

# NEW RECORDS OF CETACEAN SPECIES FOR MADEIRA ARCHIPELAGO WITH AN UPDATED CHECKLIST

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With 1 figure & 1 table

*RESUMO.* Quatorze espécies de cetáceos são descritas pela primeira vez para o mar do arquipélago da Madeira. Onze são registos confirmados, baseados em arrojamentos ou em imagens de qualidade, e três são registos não confirmados, baseados em observações visuais. As espécies confirmadas são: a baleia-azul (*Balaenoptera musculus*), a baleia-sardineira (*B. borealis*), a baleia-anã (*B. acutorostrata*), a baleia-de-bossas (*Megaptera novaeangliae*), o cachalote-anão (*Kogia sima*), o zífio (*Ziphius cavirostris*), a baleia-de-bico-de-Gervais (*Mesoplodon europaeus*), a falsa-orca (*Pseudorca crassidens*), o grampo (*Grampus griseus*), a orca-pigmeia (*Feresa attenuata*) e o golfinho-de-Fraser (*Lagenodelphis hosei*). As espécies não confirmadas são: a baleia-bico-de-garrafa (*Hyperoodon ampullatus*), baleia-piloto (*Globicephala melas*) e o golfinho-cabeça-de-melão (*Peponocephala electra*). A lista de cetáceos para o arquipélago da Madeira é assim atualizada de 15 para 29 espécies, e as espécies previamente descritas foram revistas e complementadas com informação atualizada sempre que foi considerado relevante.

*PALAVRAS CHAVE:* Macaronésia, oceano Atlântico, arrojamentos, censos, fotografias, observação de cetáceos, história da baleação, taxonomia, mamíferos marinhos.

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*ABSTRACT.* Fourteen cetaceans' species are described for the first time for the waters of Madeira archipelago. Eleven are confirmed records, based on strandings or in good quality images and three are non-confirmed records, based on visual observations. The confirmed species are: blue whale (*Balaenoptera musculus*), sei whale (*B. borealis*), common minke whale (*B. acutorostrata*), humpback whale (*Megaptera novaeangliae*), dwarf sperm whale (*Kogia sima*), Cuvier's beaked whale (*Ziphius cavirostris*), Gervais' beaked whale (*Mesoplodon europaeus*), false killer whale (*Pseudorca crassidens*), Risso's dolphin (*Grampus griseus*), pigmy killer whale (*Feresa attenuata*) and Fraser's dolphin (*Lagenodelphis hosei*). The non-confirmed species are: northern bottlenose whale (*Hyperoodon ampullatus*), long-finned pilot whale (*Globicephala melas*) and melon-headed whale (*Peponocephala electra*). The checklist of cetaceans for Madeira archipelago is now updated from 15 to 29 species, and the species previously described were also revised and complemented, whenever relevant, with updated information.

**KEYWORDS:** Macaronesia, Atlantic Ocean, strandings, surveys, photo-identification, whalewatching, whaling-historical, taxonomy, marine mammals.

## INTRODUCTION

The last two checklists revising the cetaceans' species from the Madeira archipelago (Northeast Atlantic; Fig. 1) were published almost 20 years ago (MATHIAS, 1988; SANTOS-REIS & MATHIAS, 1996). They reflected part of the data collected and published up to the 1990's, including references to historical documents (SARMENTO, 1936, 1948; SILVA & MENESES, 1940) and scientific publications of new recorded species (HARMER, 1924; NOBRE, 1938; MAUL & SERGEANT, 1977). However, there are other relevant publications that were not referred in those checklists, such as, TOWNSEND (1935), CLARKE (1954) and GORDON *et al.* (1995). Moreover, REINER (1981), FREITAS *et al.* (1998) and ALVES *et al.* (2010) refer three new species for the area, adding up to a total of 15 species.

The consultation of the official logbooks of the Madeira Whaling Company (hereafter named EBAM – Empresa Baleeira do Arquipélago da Madeira), bibliographic review, the raising interest and search of cetaceans by the whalewatching operators during the last decade, as well as, the systematic record of cetacean strandings and the increase of sea effort conducted by the Madeira Whale Museum (MWM), either by nautical or aerial surveys, resulted in the identification of new cetaceans' species for the area. In that sense, this paper adds 14 new species to the checklist of the cetological fauna of Madeira archipelago and also adds new information on eight species previously described.

