises. Until further evidence is forthcoming, the continental divide at the Strait of Gibraltar is taken to represent the southern distributional limit of the Iberian population (Donovan and Bjørge, 1995).

Seasonality

Strandings and sightings of harbour porpoises occur year-round in Spain and Portugal (Sequeira, 1996; Lens, 1997; López et al., 2002; Pierce et al., 2010; Vingada and Eira, 2017a; Díaz López and Methion, 2018; Ferreira et al., In Prep.). However, in Galicia porpoise strandings were more common in winter (peaking March and April) while in Portugal a peak was detected in May, and with similar values in June–

August (Llavona Vallina, 2018; Ferreira et al., In Prep.). Sightings from a shore vantage point in central Portugal also varied seasonally, with highest sighting rates recorded between October and March, and very few sightings between July and September (Pereira, 2015).

4.2 Population (estimates and trends)

Abundance
European-wide assessments of porpoise population size have been conducted as part of the SCANS surveys in 2005 and 2016. The 2005 population assessment was carried out in shelf waters of the combined Iberian Peninsula and the southern and central Bay of Biscay (SCANS II block W), producing abundance and density estimates of 2,357 animals (CV=0.92) and 0.017 animals/km^2 (CV=0.92) respectively (Hammond et al., 2013). During the 2016 SCANS III survey this area was amended to comprise a Block A that corresponded with the Iberian Peninsula Management Unit (IPMU) that had been adopted by the ICES WGMME in 2009 (ICES, 2009). Block A was further divided into three sub-blocks spanning the Atlantic and Bay of Biscay coasts of Portugal and Spain. The survey generated an abundance estimate of 2,715 individuals (CV=0.31) for sub-block AB, which extended from Cabo de São Vicente in Portugal north to Cape Finisterre in Galicia and encompasses the core range of the Iberian population (Table 1). Sub-blocks AA and AC had no or few porpoises (Table 1), resulting in a combined abundance for the IPMU of 2,898 animals (CV=0.32). The porpoise densities recorded for the Iberian Peninsula SCANS blocks during both the 2005 and 2016 surveys were among the lowest over the entire European continental shelf. Final porpoise abundance estimates for the IPMU were very similar, at 2,880 (CV=0.72) and 2,900 (CV=0.32) animals respectively (Hammond et al., 2017).

Table 1. Harbour porpoise abundance and density (animals/km^2) in Iberian Peninsula Block A of the SCANS III aerial survey in 2016 (Hammond et al., 2017). CV is the coefficient of variation of abundance and density. CL low and CL high are the estimated lower and upper 95% confidence limits of abundance.

Block	Geographic region	Abundance	Density	CV	CL low	CL high
AA	Straits of Gibraltar to Cabo de São Vicente	0	0	0.00	0	0
AB	Cabo de São Vicente to Cape Finisterre	2,715	0.102	0.31	1,350	4,737
AC	Cape Finisterre to Bayonne (France), including the southern Bay of Biscay	183	0.005	1.02	0	669

Spain: Based on data collected in 2003–2011 from multiple sources, López et al. (2013) produced an abundance estimate for harbour porpoises in the Spanish Galician and Bay of Biscay waters of the IPMU of 683 animals (CV=0.63, 95%CI: 345-951, N=40), with a density estimate of 0.0008 animals per km^2. This estimate did not account for availability, perception or responsive movement bias and was therefore likely negatively biased, but nonetheless highlights the small size of this population. The Galician population alone is estimated to comprise 386 (CV=0.71) individuals (López et al., 2012).

In Portuguese waters, annual aerial surveys conducted in summer/autumn between 2010 and 2015 generated an overall abundance estimate of 1,531 individuals (CV=0.32, 95%CI: 740–3,167), and a density of 0.061 animals per km^2 (Vingada and Eira, 2017a). Large inter-annual variation in abundance was recorded, varying from a minimum of 156 animals (CV=1.01, 95%CI: 29–829) in 2010, to 3,020 animals (CV=0.37, 95%CI: 1,482–6,157) in 2013 (Vingada and Eira, 2017a).

Population structure
The Iberian porpoise population is genetically-distinct from the wider European North Atlantic population (Tolley and Rosel, 2006; Fontaine et al., 2007, 2010, 2014; Llavona Vallina, 2018). Porpoises from Spain and Portugal form a genetically homogeneous “Iberian cluster,” which has lower genetic diversity than, and substantial divergence from, those further north in the Atlantic (Fontaine et al., 2007; Llavona Vallina, 2018). Although genetically distinct from one another, a contact zone exists in the northern Bay of Biscay and south-west approaches to the UK where porpoises have a hybrid ancestry from both ecotypes (see Figure 1; Fontaine et al., 2017). However, gene flow between these populations occurs asymmetrically in a northward direction, thus maintaining the genetic integrity of the Iberian population (Fontaine et al., 2010, 2014). While porpoises from Iberia and North-west Africa originate from a common ancestor (and appear to comprise a distinct ecotype), they form genetically differentiated populations consistent with the apparent distribution gap between their geographic occurrences (Fontaine et al., 2014). There is evidence for a southerly gene flow from the Iberian source population towards Mauritanian waters, but not in reverse (Fontaine et al., 2014).

4.3 Habitat (short description and trends)

Throughout its range the harbour porpoise is a cold, temperate species, favouring cool, shallow, nutrient-rich waters on the continental shelf. However, the Iberian/African ecotype is associated with upwelling-dominated habitat, which contrasts with the shallow habitat and demersal feeding habits of porpoises from the European continental shelf (Fontaine, 2016). A rich trophic network and a high diversity of fish species occurs in the Eastern Central Atlantic Upwelling system, where winds bring cold nutrient-rich deep waters to the surface (Spyrakos et al., 2011; Fontaine, 2016). Porpoises occupying the waters of Galicia also experience enhanced primary production from the complex system of flooded tectonic valleys (rías) located along the coast (Díaz López and Methion, 2018).

Porpoises appear to predominantly use continental shelf (<200 m depth) habitat in both Spain (Pierce et al., 2010; Fernández et al., 2013; Goetz et al., 2015) and Portugal (Castro, 2010; Araújo et al., 2015). This includes nearshore waters close to the coast where they have been recorded during shore-based monitoring (e.g. Pierce et al., 2010; Dia et al., In Press), and also open shelf waters of 100-200 m depth further offshore (Castro, 2010; Spyrakos et al., 2011; Llavona Vallina, 2018). Dietary data (see Section 4.4) also highlight the importance of pelagic fish, which is consistent with porpoise occurrence in deeper areas of the shelf. Sightings from Galicia showed no linear relationship with depth, suggesting that porpoises feed over the whole continental shelf (Goetz et al., 2015). In both countries there are occasional sightings in deeper waters (Araújo et al., 2015; Goetz et al., 2015), with sightings recorded in up to 4,500 m depth and 150 km from shore in Portuguese waters (MarPro census database).

