

Atlantic Coast of the Iberian Peninsula IMMA

Summary, continued.

subpopulation of the killer whale (*Orcinus orca*), assessed as Critically Endangered on IUCN's Red List. The IMMA also has a high diversity of at least nine other cetacean species.

Description:

This IMMA covers part of the north, west and south Atlantic coasts of Spain and all of the west coast of mainland Portugal, from shallow waters to areas with a maximum depth of 300 m in the shelf edge, including waters of the Strait of Gibraltar. The area is characterised by a temperate climate and high productivity, given the influence of the Iberian Upwelling Systems (Gago et al., 2011), especially in the more coastal zone. Upwelling of deep waters rich in nutrients is generally a spring-summer process, which can result in a ten-fold increase in the primary production (Blanton et al., 1984, 1987). Moreover, the area offshore the IMMA includes the presence of two submarine canyons which are important for cetaceans and extends to the Banco de Galicia (200 km off the Galician coast to the west). This oceanographic and topographic complexity, combined with the influence of major rivers, such as Mondego, Vouga, Douro and Cávado due to the significant outflow from their plumes, contributes to productivity and diversity of flora and fauna. As a consequence, waters of the Atlantic Iberian Peninsula support important fisheries, e.g. Galicia is the European region in which the fisheries sector is of greatest importance (Fraga, 1981; Blanton et al., 1984, 1987; Solórzano et al., 1988; Vázquez Seijas, 1998; Figueiras et al., 2002; Bañón et al., 2010; Gago et al.,



Area Size

51 581 km²

Qualifying Species and Criteria

Harbour porpoise – *Phocoena phocoena*

Criterion A; B (1); D (1)

Killer Whale – *Orcinus orca*

Criterion A; C (2); D (1)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera acutorostrata, *Balaenoptera musculus*, *Balaenoptera physalus*,

Delphinus delphis, *Globicephala macrorhynchus*,

Globicephala melas, *Grampus griseus*,

Orcinus orca, *Phocoena phocoena*, *Stenella coeruleoalba*, *Tursiops truncatus*

Summary

This IMMA covers much of the continental shelf and shelf edge of the Atlantic coast of the Iberian Peninsula, from Galicia to the Strait of Gibraltar. The area is characterised by seasonal upwelling, highly productive waters, high biodiversity (including many cetacean species) and intense fishing activity. The area hosts a small, endangered, and genetically distinct population (and putative subspecies) of Iberian harbour porpoise (*Phocoena phocoena*), and a very small

2011; Leitão et al., 2019). The Strait of Gibraltar is characterised by a surface inflow of Atlantic waters, driven by excess evaporation over precipitation in this basin and a deep outflow of dense Mediterranean water (Lacombe & Richez, 1982). The strait is also characterised by mixing processes through pulsed upwelling induced by the tides and constrained by the bathymetry of the area (Echevarría et al., 2002). The area coincides to a large extent with two EBSAs: the “Gulf of Cadiz EBSA” and the “West Iberian Canyons and Banks EBSA”; both areas justified, amongst other qualities, by the presence of cetaceans, and the former specifically for the presence of orcas.

Criterion A: Species or Population Vulnerability

The Iberian harbour porpoise (*Phocoena phocoena*) is distributed along the Atlantic coast of Spain and Portugal and is most common off Galicia and Northern and Central Portugal. The Iberian porpoise population is a genetically distinct population, proposed to represent a separate subspecies, tentatively named *P. p. meridionalis*, to which the North African population also belongs (Fontaine et al., 2014; Fontaine, 2016). Although the Iberian population of harbour porpoises is currently not assessed separately for the IUCN Red List, it is characterised by low and declining genetic diversity, high levels of inbreeding, and a low effective population size compared with the North Atlantic subspecies (Celemin et al., 2023; Ben Chehida et al., 2023). The population also faces multiple threats, especially fishery bycatch. The high bycatch mortality rates seem unsustainable (Read et al., 2020; Pierce et al., 2022; Taylor et al., 2022) and may put the population at risk of disappearing in the near future. The population is listed as “Critically Endangered” in Portugal’s Red Book of Portuguese Vertebrates (Torres-Pereira et al., 2023a), and as “In Danger of

Extinction” in the Spanish Catalogue of Threatened Species. The most recently published abundance estimate from the SCANS IV survey in 2022 suggests a population size of around 4000 animals in the whole Iberian Peninsula (Gilles et al., 2023), which is higher than the 2900 animals estimate derived from the SCANS III survey in 2016 (Hammond et al., 2021). However, the difference between the estimates provided by the two surveys could be due to the fact that the survey blocks in SCANS IV extended further offshore and took place in different seasons (some blocks were surveyed in summer and others in autumn) (Gilles et al., 2023).