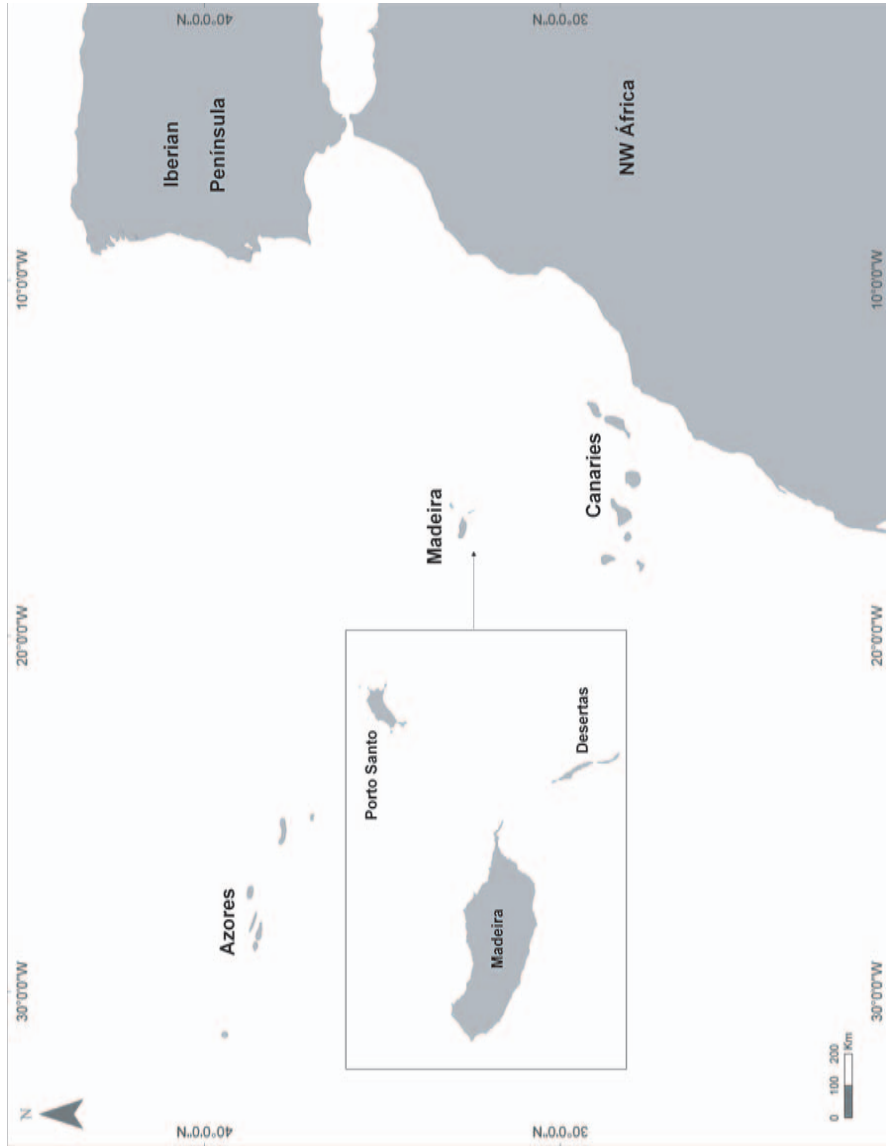


Fig. 1 - Location of the (main islands of the) Madeira archipelago in the Northeast Atlantic.

## MATERIALS AND METHODS

An extensive bibliographic review was made and the official logbooks of the EBAM (from January 1941 to October 1981) were consulted in order to find new records of species that were not yet described for the archipelago and to obtain extra information about species that had been already referred to these waters. Moreover, Madeiran ex-whalers were interviewed to collect information that might complement the EBAM records. The MWM Images Database, from the whaling period, was analysed in order to find pictures of captured specimens to match and confirm the identification of the specimens recorded in the logbooks. The systematic collection and record of information on stranded cetaceans started in 1994 and, in 1996, a stranding network was established, to cover the coastline of Madeira archipelago. Photographs were systematically taken of the stranded specimens and, whenever possible, their skulls and skeletons were collected, catalogued and stored in the MWM, for species' record and identification purposes. Opportunistic sea surveys conducted by the MWM between 1997 and 2000, as well as year round dedicated visual aerial surveys (2002-2008) and visual nautical surveys (2001-2012), allowed the identification of sighted individuals accurately up to the species level on the majority of the encounters. The encounters were documented using colour slide films, photographic and/or video digital cameras and, in some occasions, underwater images of the sighted animals were obtained. The images were stored on the MWM Images Database. Additionally, records from experienced whalewatching operators or from other opportunistic sightings, when accompanied by relevant data (species, date, position, and number of individuals) were considered after being sorted and validated. The species presented in the results were classified as:

1) confirmed – when identification was based on stranded specimens or on sightings with good quality images; 2) non-confirmed – when identification was based on visual observations, without evidence that would allow confirmation by third parties.

## RESULTS AND DISCUSSION

Fourteen species of cetaceans are described for the first time for Madeira archipelago, from which eleven are confirmed records and three are non-confirmed records. Thus, the total number of cetaceans' species for this area is now updated to 29. Apart from the harbour porpoise and the Northern Atlantic right whale, the remaining 27 species have been recorded in the last years (Table 1). Eight of the 15 species described in previous years are worth remarking in order to clarify and/or update information regarding their presence in Madeiran waters.

The authors suggest that the increase in dedicated survey efforts towards cetaceans in Madeiran waters during the last decade was the main factor contributing to add such high number of species to the cetological fauna of the archipelago, although oceanic climatological changes may also contribute to the increased number of sightings of tropical species.