Several recent studies have specifically examined the habitat preferences of porpoises in Spain and Portugal. In Spain, porpoises were found to occupy areas of shelf habitat (mean depth=87.39 m, SD=50.92), located closer to the coast (mean=8.3 km, SD=7.0), with more variable sea surface temperature (SST; mean=16.33°C, SD=0.81), and higher chlorophyll concentration (mean=3.38 mg/m3, SD=3.03) than other cetacean species (Fernández et al., 2013). Other studies have indicated a greatest predicted occurrence in medium water temperatures of ~14 to 18°C, at greater water depths (100–200 m), and with increasing chlorophyll concentration (Díaz López and Methion, 2018; Llavona Vallina, 2018). In Portugal, the presence of porpoises was related to distance from the coast, SST and chlorophyll concentration, with most observations occurring at 10–100 m depth, in years when summer and autumn SSTs were lower, and in areas of higher chlorophyll concentration (Araújo et al., 2015).

The combined results indicate rather broad habitat preferences, but are consistent in identifying shelf waters of moderate water temperature and increased chlorophyll concentration, probably indicative of upwelling areas, as being important for Iberian porpoises.

4.4 Biological characteristics

Group size
Iberian harbour porpoises are typically found in small groups of 1 to 8 animals (López-Fernández and Martínez-Cedeira, 2011). Group size in Block AB of the 2016 SCANS survey was 1.2 animals (Hammond et al., 2017). Reported mean group sizes in Galician waters include 1.6 animals (Spyrakos et al., 2011), 3.0 animals (López et al., 2004), and 2.7 animals (Pierce et al., 2010). Off the Ría of Arousa (south-west Galicia), groups of 1 to 25 animals (mean=4.8; N=70) were observed (Díaz López and Methion, 2018). Around 5% of observed individuals were considered to be dependent calves, which were present in 17% of groups (Díaz López and Methion, 2018). Group sizes estimates during aerial surveys in Portugal produced a mean of 1.7 animals (1–6 animals; N=66; Vingada and Eira, 2017a). Sightings at the Douro River mouth (northern Portugal) consisted of 1 to 3 animals (Gil et al., In Press), while the mean group size along the western Algarve coast (southern Portugal) was 2.9 animals (range=1–6: Castro, 2010).

Body size
Iberian porpoises (together with those of North-west Africa) appear to comprise a genetically, ecologically and morphologically differentiated ecotype, characterised by larger body sizes compared with European North Atlantic and Black Sea porpoises (Donovan and Bjørge, 1995; Smeenk et al., 1992; Read et al., 2013). A sample of 319 porpoises collected from the NWIP between 1990 and 2010 produced body lengths of 81–202 cm for females (N=127) and 82–189 cm for males (N=136; Table 2; Read et al., 2013). Portuguese data from 2000 to 2017 indicate body lengths of 84–205 cm for females (N=133) and 80–182 cm for males (N=132; Table 2; MarPro stranding database). The maximum reported body length is 208 cm (Sequeira, 1996). Galician harbour porpoises weighed between 9.1 and 92.6 kg with an average weight of 44.1 kg (N=135; Santos et al., 2014). There is evidence from skull morphometrics that females have

larger cranial lengths and widths than males (Vaz, 2015), in addition to the larger body lengths indicated in Table 2.

Table 2. Summary of harbour porpoise size and life history parameters in Iberian waters.

Area	Sex	Max. length (cm)	Max. age (years)	Length at sexual maturity (cm)	Age at sexual maturity (years)	Length at physical maturity (cm)	Age at physical maturity (years)	Pregnancy rate (presence of fetus)	Source
NWIP	F	202 (N=127)	18 (N=71)	161-202 (N=60)	5.5 (N=60)	185 (N=60)	10 (N=60)	0.54 (N=13)	Read et al. (2013); Read (2016)
	M	189 (N=136)	19 (N=77)	154-171 (N=47)	3.8 (N=47)	162 (N=47)	10 (N=47)	–	
Galicia (NW Spain)	F	202 (N=38	9	166 (N=35)	3	N/A	N/A	N/A	Lens (1997); Lopez (2003)
	M	176 (N=27)	9	155	5	N/A	N/A	–	
Portugal	F	208 (N=22)	N/A	N/A	N/A	N/A	N/A	N/A	Sequeira (1996)
	M	175 (N=15)	N/A	N/A	N/A	N/A	N/A	–	
	F	205 (N=133)	N/A	N/A	N/A	169 (N=77)	N/A	0.29 (N=34)	MarPro stranding database; Camarão (2017)
	M	182 (N=132)	N/A	N/A	N/A	N/A	N/A	N/A	

Sex ratio

Studies of stranded/bycaught animals suggest that the sex ratio of males to females in the NWIP is even: 1.07:1.00 for the NWIP (Read et al., 2013); 1.17:1.00 in Spain (Lens, 1997), and 1.00:1.01 for Portugal (LIFE+ MarPro stranding database).

Age

Porpoise longevity in the NWIP is 18 years for females and 19 years for males (Table 2; Figure 4). One animal of undetermined sex reached 21 years of age. Over 85% of animals that stranded or were bycaught in the NWIP were ≤10 years old, and over 60% were ≤3 years old (Read et al., 2013). Female Iberian porpoises reach sexual maturity at around 5.5 years old, with mature females being 161–202 cm long and pregnant females 176–202 cm long (n=16; Read et al., 2013). Mature male Iberian porpoises ranged from 3–19 years old (n=14) and had body lengths of 154–171 cm (n=17), with an estimated age at sexual maturity of 3.8 years (Read et al., 2013). Growth models indicated that the physical lengths of males (162 cm) and females (185 cm) was reached at approximately 10 years of age.

Reproduction

The annual pregnancy rate (APR; estimated from the proportion of mature females with a foetus between September and May) of a combined dataset of Iberian porpoises was 0.54 (Read et al., 2013). However, recent data from Portuguese data indicated a much lower pregnancy rate of 0.29 (Table 2; MarPro strandings database). The calving interval, during which gestation, lactation and reproductive resting occur, was estimated to be 1.89 years, and females appeared to remain reproductively active until at least 16 to 18 years old (Read et al., 2013; Read, 2016). Four neonate porpoises were recovered in May and August, indicating a summer calving period (Read, 2016).