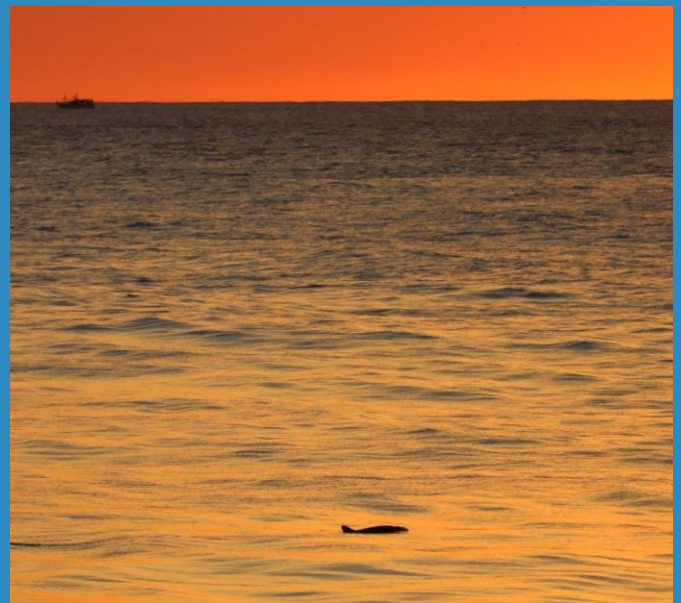


Figure 1. Harbour porpoise (*Phocoena phocoena*) observed off Porto, Portugal, with a fishing vessel on the horizon. Photo credit: Cláudia Oliveira-Rodrigues / CIIMAR



Figure 2. Harbour porpoises (*Phocoena phocoena*) recorded off Porto, Portugal. Photo credit: Luís Afonso / CIIMAR

The “Gulf of Cadiz and Strait of Gibraltar” subpopulation of killer whales, once known to occupy mainly the broader Gibraltar Strait area during spring and summer (Esteban et al., 2014), was recently observed, through re-sightings of identified individuals to be ranging widely to the north along the west coast of the Iberian Peninsula all the way to Galicia (Esteban et al., 2022). By contrast, the information about orca presence along the African coast south of the Strait of Gibraltar is too scant (possibly due to a lack of qualified observations) to allow determination of how far the population ranges southwards. The population is considered Critically Endangered on IUCN’s Red List (Esteban & Foote, 2019) and in the Red List of Mammals of Mainland Portugal (Ferreira et al., 2023), while it is designated

as Vulnerable in the Spanish National Catalogue of Endangered Species (Royal Decree 139/2011). The vulnerability of this subpopulation has been demonstrated based on its small size (Esteban et al., 2016b), isolation from other Atlantic populations (Foote et al., 2011; Esteban et al., 2016c), limited fecundity and low survival of offspring (Esteban et al., 2016b), and dependency on a depleted main prey, the bluefin tuna (*Thunnus thynnus*) (García-Tiscar 2009; Esteban et al., 2016c). On May 17th 2017, the Spanish Ministry of Environment issued the Conservation Plan for Iberian killer whales (Order APM/427/2017), identifying critical killer whale habitat in Spanish waters and the necessity to protect it.



Figure 3: A male killer whale (*Orcinus orca*) sighted in southern Portugal in the Atlantic Coast of the Iberian Peninsula IMMA. Photo credit: Mar Ilimitado

Criterion B: Distribution and Abundance

Sub-criterion B1: Small and Resident Populations

Studies based on genetic data suggest that porpoises stranded in Spain and Portugal are genetically similar and form part of a single genetically isolated population; no differences in mitochondrial and microsatellite genetic diversity, or in genetic ancestry, were detected between porpoises from the two countries. Genetic evidence also suggests some movement of Iberian animals into the Celtic Sea but no reverse movement (Fontaine et al., 2007, 2010, 2014; Vallina, 2018; Ben Chehida et al., 2021, 2023). It seems that there is some degree of site fidelity within the Iberian population. A land-based monitoring programme in the north of Portugal showed that a small group of harbour porpoises inhabits the area of the mouth of Douro River, with presence of the animals recorded throughout the year. The numerous re-sightings of the same individual (a leucistic animal) in the area, from 2016 to 2020, are consistent with site fidelity (Gil et al., 2019).



Figure 4: Leucistic harbour porpoise (*Phocoena phocoena*) first observed at the Mouth of Douro River in 2016. In 2020, the specimen was found dead and determined to be a gestating female. Photo credit: Tara Callahan / CIIMAR

Criterion C: Key Life Cycle Activities

Sub-criterion C2: Feeding Areas

The southern portion of the IMMA, including the Gulf of Cadiz and Strait of Gibraltar, has been identified as a seasonal feeding ground for killer whales in the spring and summer due to the concentration of their main prey, bluefin tuna (Esteban et al., 2014). The animals' feeding ecology in the remainder of the area is not known. Tuna predation occurs as the fishes migrate through the Strait of Gibraltar into the Mediterranean in the spring, and back out again in the summer. Orcas have been observed feeding on bluefin tuna regularly, using two foraging strategies. The first strategy happens in spring and summer and consists of an "endurance-exhaustion" technique where the whales actively chase the tuna until it is exhausted (Guinet et al., 2007). The second strategy happens only in summer and involves depredating the tuna caught by the drop line Spanish and Moroccan fisheries (Esteban et al., 2016b). Only some social groups have exhibited this second strategy (Esteban et al., 2016a). Following the decrease in drop-line fishery catches, no calves have been reported to survive (Esteban et al., 2016b). The population growth rate was positive at 4% for individuals depredating fishery-caught tuna, and no growth was observed for non-interacting individuals (Esteban et al., 2016b). These differences in demographic parameters can be explained by access to larger tuna through depredation. Consequently, whales would need more tuna to cover their daily energy requirements while actively hunting, suggesting an effect of artificial food provisioning on their survival and reproductive output.