**TABLE 1** - Updated list of cetacean species recorded in the waters of the archipelago of Madeira. Classification according to Rice (1998) and common names according to approved IWC list. Type of record: S – sighting; C – catch; ST – stranding. First recorded: first record (year) according to the first published scientific or historical reference that reports the species; references in brackets are non-peer-reviewed. Last recorded: last known record (year) of the species based on all types of data until December 2012. Symbols legend: \* new confirmed record; + new record based only on visual observations; ! species described in previous years for Madeira archipelago but with new information (see Results and Discussion).

Scientific name	English name	Type of record	First published scientific or historical reference	First recorded	Last recorded
<b>Sub-order Mysticeti</b>					
Family BALAENIDAE					
! <i>Eubalaena glacialis</i> Müller, 1776	Northern Atlantic right whale	C	Maul & Sergeant (1977)	1967 <sup>1</sup>	1967
Family BALAENOPTERIDAE					
* <i>Balaenoptera musculus</i> (Linnaeus, 1758)	Blue whale	S	this note	1964	2009
! <i>Balaenoptera physalus</i> (Linnaeus, 1758)	Fin whale	S, C, ST	Gordon <i>et al.</i> (1995)	1990 <sup>2</sup>	2012
* <i>Balaenoptera borealis</i> Lesson, 1828	Sei whale	S	this note	2002	2011
* <i>Balaenoptera acutorostrata</i> Lacépède, 1804	Common minke whale	S, ST	this note	1956	2010
! <i>Balaenoptera edeni</i> Anderson, 1878	Bryde's whale	S, ST	Alves <i>et al.</i> (2010)	2005 <sup>3</sup>	2012
* <i>Megaptera novaeangliae</i> (Borowski, 1781)	Humpback whale	S, C	this note	1957	2012
<b>Sub-order Odontoceti</b>					
Family PHYSETERIDAE					
! <i>Physeter macrocephalus</i> Linnaeus, 1758	Sperm whale	S, C, ST	Townsend (1935)	≤1920 <sup>4</sup>	2012
Family KOGIIDAE					
<i>Kogia breviceps</i> (Blainville, 1838)	Pygmy sperm whale	S, C, ST	Maul & Sergeant (1977)	1941	2012
* <i>Kogia sima</i> (Owen, 1866)	Dwarf sperm whale	ST	this note	2000	2000
Family ZIPHIIDAE					
* <i>Ziphius cavirostris</i> G. Cuvier, 1823	Cuvier's beaked whale	S, ST	this note	1992	2011
! <i>Mesoplodon bidens</i> (Sowerby, 1804)	Sowerby's beaked whale	C, ST	Maul & Sergeant (1977)	1941	2012
<i>Mesoplodon densirostris</i> Blainville, 1817	Blainville's beaked whale	S, ST	Harmer (1924)	1917	2012
* <i>Mesoplodon europaeus</i> (Gervais, 1855)	Gervais' beaked whale	ST	this note	2007	2007
+ <i>Hyperoodon ampullatus</i> (Forster, 1770)	Northern bottlenose whale	S	this note	2001	2008
Family DELPHINIDAE					
! <i>Orcinus orca</i> (Linnaeus, 1758)	killer whale	S	(Sarmiento, 1948), Hammond & Lockyer (1988)	≤1948	2012
<i>Globicephala macrorhynchus</i> Gray, 1846	Short-finned pilot whale	S, C, ST	(Sarmiento, 1936; Nobre, 1938), Fraser (1950)	1936	2012
+ <i>Globicephala melas</i> (Traill, 1809)	Long-finned pilot whale	S	(Pais, 1993), this note	1984	1993
* <i>Pseudorca crassidens</i> (Owen, 1846)	False killer whale	S, ST	this note	1997	2011
<i>Steno bredanensis</i> (G. Cuvier in Lesson, 1828)	Rough toothed dolphin	S, C	Reiner (1981)	1968	2012
* <i>Grampus griseus</i> (G. Cuvier, 1812)	Risso's dolphin	S, ST	(Sarmiento, 1948), this note	≤1948	2012
<i>Tursiops truncatus</i> (Montagu, 1821)	Bottlenose dolphin	S, ST	(Sarmiento, 1936), Maul & Sergeant (1977)	1933-34	2012
<i>Stenella frontalis</i> (G. Cuvier, 1829)	Atlantic spotted dolphin	S, ST	Freitas <i>et al.</i> (1998)	1997	2012
! <i>Stenella coeruleoalba</i> (Meyen, 1833)	Striped dolphin	S, ST	Freitas <i>et al.</i> (1998)	1995 <sup>5</sup>	2012
<i>Delphinus delphis</i> Linnaeus, 1758	Common dolphin	S, ST	(Sarmiento, 1936), Maul & Sergeant (1977)	1932	2012
* <i>Lagenodelphis hosei</i> Fraser, 1956	Fraser's dolphin	S	this note	2003	2010
+ <i>Peponocephala electra</i> (Gray, 1846)	Melon-headed whale	S	this note	2005	2005
* <i>Feresa attenuata</i> Gray, 1874	Pigmy killer whale	S	this note	2009	2009
Family PHOCOENIDAE					
! <i>Phocoena phocoena</i> (Linnaeus, 1758)	Harbour porpoise	C	(Sarmiento, 1936), Matias (1988)	1905	1905

<sup>1</sup> A pregnant female northern right whale was captured in Madeira on 7 January 1959 (unpublished record - official logbooks of EBAM).