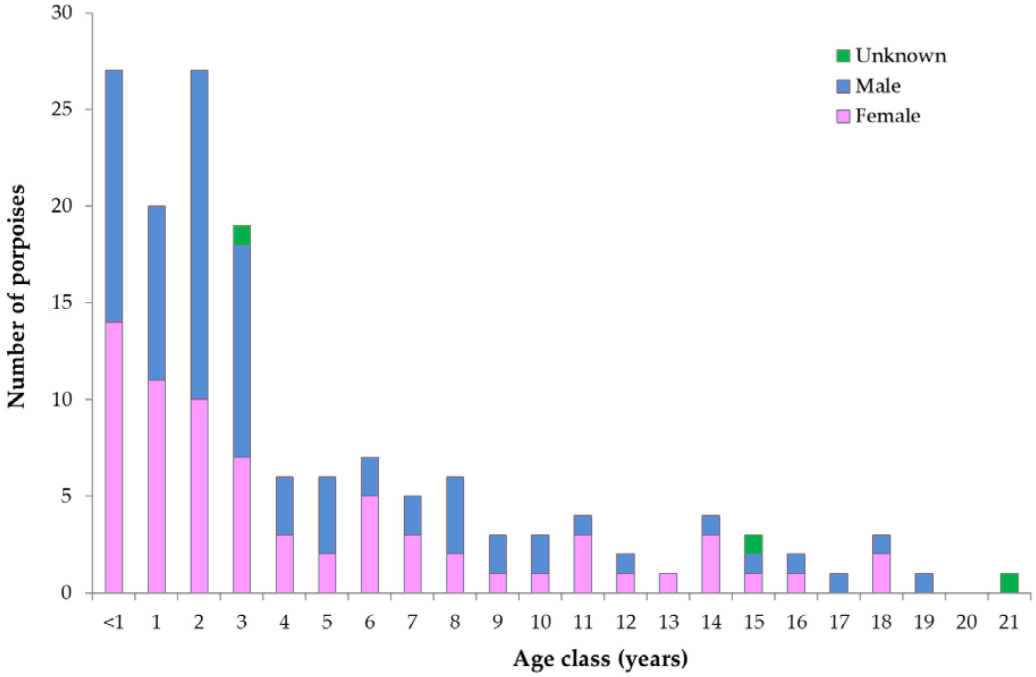

Figure 4. Frequency of estimated age of stranded harbour porpoises in the NWIP (from Read et al., 2013).

Diet

Using three different methods, Santos et al. (2014) estimated that Iberian porpoises consumed an average of between 1.96 and 3.45 kg of food daily. The lowest value equated to 4.44% of the body weight of an average porpoise. The remains of 18 fish taxa and four cephalopod taxa were identified in the stomach contents of 56 porpoises stranded or bycaught in Galicia (Read et al., 2013). However, most prey comprised pelagic and demersal fish, and relatively small amounts of cephalopods were consumed. Based on reconstructed weight, pouting (*Trisopterus* spp) were the main prey item (32.2%), followed by blue whiting (*Micromesistius poutassou*; 20.8%), scad (*Trachurus trachurus;* 17.6%), hake (*Merluccius merluccius*; 8.6%) and sardines (*Sardina pilchardus*; 5.9%). Along the Portuguese coast, the main prey species by weight comprised mullet (*Liza* spp.; 52.1%), hake (15.2%), common dragonet (*Callionymus lyra;* 10.6%), seabass (*Dicentrarchus* sp.; 6.5%) and pouting (5.1%; Aguiar, 2013). Prey species by weight of porpoises from central and northern Portugal only, comprised mullet (29.1%), hake (19.0%), seabass (14.8%), sea bream (Sarpa salpa; 10.6%), pouting (7.0%) and blue whiting (5.9%; Pinheiro, 2017). Stable isotope analysis of nineteen porpoises that stranded in the NWIP between 2004 and 2008, revealed high δ13C and δ15N values indicative of a coastal distribution or a greater use of benthic resources (Mèndez-Fernandez et al., 2012).

Interspecific competition

The sympatric occurrence of harbour porpoises with common bottlenose dolphins (*Tursiops truncatus*) in coastal Galician waters, and the similarities in diet between these species in the region, suggests that trophic competition may potentially occur between the two species (Méndez-Fernández et al., 2012; Fernández et al., 2013). Aggressive, non-predatory interactions have occasionally been documented in the NWIP (López and Rodríguez, 1995). However, Díaz López and Methion (2018) concluded that interspecific competition with bottlenose dolphins did not affect the distribution or relative density of harbour porpoises off Galicia.

4.5 Role of the taxon in its ecosystem

Relatively little is known about the ecological influences of small cetaceans, although their high metabolic rates and locally high population densities have the potential to exert considerable top-down control on populations of some prey species (Estes et al., 2016). The Iberian harbour porpoise is an apex predator occupying a high trophic position (Read et al., 2013), and thus may contribute to the maintenance and the structure of the ecosystem. It is also an important indicator species for demonstrating the health and trophic integrity of the marine ecosystem. Mèndez-Fernandez et al. (2012) noted that little is known about the role of Iberian cetaceans in the food web or their trophic relationships. There is evidence that porpoises play a relatively minor role in the structure and functioning of the Portuguese continental shelf ecosystem, having the lowest keystone index and relative total impact of each of the functional ecosystem groups examined

by Malta et al. (in press). Iberian porpoises may consume up to 3.45 kg of food daily (Santos et al., 2014), a portion of which will be excreted and thus redistribute nutrients and energy within the ecosystem. Their high mobility connects ocean ecosystems over large spatial scales.

5. Conservation status and threats

5.1 IUCN Red List Assessment (if available)

The current (2008) IUCN Red List recognises two European subspecies of the harbour porpoise: the North Atlantic subspecies (*P. p. phocoena*) and the Black Sea subspecies (*P. p. relicta*). The European North Atlantic population is classified as Least Concern. There is no specific acknowledgement of the Iberian population.