Figure 5: A group of killer whales (*Orcinus orca*) sighted in South Portugal. Photo credit: Ocean Vibes

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

Iberian porpoises form a morphologically and genetically distinct population that is largely isolated from other studied harbour porpoises in the northeast Atlantic (Fontaine et al., 2007, 2010, 2014). They are closely related to the population in Northwest Africa (Fontaine et al., 2014). Fontaine et al. (2014) proposed that the Iberian and Northwest African porpoise populations together represent a distinct ecotype adapted to upwelling systems. Considering their phylogenetic divergence from the subspecies described in the North Atlantic (*P. p. phocoena*) and Black Sea (*P. p. relicta*), their allopatric distribution, and their morphological and ecological distinctiveness, it was proposed to raise this distinct ecotype as a separate subspecies with the name *P. p. meridionalis* (Fontaine et al., 2014).

Iberian peninsula killer whales represent a genetically distinctive population consisting of 39 individuals with a peculiar behaviour for catching Bluefin Tuna (Foote et al., 2011; Esteban et al., 2016c). Since 2020 individuals in this population have initiated several interactions with small boats, during which the whales have harassed the vessels and, in several instances, rammed the hulls or damaged the rudders (Esteban et al., 2022; see also <https://www.orcaiberica.org/en> for extensive details on this behaviour, occurrences, incidents, etc.). Evidence exists from the observations that such interactions with boats have been limited to a number of identified individuals. As of November 2023, most of the >500 reported interactions have caused medium to minor damage to the involved vessels, with a total of three sailing boats sinking as a result of the damage (A. López Fernandez, pers. comm.).

Sub-criterion D2: Diversity

Consistent with the high productivity supported by seasonal upwelling, the waters off the Atlantic coast of the Iberian Peninsula host a remarkable diversity of marine mammal species (e.g. Lopez et al., 2002, 2004; Brito et al., 2011; De Stephanis et al., 2008; Vingada & Eira, 2018; Gilles et al., 2023; Mathias et al., 2023). In addition to the unique harbour porpoises and killer whale populations that inhabit this area, nine additional cetacean species regularly occur in the IMMA. These include bottlenose dolphins (*Tursiops truncatus*) (e.g. Ferreira et al., 2023), common dolphins (*Delphinus delphis*) (e.g. European Mammal Assessment team, 2007b), fin whales (*Balaenoptera physalus*) (e.g. Gauffier et al., 2009; Eira et al., 2023), blue whales (*Balaenoptera musculus*) (e.g. Diaz-Lopez, 2021; European Mammal Assessment team, 2007a), striped dolphins (*Stenella coeruleoalba*), Risso's dolphins (*Grampus griseus*) (e.g. Stekke et al., 2011; Torres-Pereira et al., 2023b), long-finned pilot whales (*Globicephala melas*) (e.g. Verborgh et al., 2009, 2016), minke whales (*Balaenoptera acutorostrata*), Short-finned pilot whales (*Globicephala macrorhynchus*) are also recorded but are not common in the area. The majority of these species are known from strandings (e.g. Lopez et al., 2002) as well as sightings (Gilles et al., 2023). Several baleen whales routinely migrate through mid-Atlantic waters (e.g. Visser et al., 2011) and may be seen regularly feeding on, and along the edge of, the Iberian continental shelf. Fin whales have long been known from the area, being targeted by commercial whaling until the IWC moratorium came into effect (Sanpera & Aguilar, 1992). Blue whales have been seen with increasing frequency in recent years (Diaz Lopes et al., 2021).

See <https://www.livescience.com/animals/orcas/orcas-have-sunk-3-boats-in-europe-and-appear-to-be-teaching-others-to-do-the-same-but-why>



Figure 6: Bottlenose dolphin (*Tursiops truncatus*) observed continuously surrounding a buoy off Gaia, Portugal. Photo credit: Cláudia Oliveira-Rodrigues / CIIMAR



Figure 7: Common dolphin (*Delphinus delphis*) recorded off Leça da Palmeira, Portugal, with a deactivated refinery on the background. Photo credit: Luís Afonso / CIIMAR



Figure 8: Free-ranging common dolphin (*Delphinus delphis*) recorded in the north of mainland Portugal. Photo credit: Anxo Gende / CIIMAR



Figure 9: Fin whale (*Balaenoptera physalus*) recorded offshore the north of mainland Portugal.
Photo credit: Cláudia Oliveira-Rodrigues / CIIMAR

Supporting Information

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