<sup>2</sup> The first known fin whale record is of an animal captured in Madeira on 4 June 1952. There are records of 12 more captured animals until November 1957 (unpublished records - official logbooks of EBAM).

<sup>3</sup> The species is mentioned by Alves *et al.* (2010) for Madeira waters, however the first confirmed record for this species is from a sighting on 28 September 2003.

<sup>4</sup> The species is mentioned by Townsend (1935) for Madeira waters, referring to Logbook records of American whalships for the period between 1761 to 1920.

<sup>5</sup> The first record for this species is from an animal stranded in September 1991, according to the Records of Museu Municipal do Funchal.

### Confirmed records

#### **Blue whale** *Balaenoptera musculus* (Linnaeus, 1758)

There are only four reports of sightings of single individuals of this species in Madeiran waters. The most recent record is from April 2009 when a blue whale and a fin whale were photographed by whalewatching operators and by the MWM research team at two nautical miles South of “Garajau” (South Madeira). The oldest record is from whalers in 1964 at “Caniçal” (Southeast Madeira) (JOÃO MOREIRA, *pers. comm.*) and the remaining two are from whalewatching operators off the Southeast coast of Madeira Island, one in September 1993 (MIGUEL FERNANDES, *pers. comm.*) and the other one in September 2004 (HÉLDER CAMACHO and JOÃO SOUSA, *pers. comm.*). Blue whales are known to have a cosmopolitan distribution (SEARS, 2002), and have been observed in the neighbouring archipelagos of the Azores (SIMAS *et al.*, 1998) and the Canary Islands (RITTER & BREDERLAU, 1998). The very low number of records may be explained because the main migratory routes of this species do not include Madeira archipelago and may also reflect the very small size of the North Atlantic population (REEVES *et al.*, 2003).

#### **Sei whale** *Balaenoptera borealis* Lesson, 1828

The first record was a sighting of three individuals on September 2002 during nautical surveys off the coast of “Porto da Cruz” (Northeast Madeira). Several more sightings of this species have been recorded up to date by the MWM team in visual aerial and nautical surveys, as well as by whalewatching operators. However, due to the difficulty to distinguish this species from Bryde’s whale at sea, many more records have not been considered confirmed observations of the species (there was not a clear dorsal view of the head), which may lead to an underestimation of the species’ presence in the area. The presence of this species in Madeiran waters was expected and is in accordance to its general distribution pattern in the North Atlantic (PRIETO *et al.*, 2011). The sei whale is also present in the neighbouring archipelagos of the Azores (GORDON *et al.*, 1990) and the Canary Islands (RITTER & BREDERLAU, 1998).

#### **Common minke whale** *Balaenoptera acutorostrata* Lacépède, 1804

The first record of this species was a sighting in 1956 by EBAM whalers close to “Garajau” (South Madeira) (FRANCISCO REINER, *pers. comm.*). More recently, two animals stranded, one on July 1998 at Desertas islands (stranding code: AR.M.98.01) and another on August 1999 at Porto Santo Island (AR.M.99.01). Only three more sightings were recorded up to date, one on July 2002 off the West coast of Madeira Island by the MWM team, another by the shore of the Southeast coast of the same Island (FILIPE ALVES, *pers. comm.*) on May 2004, and the most recent sighting in February 2010 by the shore in front of the MWM (JOÃO SOUSA, *pers. comm.*), at “Caniçal” (Southeast Madeira). Despite the common minke whale’s

cosmopolitan distribution, it occurs more frequently in coastal and colder waters (PERRIN & BROWNELL, 2002). The common minke whale's preference for coastal waters may be one of the possible explanations for such low number of sightings in the deep oceanic waters around Madeira.

**Humpback whale** *Megaptera novaeangliae* (Borowski, 1781)

A total of five individuals were taken during the whaling period in Madeira and, according to the official logbooks of EBAM, the first one was on July 1957. More recently, single individuals were sighted by whalewatching operators (on November 2003, June 2004 and September 2012), and by the MWM team on May 2006, all at South of Madeira. Despite the humpback whale cosmopolitan distribution (CLAPHAM, 2002), its main migration routes in the Atlantic seem not to include the inshore waters of Madeira archipelago, as supported by the low number of records of this species in the last decades, including the whaling period (1941-1981).

**Dwarf sperm whale** *Kogia sima* (Owen, 1866)

The only known record of this species for Madeira archipelago is the stranding of a juvenile on August 2000 (AR.O.00.06), at "Madalena do Mar" (Southwest Madeira), later identified by the skull (skull reference code: MB387). There are also reports of a few strandings at the nearby archipelagos of the Azores (GONÇALVES *et al.*, 1996) and the Canary Islands (JABER *et al.*, 2004). This species has an evasive behaviour and it is very hard to distinguish from the pygmy sperm whale (*Kogia breviceps* (BLAINVILLE, 1838)) at sea. It is known to occur in tropical and temperate latitudes worldwide (MCALPINE, 2002).