5.2 Equivalent information relevant to conservation status assessment

Although currently unrecognised by the IUCN Red List, a significant amount of new information on Iberian porpoises has emerged within the last decade and since the 2008 Red List assessment was produced. The ICES (2009) WGMME recognised Iberian porpoises as a critical isolated population representing a demographically significant unit (DSU), and considered it to be a unique management unit (MU) inhabiting ICES areas 8c and 9a. The European North Atlantic and Black Sea populations of harbour porpoises are currently recognised as subspecies, representing distinct evolutionary significant units (ESUs) that are following independent evolutionary trajectories. In recent work on porpoise genetic structure in the eastern North Atlantic, Fontaine et al. (2014) showed that porpoise populations from Iberia and Mauritania had a sufficiently high level of mitochondrial genetic divergence to also be considered as a distinct ESU. In addition to the genetic information, this was supported by morphological traits, such as the larger body size found in porpoises from Iberia and North-west Africa (Smeenk et al., 1992; Donovan and Bjørge, 1995). Furthermore, Iberian/North-west African porpoises occupy a distinctly different upwelling-related habitat and related trophic structure compared with the European North Atlantic population (Pierce et al., 2010; Pinela et al., 2010; Méndez-Fernandez et al., 2013). These combined characteristics suggest that the Iberian/North-west African porpoises may represent a distinct ecotype (Fontaine et al., 2014). The occurrence of different ecotypes in the potential area of spatial overlap in the Bay of Biscay, may limit contact between the Iberian and European North Atlantic populations via the occupation of different habitats and act to further separate the populations. This combined evidence supports the elevation of the Iberian and North-west African populations to subspecies status, with Fontaine et al. (2014) proposing them as *Phocoena phocoena meridionalis*. Genetic studies also support differentiation between Iberian and African porpoises (Fontaine et al., 2007, 2010, 2014), such that the Iberian porpoises should be recognised as a distinct and isolated population of *P. p. meridionalis*.

In addition to its unique genetic status, the Iberian porpoise population is of high conservation priority because of its low population size, isolated status and apparently high mortality due to anthropogenic causes. Abundance estimates have indicated fewer than 3,000 animals in the total population (Section 4.2). Studies by Fontaine et al. (2007, 2010, 2014) indicated that gene flow between the Iberian population and those in adjacent regions is low, and is predominantly outward, suggesting little or no potential growth of the Iberian population from immigration, and highlighting its importance as a source population for adjacent areas.

The best estimate information available suggests that the Iberian porpoise population experiences unsustainable levels of fisheries bycatch, primarily in nearshore set nets, beach seine fisheries, and IUU (illegal, unreported and unregulated) fishing (see Section 5.3). A study of Spanish and Portuguese porpoise specimens found that approximately 60% of the animals for which cause of mortality could be ascertained had died as the result of fisheries interactions (Read et al., 2013). A more recent analysis of Portuguese strandings found that 64.4% and 18.8% of animals had died as the result of confirmed and suspected fisheries bycatch respectively (Ferreira et al., In Prep.). The overall annual rate of mortality of Iberian porpoises due to fisheries, has been estimated at 11% of the population for the NWIP (Read et al., 2012), although that value assumes that mortality near the coast is representative of mortality across the whole population. Two estimated annual pregnancy rates (0.54 and 0.29%; see Table 2) would not be sufficient to counteract annual mortality rates. The reported bycatch rates for Iberian porpoises in Spain and Portugal greatly exceed the 1.0% precautionary and 1.7% maximum removal levels recommended by ASCOBANS (Section 5.3), and are not considered sustainable.

In light of these multiple strands of evidence, the ICES WGMME has strongly recommended that the Iberian harbour porpoise population should be considered a high priority for conservation, and that immediate action should be taken by the Spanish and Portuguese governments to monitor and conserve the population (ICES, 2009, 2010a, 2012).

5.3 Threats to the population (factors, intensity)

Bycatch and contaminants were considered the major threats to Iberian harbour porpoises by the ICES WGMME (ICES, 2015). Additional potential threats that have been identified within the NWIP include climate change, oil spills, overfishing, disturbance (from maritime traffic, and loud sound sources such as airguns and sonar), disease (e.g. herpesvirus; Bento et al., 2018), and other sources of marine pollution (e.g. biotoxins and pollution from sewage outfalls). Some key threats are elaborated on below.

Bycatch in fisheries
Interactions with fisheries are considered to be a significant, and unsustainable, cause of mortality for Iberian porpoises (Sequeira, 1996; López et al., 2002, 2003; López-Fernández and Martínez-Cedeira, 2011; López et al., 2012; Read et al., 2013; Pereira, 2015; Read, 2016; Llavona Vallina, 2018). The NWIP comprises one of the most important fishing regions in the world, with an estimated 1.5 million fishing trips per year by 13,000 registered fishing vessels (Read, 2016). The most numerous sector is the coastal small boat fishery using set nets (gillnets, trammel nets, semi-trammel nets), longlines, traps, beach seines (Portugal only), purse seines, dredges, bottom trawlers and beam trawls (López et al., 2004; IBERMIX, 2007; Read, 2016). Interviews at Galician harbours from 2008 to 2010 indicated that set nets comprised 41.5% of the fishing gear used in the region (Goetz et al., 2014). Set net fisheries are also prevalent in northern Portugal, with 2,320 licences issued in 1991 and primarily in areas overlapping with core porpoise occurrence (Sequeira, 1996). A dedicated study to detect cetacean–fishery interaction hotspots in Iberian waters, found a substantial overlap between fisheries and cetacean foraging areas, leading to bycatch mortality (Goetz et al., 2015). Harbour porpoises comprised 8.5% of the cetacean sightings reported by fishers. They were primarily seen close to set gillnets in Spanish fisheries, and by fishers operating polyvalent gear, purse seines, and beach seines in Portugal (Goetz et al., 2015).

The NWIP has one of the highest rates of marine mammal strandings in Europe. Harbour porpoises comprised 7% of strandings in Galicia (López et al., 2002) and 11.8% of strandings in central-north Portugal (2000–2016; Ferreira et al., 2012, 2017). The proportion of dead porpoises in Galicia that showed evidence of fisheries interactions was 22.3% between 1990 and 1999 (N=103; López et al., 2002), 24% between 2000 and 2006 (N=64; López et al., 2012), and 15.4% between 1990 and 2013 (N=241; Vázquez, et al., 2014). The harbour porpoise was the second most frequently bycaught species on the Asturian coast (12 out of 43 records; Nores et al., 1992). In Portugal, the mortality of 50% of stranded cetaceans between 1981 and 1994 was directly attributed to fishing activities (Sequeira, 1996). More recently, the confirmed and suspected bycatch of porpoises within the Portuguese stranding dataset comprised 64.4% and 18.8% of animals respectively, with the confirmed bycatch fluctuating annually from 40.0% of stranded animals in 2009 to 86.7% in 2015 (Ferreira et al., In Prep.). In a large combined dataset of 319 porpoises stranded in the NWIP between 1990 and 2010 (including Portuguese animals from 2000 onwards), approximately 60% of the animals for which cause of mortality could be ascertained had died as the result of fisheries interactions (Read et al., 2013).