**Cuvier's beaked whale** *Ziphius cavirostris* Cuvier, 1823

The first record of this species is of an individual stranded on August 1992 (AR.O.92.01) at "Porto Moniz" (Northwest Madeira). Years later, more strandings occurred, namely on May 1999 (AR.O.99.01) at "Ponta de São Lourenço" (East Madeira), on May 2000 (AR.O.00.02 – MB381; AR.O.00.03 – MB382) at Porto Santo Island and on May 2000 (AR.O.00.04 – MB383) at "Santana" (Northeast Madeira). Besides the strandings, this species has been occasionally sighted in Madeiran waters during visual nautical and aerial surveys. Cuvier's beaked whales have a cosmopolitan distribution in deep offshore, tropical to cool temperate marine waters and, as other beaked whales, are difficult to detect and approach at sea. Most of the data comes from strandings (HEYNING, 2002), as occurred at the neighbouring archipelagos of the Azores (REINER *et al.*, 1993) and the Canary Islands (VONK & MARTÍN, 1989; MARTÍN *et al.*, 2004).

**Gervais' beaked whale** *Mesoplodon europaeus* Gervais, 1855

On April 2007 a female of Gervais' beaked whale stranded (AR.O.07.02 – MB388) in "Ponta Delgada" (North Madeira) and later on May of the same year a male stranded in

Porto Santo Island (AR.O.07.04 – MB389). Although the female skull was the only one recovered in good conditions to allow species identification, photographs of the stranded male head confirmed it as being of the same species. These two strandings are the only records of the species for Madeira archipelago. The distribution of Gervais' beaked whale appears to include mostly tropical and warm temperate waters of the North Atlantic. Gervais' beaked whale is known particularly from stranding records, mainly in western North Atlantic (REEVES *et al.*, 2002) as well as in the neighbouring archipelagos of the Azores (REINER *et al.*, 1993) and the Canary Islands (MARTÍN *et al.*, 2004).

**False killer whale** *Pseudorca crassidens* (Owen, 1846)

The first record of the species in Madeira archipelago was of a group of about 15 individuals on October 1997. They were sighted opportunistically in the channel between the islands of Madeira and Porto Santo by the MWM research team. There is also a record of an individual stranded on August 2001 (AR.O.01.07 – MB384) at “Ponta do Pargo” (Southwest Madeira) and several groups were sighted again on eleven other occasions between 2001 and 2011, either by the MWM research team or by whalewatching operators. The species is known to usually occur in tropical and warm temperate waters, deeper than 1000 m (REEVES *et al.*, 2002) and it has also been described for the neighbouring archipelagos of the Azores (REINER & SANTOS, 1984) and the Canary Islands (HERNÁNDEZ-GARCÍA, 2002).

**Risso's dolphin** *Grampus griseus* (Cuvier, 1812)

SARMENTO (1948) mentions Risso's dolphin as one of the possible species present in Madeiran waters based on descriptions of the colour and shape of the dorsal fin of some sighted animals. However no dates or locations were given for the referred sightings. The first documented record is from a stranding of one adult individual (AR.O.86.01) at “Caniçal” (Southeast Madeira) on December 1986 (unpublished data from the Museu Municipal do Funchal). Over 30 sightings have been recorded between 1998 and 2012 in Madeiran waters, almost all in the South coast of Madeira Island, mainly by whalewatching operators but also by the MWM research team. Risso's dolphins have a worldwide distribution in temperate and tropical oceans, between about 400 to 1000 m depth (BAIRD, 2009), and it is present in all other Macaronesian islands (CHAVES, 1924; VONK & MARTÍN, 1988; REINER *et al.*, 1996).

**Pygmy killer whale** *Feresa attenuata* Gray, 1874

The only record of the species in Madeira archipelago was of a group of about 12 individuals with two calves on May 2009. The group was sighted during random nautical surveys in the Southeast coast of Madeira Island. They were difficult to approach and avoided the boat. Photos of the animals were taken and subsequently identified as *Feresa attenuata*. The pygmy killer whale is found in tropical and subtropical waters worldwide (DONAHUE & PERRYMAN, 2002), though according to WILLIAMS *et al.* (2002) this species was sighted in



cooler waters in the Bay of Biscay, North-eastern Atlantic. These extralimital records are generally associated with incursions of warm waters in those areas (TAYLOR *et al.*, 2008). To our knowledge the last record of this species for the Macaronesia was on February 2012 in the Cape Verde Islands, with mass stranding of 7 pygmy killer whales (LÓPEZ-SUÁREZ *et al.*, 2012).

#### **Fraser's dolphin** *Lagenodelphis hosei* Fraser, 1956

There are five records of this species for Madeiran waters, all made by whalewatching operators. In all occasions the animals accompanied closely the boats for short periods of time, allowing the species identification, but photographs for species confirmation were only taken in the last two sightings in 2010. The first sighting was a group of around 25 individuals on October 2003 (PETER BRISTOW, *pers. comm.*); the second sighting was of a group of around 75 individuals on April 2005 (LUÍS DIAS, *pers. comm.*); both off the Southeast coast of Madeira; the third sighting was a group of four animals in November 2008 at South of Madeira (MIGUEL FERNANDES, *pers. comm.*); and the fourth and fifth sightings were on August 2010 also at the South of Madeira, both in the same day and probably from the same group, (RAQUEL MARQUES, *pers. comm.*). Fraser's dolphin is a tropical species, ranging between 30°N and 30°S, and the occurrence outside this limit is considered unusual and is probably influenced by temporary oceanographic events (DOLAR, 2002). The presence of this species in Madeiran waters should be regarded as exceptional based on the few existing records.

#### **Non-confirmed records**

##### **Northern bottlenose whale** *Hyperoodon ampullatus* (Forster, 1770)

There are four sightings of isolated individuals or groups of up to three animals of this species. The first one was on August 2001 off the South coast of Madeira, during nautical surveys conducted by the MWM research team, and the last one on October 2008 West of the Desertas Islands by a whalewatching operator (LUÍS DIAS, *pers. comm.*). This species is found only in the North Atlantic and is rarely seen further south than Nova Scotia, Azores or the Iberian Peninsula (REEVES *et al.*, 2002). However, the stranding of a northern bottlenose whale in Fuerteventura on 1988, Canary Islands (MARTÍN *et al.*, 2004), which is further South of Madeira archipelago and away from the main known area of distribution, confirms the Madeira archipelago within a wider area of occurrence of the species. However, it should be seen as an exceptional presence based on the few existing records.

##### **Long-finned pilot whale** *Globicephala melas* (Traill, 1809)

There are at least two non-confirmed opportunistic sightings of this species in Madeiran waters. MIGUEL LACERDA (*pers. comm.*) made the first sighting on July 1984 in the Southeast coast of Madeira and PAIS (1993) reported one sighting of long-finned pilot

whales on June 1993 at about 50 nm North of Madeira Island. Although SARMENTO (1936) and NOBRE (1938) had identified two individuals taken from Madeiran waters as long-finned pilot whales, FRASER (1950) later corrected the identification to short-finned pilot whales (*Globicephala macrorhynchus* Gray, 1846). The similarity of these two species may lead to an underestimation of sightings of long-finned pilot whales in these waters. Thus, more attention is required in identifying pilot whales (*Globicephala* sp.) in future sightings. The waters of the Azores, Madeira and Mauritania are described as the southern limit of this species range (REEVES *et al.*, 2002; PRIETO & FERNANDES, 2007).

**Melon-headed whale** *Peponocephala electra* (Gray, 1846)

There are two sightings of this species, both off “Caniço” (Southeast Madeira) and within a short-time interval. The first one was of a group of about 12 individuals on June 2005 by a whalewatching operator (LUÍS DIAS, *pers. comm.*), and the second one of about six individuals on July 2005, during MWM nautical surveys. In both encounters the observers, based on visible anatomical characteristics of the animals and in photographs, identified them as being melon-headed whales. However, the similarity of this species with the pigmy killer whale (*Feresa attenuata* Gray, 1874), the small size of the groups (a characteristic usually related to pigmy killer whales (PERRYMAN, 2002)) and the low quality of the images make it impossible to confirm the sightings as being of melon-headed whales. Both melon-headed whale and the pigmy killer whale have Madeira archipelago within their expected overall area of occurrence (PERRYMAN, 2002; DONAHUE & PERRYMAN, 2002).

**Remarks on species described in previous years**

**Northern Atlantic right whale** *Eubalaena glacialis* Müller, 1776

The northern right whale was initially identified from a skull of one of two animals captured in 1967 by EBAM in Madeiran waters (MAUL & SERGEANT, 1977). According to the EBAM official logbooks, another animal (a pregnant female) was captured previously on January 1959. To date there are no further records of the Northern Atlantic right whale in Madeiran waters. The fact that this species is considered nearly extinct in the Northeast Atlantic, where it has only been sighted for a few occasions in the last decades (SILVA *et al.*, 2012), makes it unlikely to be resighted in Madeiran waters.

**Fin whale** *Balaenoptera physalus* (Linnaeus, 1758)

Although the first bibliographic reference to this species in Madeiran waters is from GORDON *et al.* (1995), the first record is of an animal captured by EBAM in June 1952 (unpublished records – official logbooks of EBAM). There are 12 more records of individual animals captured until November 1957 by EBAM, accompanied by photographic records of some of those events.