Iberian porpoises are apparently susceptible to bycatch by several different types of fishery. Lens (1997) reported 14 bycaught porpoises between 1978 and 1994 in Spanish gillnet, fixed bottom gillnet, purse seine, trawl and longline fisheries. An estimated total annual bycatch of approximately 40 porpoises occurs annually in Galician trawl and set gillnet fisheries (Goetz et al., 2014). In Portugal, fisheries monitoring in 2009–2010 reported porpoise mortality in polyvalent and beach seine fisheries, producing a bycatch rate of 0.017 animals per haul (from 292 hauls) for beach seines (Vingada et al., 2011). Extrapolated bycatch figures for the polyvalent fishery in Portuguese waters of ICES area 9a included 80 porpoises in 2010 (ICES, 2013a), and 103 porpoises in 2011 (ICES, 2013b). An expanded bycatch monitoring dataset of 6,996 fishing events from 2010 to 2015 (incorporating both the SAFESEA and MARPRO projects) yielded annual estimated porpoise bycatches of 17 individuals by the purse seine fleet (1.08% of the estimated national population), 248 animals in the polyvalent fleet (13.24% of the estimated national population), and 21 animals in the beach seine fishery (1.4% of the estimated national population), with no observed porpoise bycatches by bottom trawlers or longliners (Vingada et al., 2015; Vingada and Eira, 2017a, 2017b; Jose Vingada, pers. comm.). The same studies also monitored IUU fishing from 2012 to 2015, producing an estimated annual bycatch of 223 individuals (14.6% of the estimated national population), although uncertainty was high due to the illegal nature of such fisheries.

In the sample of 319 Iberian porpoises examined by Read et al. (2013), over 60% of aged animals were ≤3 years old and had died prior to attaining sexual maturity. The application of life history information to age-at-death data indicated that the Iberian population had an estimated overall annual mortality rate of 18%, which would require an unfeasibly high birth rate to maintain the population (Read, 2016). In that study, the overall rate of mortality of the Iberian porpoise population directly attributable to fisheries was between 4.3 and 11%, representing an unacceptably high level (Read et al., 2013; Read, 2016). The minimum number of harbour porpoises estimated to be bycaught in the Spanish Galician and Cantabrian fisheries was 233 (60–405) animals (López et al., 2012), which represents 34.11% (17.39–42.58) of the estimated total abundance in the same area (López et al., 2013). In Portugal, the combined annual bycatch rates described above from purse seine, polyvalent, beach seine and IUU fisheries amount to 30.32% of the estimated national population size of 1,531 animals. An ASCOBANS and International Whaling Commission working group recommended a maximum annual bycatch mortality rate of 1.7% of the best-available population estimate. More recently, the ASCOBANS resolutions stated that the immediate precautionary objective was to reduce bycatch levels to 1% of the best available population estimate. The reported bycatch rates for Iberian porpoises in Spain and Portugal greatly exceed those recommendations, and are not considered sustainable.

Contaminants

Three Galician female porpoises had lower persistent organic pollutant (POP) concentrations compared to North Sea animals (Pierce et al., 2008). However, in a larger study, the mean polychlorinated biphenyls (PCB) concentrations in the blubber of 13 porpoises stranded along the north-west Iberian Peninsula were 20.8 μg g^{-1} lipid weight for females, and 19.8 μg g^{-1} for males. The values of 75% of the animals exceeded the threshold level for PCB concentrations associated with adverse health effects on marine mammals (17 μg g^{-1} lipid wt), and were amongst the highest recorded in European regions (Méndez-Fernandez et al., 2014a). The high concentrations found in adult harbour porpoises were in accordance with their coastal habitat, their proximity to areas with the highest anthropogenic impact from contaminants, and their mainly fish-feeding dietary habits. Iberian harbour porpoises also exhibited slightly higher concentrations of mercury and cadmium in comparison with most other Atlantic regions, but the concentrations were far below the suggested threshold levels of effects in marine mammals (Méndez-Fernandez et al., 2014b). Compared with the values reported by Méndez-Fernandez et al. (2014b) for the NWIP, 42 harbour porpoises stranded in Portugal from 2005 to 2013 had higher levels of mercury and lower levels of cadmium (Ferreira et al., 2016). The higher mercury levels may anthropogenic sources, with Portuguese animals inhabiting waters closer to the Mediterranean where high levels of mercury occur in the seawater (Ferreira et al., 2016). Nevertheless, the recorded mercury levels did not exceed the level for toxic thresholds in marine mammals.

Climate change

The relationship between Iberian harbour porpoises and upwelling-influenced, cool, nutrient-rich shelf habitat is considered to be a pivotal factor in the current geographic isolation and genetic differentiation of the population (Tolley and Rosel, 2007). Fontaine et al. (2014) noted that the current range reflects a relict population that previously occupied a much wider area (including the Mediterranean) during colder, and more productive, oceanic regimes. The present-day distribution of the Iberian population is thought to be constrained by warm, oligotrophic conditions over the narrow shelf in the southern Bay of Biscay, which forms a strong barrier to gene flow and causes habitat-related population fragmentation (Fontaine et al., 2007, 2010). Further warming of sea temperatures may be expected to further increase the genetic isolation of the Iberian porpoise population. Additionally, shifting ocean regimes may affect the extent and intensity of the upwelling that currently provides habitat for porpoises along the Iberian Peninsula. The asymmetric outward gene flow from the Iberian population may reflect already limited availability of food resources along the Iberian coastline and form a strong driver of harbour porpoise dispersal (Fontaine et al., 2014).

Oil spills

The proximity of Galicia to one of the world's busiest shipping routes, along with the presence of a refinery located in one of its largest ports (A Coruña), make the NWIP coastline particularly vulnerable to oil pollution. Galicia experienced five out of the eleven major oil spills in Europe between 1976 and 2006 (Loureiro et al., 2006). The ‘Prestige’ oil spill in November 2002 released 60,000 metric tons of oil into the Atlantic off Galicia, and polluted 1,300 km of coastline (Loureiro et al., 2006). In the six months following the spill there were 124 cetaceans stranded along the Galician coast, of which 35% were oiled and 3% were considered to have died as a direct result of oil (López et al., 2005). This included the mortality of at

least one porpoise (López et al., 2005; Loureiro et al., 2006). The potential impacts on porpoises from the reduction or shifted distribution of fish stocks as a result of oil spills remain largely undocumented.