**Bryde's whale** *Balaenoptera edeni* Anderson, 1878

ALVES *et al.* (2010) mention this species for the first time for Madeiran waters referring to sightings in 2005 and a tagging event that happened in 2006. In that publication the species is identified as *Balaenoptera brydei* after the genetic sequences obtained from the analysis of a skin sample (sample BEM02 deposited in GenBank with reference number EU030282) matched genetic sequences of *Balaenoptera brydei* Olsen, 1913, deposited in the GenBank. Due to the uncertainties regarding the taxonomy of this species, the authors in the present paper adopted the more conservative approach based on the revised list of cetacean species and sub-species of the Society for Marine Mammology (COMMITTEE ON TAXONOMY, 2012). The first confirmed record is of a calf stranded on August 2004 at “Santa Cruz” (Southeast Madeira). The animal was identified by the three longitudinal ridges on the top of the head and by its skull, which is catalogued and stored at the MWM (AR.M.04.01 – MB385). It was not possible to confirm the species genetically due to the carcass advanced state of decomposition. Later, the MWM team identified one individual of this species from a photograph taken by a whalewatching operator on the South coast of Madeira Island on the 28 September 2003. To date, this species has been regularly observed, in groups of one to five individuals, between June and November, during visual nautical and aerial surveys carried out by the MWM, and by whalewatching operators. Again, due to the difficulty to distinguish this species from the sei whale, the only records considered valid were the ones for which there was a clear dorsal view of the head during encounters, which may lead to an underestimation of the species' number of sightings. Although Madeira archipelago is located at the northern limit of the species range in the East Atlantic (KATO, 2002) we observed a rapid increase in the number of sightings over the last years. Additionally, 2005 also revealed to be an exceptional year for this species presence in the Canary Islands (BREDELAU *et al.*, 2006; RITTER & NEUMANN, 2006). In the Azores archipelago, located at a northern latitude, the species was also observed (STEINER *et al.*, 2008).

**Sperm whale** *Physeter macrocephalus* Linnaeus, 1758

Although the previous checklists dated the first sperm whale record in Madeiran waters in 1936 (SARMENTO, 1948), this species was already mentioned by TOWNSEND (1935), referring to the Logbook records of American whaleships for the period between 1761 and 1920. Later in 1940, the sperm whales were sighted from lookout posts located at “Porto Moniz” (Northwest Madeira) and at “Machico” (Southeast Madeira). The shore based whaling activity in Madeira archipelago started in January 1941, with the first sperm whale being hunted in February that year (unpublished data; Madeira Whaling Historical records at the MWM).

**Sowerby's beaked whale** *Mesoplodon bidens* (Sowerby, 1804)

This species has only two confirmed records for the Madeiran waters. The first one was on August 1941, when an animal was taken and identified later from its skull (MAUL

& SERGEANT, 1977) and the second one was on July 2012, when a group of three individuals stranded alive at “Machico” beach (Southeast Madeira). This group was rescued and sent back to the sea by locals. The existence of only two confirmed records of this species for Madeiran waters may result from Madeira archipelago’s location at the Southern limit of this species known area of occurrence (REEVES *et al.*, 2002) and/or from the difficulty to approach and distinguish them from other beaked whales at sea.

**Killer whale** *Orcinus orca* (Linnaeus, 1758)

SARMENTO (1948) refers to this species for Madeiran waters, stating that it has been recognised by its dorsal fin and white patches on the body; however no dates or locations were given for the sightings. It may be inferred that those sightings were prior to the date of that publication. The killer whale is referred again by HAMMOND & LOCKYER (1988) in regard to seven animals captured by the EBAM between 1952 and 1956.

**Striped dolphin** *Stenella coeruleoalba* (Meyen, 1833)

This species is listed for Madeira in SNPRCN (1990) and SANTOS-REIS & MATHIAS (1996), but no information is given related to date, occurrence, type of record or source. Although FREITAS *et al.* (1998) referred the first sighting of this species in Madeiran waters between 1994-97 (the year of the sighting was 1995, CARLA FREITAS *pers. comm.*), five strandings are documented in Museu de História Natural do Funchal (unpublished data) prior to this period, being the first one in September 1991.

**Harbour porpoise** *Phocoena phocoena* (Linnaeus, 1758)

The harbour porpoise has been referenced to Madeiran waters based on an animal caught in a tuna fishing gear in 1905 and described as being smaller than a common dolphin (SARMENTO, 1936, 1948). Unfortunately no more detailed description or remains of the animal exist to allow species confirmation. Thus harbour porpoise is considered as a non-confirmed species for Madeira, following the same criteria used by the authors in this paper for other species that were only visually identified. The harbour porpoise preference for coastal habitats plus the lack of records of the species in Madeiran waters, apart from the above reference, makes us consider its presence in these waters exceptional.