Overfishing
Within some parts of the NWIP there is considerable overlap between commercial fisheries and the distribution and diet of cetaceans, including the harbour porpoise (Read, 2016). Direct cause and effect relationships between fishing activity and declines or shifts in cetacean populations due to competition for the same resources are very difficult to assess, due to multiple other factors influencing the occurrence of cetaceans and the inherent complexity of marine trophodynamics.

Disturbance
The presence of motor boats and fishing vessels was found to negatively affect the presence and density of porpoises recorded off Galicia (Díaz López and Methion, 2018). Similar results were found in central Portugal, where the porpoise sighting rate increased as the number of fishing boats decreased (Pereira, 2015). Further work is needed to understand whether disturbance from vessel traffic represents a population-level threat to Iberian porpoises.

5.4 Threats connected especially with migrations

No information. More studies are needed to assess the specific impacts on migratory behaviour of threats such as those outlined in Section 5.3.

5.5 National and international utilization

Iberian harbour porpoises are protected by both Spain and Portugal, and no exploitation is permitted. However, interviews with Galician fishers indicated some human consumption of small cetaceans, and their use for bait, animal food and as a source of fat (López et al., 2003). These reports were assumed to relate to the use of animals initially bycaught in fishing gear.

6. Protection status and species management

6.1 National protection status

Spain
The protection of cetacean species in Spanish waters is covered by Real Decreto 1727/2007, which aims to implement measures to ensure their survival and favourable conservation status. In addition, cetaceans are included in the Spanish national legislation established to protect the environment and biodiversity (42/2007 de Protección del Patrimonio Natural y la Biodiversidad, which transposes the EU Habitats Directive into Spanish law) and specifically the marine environment (41/2010 de Protección del Medio Marino). The law on conservation of wild areas and species (4/1989) established a Catálogo Nacional de Especies Amenazadas (National List of Threatened Species), which includes the harbour porpoise as a Vulnerable species requiring a Special Management Plan for Conservation. The law on conservation of nature (9/2001) sets out rules for the protection, conservation and restoration of natural resources and the management of wild habitats and species. In Galicia, decree 88/2007 relates to the Catálogo Gallego de Especies Amenazadas (Galician List of Threatened Species) and aims to prevent the loss of biodiversity. The harbour porpoise is listed as Vulnerable.

Portugal
Harbour porpoises are currently listed as Vulnerable in the Red Book of Portuguese Vertebrates (Cabral et al., 2005). Decreto-Lei 263/81 covers the protection of cetacean species in Portuguese waters, forbidding their intentional capture, transport and death, and the use of stranded or bycaught animals for commercial purposes. Portuguese legislation n.1727/2007 was approved to minimise the potential negative effects of whale watching on cetacean populations. In Portuguese legislation, the EU Habitat Directive transposition is the Decreto Lei 140/99 and the Decreto Lei 49/2005.

6.2 International protection status

CITES
The 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in specimens of wild animals and plants does not threaten their

survival in the wild. Harbour porpoises are listed in Appendix II (species not threatened with extinction, but in danger if their commerce is not subject to restraints).

CMS
The 1979 Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) aims to conserve terrestrial, aquatic and avian migratory species throughout their range. The North and Baltic Sea, NW Atlantic, Black Sea and NW African populations of the harbour porpoise are currently included on Appendix II (migratory species that need or would significantly benefit from international cooperation). Currently, the Iberian porpoise population is not listed on the CMS Appendices, although both Spain and Portugal are CMS parties.

Bern Convention
The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) aims to ensure the conservation and protection of wild plant and animal species (listed in four appendices) and their natural habitats, to increase co-operation between parties, and to regulate the exploitation of the listed species. Harbour porpoises are included in Appendix II, which lists strictly protected species.

EU Habitats Directive
To implement the Bern Convention in Europe, the European Union adopted Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) in 1992. The main aim of the Habitats Directive is to promote the preservation of biodiversity by requiring Member States to maintain or restore natural habitats and wild species listed in the Annexes at a favourable conservation status, and introduce robust protection for those habitats and species of European importance. All cetaceans are included in Annex IV, identifying them as species of European Union interest in need of strict protection, prohibiting all forms of deliberate capture and killing, damage to or destruction of breeding or resting sites, disturbance, particularly during the period of breeding, and the possession of, and international trade in, these animals. Harbour porpoises are also listed as priority species on Annex II, requiring Member States to designate Special Areas of Conservation (SACs), which are part of the Natura 2000 network, to protect their populations.

Marine Strategy Framework Directive
EU Council Directive 56/2008 (Marine Strategy Framework Directive, MSFD), which was adopted in 2008, seeks to achieve "good environmental status (GES)" for the marine areas within the EU by 2020. The MFSD provides the framework for implementing the EU Habitats Directive and the Common Fisheries Policy. It specifies requirements for Member States to monitor and report on the status of the marine environment and biodiversity, restore GES, and designate marine protected areas. With regard to the harbour porpoise, this mainly applies via GES descriptors 1, 4 and 11: (1) Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions; (4) All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity; and (11) Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment. All Member States are required to select species to be protected within their waters. As part of the requirements for monitoring of the MSFD, the Iberian harbour porpoise has been selected in Spain as a management unit to be used as indicator that the good environmental status of marine waters is achieved or maintained (Read, 2016). In Portugal, marine mammals were initially excluded from the MFSD due to the “lack of sufficient information” (Llavona Vallina, 2018), but in January 2019 public consultations will commence to consider whether data support the inclusion of some species.

OSPAR
The convention for the protection of the marine environment of the North-east Atlantic (OSPAR Convention) guides international cooperation between fifteen Governments of Europe and the European Union, on the protection of the marine environment of the North-East Atlantic. That includes the implementation of the MSFD for marine mammals. The harbour porpoise was included on the OSPAR List of threatened and/or declining species and habitats by OSPAR Agreement 2008-6, requiring baseline monitoring including visual surveys of abundance and distribution, and reporting strandings and bycatch. Additionally, surveys are required for areas known or suspected to host high densities of harbour porpoise or to be breeding, birthing, or rearing grounds. The monitoring should be enhanced when a population is considered to be endangered, or when a population has shown statistically significant declines. The waters of Spain and Portugal are part of OSPAR Region IV (Bay of Biscay and Iberian Coast).

ASCOBANS and ACCOBAMS
The waters surrounding the Iberian Peninsula are included in two regional agreements that were concluded under the auspices of the CMS and aim to achieve and maintain a favourable conservation status for cetacean species. The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) entered into force in 1994, but was extended in 2008 (as the Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas) to include most of the Iberian Peninsula. The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) came into force in 2001 to conserve cetaceans in the Mediterranean regions west of the Straits of the Gibraltar, and was extended in 2010 to include the Spanish and Portuguese Exclusive Economic Zones. Together, ASCOBANS and ACCOBAMS recommend that Member States should implement measures for habitat conservation and management, promote scientific research, evaluate bycatch and strandings data, improve legislation and raise public awareness of cetacean conservation. Spain and Portugal are signatories of ACCOBAMS, but are not parties to ASCOBANS where those countries are considered to be non-party range states.

Regulation 812/2004
The EU regulates fishing activities of its Member States through the Common Fisheries Policy (CFP; EC 1380/2013). Cetacean bycatch is specifically regulated through the EC Council Regulation 812/2004, implemented to monitor and reduce the incidental bycatch of cetaceans in certain fisheries. In addition, EC Regulation 199/2008 requires the monitoring of discards and bycatch (including cetaceans), in certain fisheries in the ICES area. In compliance with the regulations, 10% of all vessels ≥15 m length that fish with trawls (pelagic and high vertical opening trawl nets) and set gillnets (single panel bottom-set gillnets, trammel nets and driftnets with mesh size ≤80 mm) in Iberian Atlantic waters are obliged to carry on-board observers (Lens and Díaz, 2008; Goetz, 2014). Vessels of <15 m length have to be monitored by means of scientific surveys and pilot projects. The use of acoustic deterrent devices (pingers) is obligatory for single panel bottom-set gillnet and trammel net fisheries that are deployed from vessels ≥12 m in length. However, it has become apparent that the larger vessels for which observer schemes are required under EU Regulation 812/2004 (Lens and Díaz, 2008), are not those responsible for the majority of porpoise bycatch in the NWIP which are smaller vessels operating in nearshore waters (Goetz et al., 2014). Further, Spain and Portugal are considered to have only poor and moderate compliance respectively with Regulation 812/2004 (Read et al., 2017).

Data Collection Framework
Under Council Regulation (EC) 199/2008, relating to the EU (fisheries) Data Collection Framework (DCF), there is a requirement for observers to monitor all discards and incidental catches of protected marine fauna in several fisheries in the ICES areas. In 2016, in accordance with Article 3 of the DCF, Implementing Decision EU 2016/1251 was adopted to establish a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019. This Decision included the collection of data (including absence in the catch) on the incidental bycatch of all birds, mammals and reptiles and fish protected under Union legislation and international agreements, and in all fisheries (Read et al., 2017). Data can either be collected by scientific observers, or by the fishers themselves through logbooks.

6.3 Management measures

Legislation including the EC Habitats Directive and the MFSD require harbour porpoise populations to be maintained at favourable conservation status or good environmental status. In 2009, the ICES WGMME endorsed the MUs (including the Iberian Peninsula MU) that had been proposed by ASCOBANS for harbour porpoises in European North Atlantic waters, as part of the MSFD. During 2007, ICES established the Working Group on Accidental Captures of Protected Species (WGBYC) to address the bycatch requirements in relation to EC Council Regulation 812/2004. Governmental programmes to monitor cetacean-fishery interactions and possible mitigation methods for cetaceans in Spain and Portugal need to be established and legally implemented (see Section 6.5). In Spain, the Galician government has been developing a Conservation Plan for harbour porpoises (Pierce et al., 2010). Additionally, a conservation monitoring plan has been formulated for Andalucian harbour porpoises in the Gulf of Cadiz along the south Atlantic coast of Spain (Sociedad Española de Cetáceos (2006).

6.4 Habitat conservation

The harbour porpoise is included in Annex II of the EC Habitats Directive, which requires Member States to identify SACs for the protection of populations. In a review of marine protected areas (MPAs) for which

cetacean populations were included by the ICES WGMME, the following areas were identified for harbour porpoises in Spain and Portugal (ICES, 2011).

Spain
The following SACs include harbour porpoises as a qualifying feature:

- Costa da Morte SAC, proposed in 1997.
- Complexo humido de Corrubedo SAC, proposed in 1999.
- Complexo Ons - O Grove SAC, proposed in 2000.
- Costa da Vela, proposed in 1999.
- Penarronda-Barayo, proposed in 2004.
- Cabo Busto-Luanco, proposed in 2004.
- Yacimientos de Icnitas, proposed in 2004.
- Estrecho, proposed in 1999.

All of these SACs are small in spatial scale (10–94 km^2; ICES, 2011), and may consequently be of limited effectiveness for conserving mobile marine predators without additional wider measures. Several additional suitable areas have been suggested as harbour porpoise SACs based on distribution and abundance surveys (Llavona Vallina, 2018; Díaz López and Methion, 2018).

Portugal
In Portugal, six Natura 2000 sites with marine areas have currently been designated with the harbour porpoise as a qualifying feature (José Vingaga, pers. comm.):

- Sintra-Cascais (Natura PTCON0008), designated in 1997.
- Arrábida-Espichel (Natura PTCON0010), designated in 1997.
- Costa Sudoeste (Natura PTCON0012), designated in 1997.
- Litoral Norte (Natura PTCON0017) , designated in 2000.
- Peniche-Stª. Cruz (Natura PTCON0056), designated in 2000.
- Ria de Aveiro (Natura PTCON0061), designated in 2014.

Most are relatively small in spatial scale (9–84 km^2); however, the Costa Sudoeste site is larger at 181 km^2. No management plans are in place (ICES, 2011), although they are currently being compiled.

6.5 Population monitoring

Several European and international agreements and directives require EU Member States to carry out monitoring of small cetaceans and to take steps to ensure that good conservation status is achieved and maintained (e.g. EU Habitats Directive, EU MSFD, ASCOBANS and ACCOBAMS). However, Spain and Portugal do not currently have stable, long-term, centrally-funded, cetacean monitoring programs in place (Read, 2016), but rather rely heavily on project funding and volunteer networks.

Surveys
Two recent large-scale European-funded cetacean sightings surveys included the shelf waters of Spain and Portugal (SCANS II in 2005 and SCANS III in 2016), and provided robust population abundance estimates for the Iberian Peninsula region (Hammond et al., 2013, 2017). Prior to 2010, the vast majority of localised dedicated and opportunistic cetacean population monitoring around the Iberian Peninsula was carried out by two non-governmental organisations (NGOs), in Galicia (Coordinadora para o Estudo dos Mamiferos Mariños, CEMMA; see López et al., 2002) since the early 1990s, and in Portugal (Sociedade Portuguesa de Vida Salvagem, SPVS) since 2000. In recent years, systematic surveys have been conducted within the NWIP using shore (e.g. Pierce et al., 2010; Pereira, 2015), vessel (e.g. Vingada and Eira, 2017a; Díaz López and Methion, 2018) and aircraft (e.g. Santos et al., 2012a; Araújo et al., 2015; Vingada and Eira, 2017a) platforms. In Portugal, the SAFESEA-EEA Grants project (2008–2010) collected distribution and abundance data on cetaceans in northern and central Portugal via coastal surveys (from land) and aerial surveys of the waters up to 50 nm from the coast (Vingada et al., 2011; ICES, 2014b). Subsequently, the work was continued by the Life+MarPro project (2011–2016), which aimed to define

protected areas and management plans for harbour porpoises (and other fauna) to fulfil requirements under the Habitat Directive. That project implemented annual aerial surveys, monthly coastal surveys, and boat-based survey work to produce baseline information on the abundance and distribution of cetacean populations and support the identification of new Natura 2000 sites for cetaceans (Santos et al., 2012b; ICES, 2014a,b; Araújo et al., 2015; Vingada and Eira, 2017a).

Strandings and carcass recovery
Monitoring of cetacean strandings in Galicia is carried out by CEMMA. In Portugal, the national marine animal stranding network is coordinated by the Instituto da Conservação da Natureza e Florestas (ICNF), comprising three regional networks (IUCN, 2014a). The ICNF issues a license to SPVS to coordinate stranding reports along two-thirds of the Portuguese coast, and covers the remaining third itself. Additionally, the NGOs have encouraged fishermen to provide the carcasses of bycaught cetaceans (e.g. López et al., 2003). Analysis of stranded and bycaught porpoises provides ongoing information on the status, mortality and life-history parameters of Iberian porpoises that are fundamental to population monitoring (e.g. Read et al., 2013).

Bycatch
Although some government-led pilot projects have taken place to monitor the bycatch of cetaceans in Iberian fisheries, sampling coverage has been limited and focused on larger vessels. Spain implemented a pilot observer programme in 2008 that monitored bottom-set gillnetting vessels of ≥15 m length in some areas (ICES, 2010b). No monitoring was carried out in gillnet fisheries in the nearshore waters of ICES areas 8c and 9a which are of highest importance for Iberian porpoises, and funding has not been available for dedicated monitoring since the pilot project (ICES, 2016, 2018). No national bycatch monitoring reports with regard to Regulation 812/2004 have been submitted to ICES by Spain since the report covering 2009 (ICES, 2013b, 2016, 2018), although a NGO-led report was produced in 2014 compiling historical and current knowledge on cetacean bycatch (Vázquez, et al., 2014). Consequently, Spain is considered to have poor compliance with Regulation 812/2004 (Read et al., 2017). The majority of bycatch monitoring in Spain is currently carried out by CEMMA and other NGOs, via stranding necropsies and observer placements (ICES, 2010a). The Secretaría General de Pesca conducted a project for testing the efficiency of acoustic deterrents in gillnet and purse-seining fisheries in 2010 (ICES, 2013a).

In Portugal, the SAFESEA project assessed interactions between cetaceans and inshore northern and central Portuguese fisheries, via strandings, onboard observer effort, logbooks, fisher interviews, and volunteer reporting of incidental captured animals by fishermen (Vingada et al., 2011; ICES, 2014b). Monitoring of the purse seine, polyvalent (including set nets), bottom trawler, longline and beach seine fisheries has been carried out since 2010 by observers from the SAFESEA and LIFE+MarPro project, complemented by several trips from the National Biological Sampling Plan of the IPMA (Portuguese Institute of the Sea and Atmosphere) (ICES, 2013b, 2014b, 2016, 2018; Vingada et al., 2015; Vingada and Eira, 2017a). Monitoring under the LIFE+MarPro project evaluated the conflict between target species and fisheries via similar approaches to SAFESEA, and with the additional use of electronic surveillance equipment. Portuguese research into the use of acoustic pingers in set net, purse seine and beach seine fisheries commenced in 2010 as voluntary trials under the framework of the SAFESEA project, and continued from 2011 to 2016 under the framework of the LIFE+MarPro project (ICES, 2012, 2014b). Under Portaria No. 172/2017, the use of pingers was recently made obligatory for all beach seine nets. The trial results indicate that porpoise mortality appears to have decreased in a variety of fishing gear fitted with pingers, when compared with controls (Pereira et al., in prep.; Vingada and Eira, 2017a). In recent years, pinger trials have extended to the Algarve and Portuguese south coast region under the scope of iNOVPESCA (ICES, 2018).

7. Effects of the proposed amendment

7.1 Anticipated benefits of the amendment

The CMS aims to conserve migratory species throughout their range via the promotion of concerted action among the Range States, which are encouraged to conclude global or regional conservation agreements.

Appendix I
For migratory species listed in Appendix I (species in danger of extinction throughout all or a significant portion of their range), Range States are required to provide strict protection by prohibiting takes, conserving habitats, limiting obstacles to their migrations and controlling other factors that might endanger

them. The Iberian harbour porpoise has a small total population size, and the documented regional mortality rates from fisheries bycatch are unsustainably high. Consequently, it is considered to face the risk of extinction throughout its range and to be of high conservation priority. Listing on CMS Appendix I would benefit the species via the implementation of strict protection methods in all parts of its range, and would specifically require Range States to address the current high mortality in a variety of shelf fisheries via increased observer monitoring of nearshore and artisanal fisheries, and the development and implementation of suitable mitigation measures.

Appendix II
For migratory species listed in Appendix II (migratory species that have an unfavourable conservation status), the Range States are encouraged to conclude global or regional Agreements for their conservation and management. The Iberian harbour porpoise appears to have unfavourable conservation status (ICES, 2015), and is already acknowledged as a Vulnerable species in the National Threatened Species Lists of Spain and Portugal. Listing on CMS Appendix II would benefit the species via the formulation of region-wide transboundary management plans that would address the entire population, rather than management of small localised areas that are likely to be ineffective for such a mobile species. Coordinated effort by both Range States would increase the outputs of scientific programmes aimed at monitoring the seasonal distribution and abundance of the population, improve bycatch mitigation implementation, and maximise the identification and designation of protected areas with regard to the overall population.

7.2 Potential risks of the amendment

None identified.

7.3 Intention of the proponent concerning development of an Agreement or Concerted Action

To be completed by the proponent.

8. Range States

Spain and Portugal.

9. Consultations

To be completed by the proponent.

Portugal
Instituto da Conservação da Natureza e das Florestas
CONTACT PERSON: Marina Sequeira
Av. da República, 16 – 16B
1050-191 Lisboa
Email: marina.sequeira@icnf.pt

10. Additional remarks

No additional remarks.

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