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## REFERENCES

- ALVES, F., A. DINIS, I. CASÇÃO & L. FREITAS:  
2010. Bryde’s whale (*Balaenoptera brydei*) stable associations and dive profiles: new insights into foraging behavior. *Marine Mammal Science*, **26**: 202-212.
- BAIRD, R. W.:  
2009. Risso’s Dolphin *Grampus griseus*. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 975-976, Academic Press, San Diego.
- BREDERLAU, B., M. MEGNET, S. HILDEBRANT, A. SERVIDIO & V. MARTÍN:  
2006. Exceptional presence of Bryde’s whales (*Balaenoptera edeni*) in La Gomera (Canary Islands). In: *Guidelines and Abstract Book of the twentieth Annual*

- Conference of the European Cetacean Society* (ed.: I. Kuklik), 204 pp., Gdynia, 2-7 April.
- CHAVES, F. A.:  
1924. Cetáceos que aparecem nos mares dos Açores. *A Pesca Marítima*, **15**: 41-44.
- CLAPHAM, P. J.:  
2002. Humpback Whale. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 589-591, Academic Press, San Diego.
- CLARKE, R.:  
1954. Open boat whaling in the Azores. *Discovery Reports*, **26**: 281-354.
- COMMITTEE ON TAXONOMY:  
2012. List of marine mammal species and subspecies. Society for Marine Mammalogy. <[www.marinemammalscience.org](http://www.marinemammalscience.org)>, consulted on December.
- DOLAR, M.:  
2002. Fraser's dolphin. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 485-487, Academic Press, San Diego.
- DONAHUE, M. A. & W. L. PERRYMAN:  
2002. Pygmy killer whale. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 1009-1010, Academic Press, San Diego.
- FRASER, F. C.:  
1950. Two skulls of *Globicephala macrorhyncha* (Gray) from Dakar. *Atlantide Reports*, Copenhagen, **1**: 49-60.
- FREITAS, C., T. DELLINGER & F. REINER:  
1998. First record of Atlantic spotted dolphins, *Stenella frontalis* G. Cuvier, 1829 (Cetacea: Delphinidae) from the Archipelago of Madeira. *Bocagiana*, **190**: 1-5.
- GONÇALVES, J. M., J. P. BARREIROS, J. M. AZEVEDO & R. NORBERTO:  
1996. Cetaceans stranded in the Azores during 1992-1996. *Arquipélago: Life and Marine Sciences*, **14A**: 57-65.
- GORDON, J., L. STEINER & J. M. GONÇALVES:  
1990. Sei whales (*Balaenoptera borealis*) encountered in the Azores: a new record for the region. *Arquipélago, Life and Marine Sciences*, **8**: 97-100.

- GORDON, J., L. STEINER & H. R. MARTINS:  
1995. Observations of fin whales (*Balaenoptera physalus* L., 1758) around the Central North Atlantic islands of the Azores and Madeira. *Arquipélago, Life and Marine Sciences*, **13A**: 79-84.
- HAMMOND, P. S. & C. LOCKYER:  
1988. Distribution of killer whales in the Eastern North Atlantic. Jóhann Sigurjónsson & Stephen Leatherwood (Guest Editors), RIT, Fiskideildar, *Journal of the Marine Research Institute*, Reykjavik, **XI**: 24-41.
- HARMER, S. F:  
1924. On Mesoplodon and other beaked whales. *Proceedings of the Zoological Society*, **36**: 541-587.
- HERNÁNDEZ-GARCÍA, V.:  
2002. Contents of the digestive tract of a false killer whale (*Pseudorca crassidens*) stranded in Gran Canaria (Canary Islands, Central East Atlantic). *Bulletin of Marine Science*, **71** (1): 367-369.
- HEYNING, J. E.:  
2002. Cuvier's Beaked Whale. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 305-307, Academic Press, San Diego.
- JABER, J. R., J. PEREZ, M. ARBELO, M. ANDRADA, M. HIDALGO, J. C. GOMEZ-VILLAMANDOS, T. Van Den INGH & A. FERNANDEZ:  
2004. Hepatic Lesions in Cetaceans Stranded in the Canary Islands. *Veterinary Pathology*, **41**: 147-153.
- KATO, H.:  
2002. Bryde's whales. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 171-177, Academic Press, San Diego.
- LÓPEZ-SUÁREZ, P., C. OUJO, M. ACRE & C. J. HAZEVOET:  
2012. A stranding of pygmy killer whale *Feresa attenuata* Gray, 1874 on Boavista during February 2012: first record for the Cape Verde Islands, *Zoologia Caboverdiana* **3** (1): 52-55.
- MARTÍN, V., A. SERVIDIO & S. GARCÍA:  
2004. Mass strandings of beaked whales in the Canary Islands. In: *Proceedings of the*

*Workshop on Active Sonar and Cetaceans* (eds.: P. G. H. Evans & L. A. Miller), Seventeenth Annual Conference of the European Cetacean Society, Las Palmas, Gran Canaria, 8 March 2003. ECS Newsletter, Special Issue, **42**: 33-36.

MATHIAS, M. L.:

1988. Annotated list of the mammals recorded from the Madeira Islands. *Boletim do Museu Municipal do Funchal*, **40** (201): 111-137.

MAUL, G. E. & D. E. SERGEANT:

1977. New Cetacean records from Madeira. *Bocagiana*, **43**: 1-8.

McALPINE, D. F.:

2002. Pygmy and Dwarf Sperm Whales. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 1007-1009, Academic Press, San Diego.

NOBRE, A.:

1938. O *Globicephalus melas* dos mares do arquipélago da Madeira. *Anais da Faculdade de Ciências do Porto*, **22**: 234.

PAIS, C. A.:

1993. *Observação de cetáceos no Arquipélago da Madeira e Ilhas Selvagens*. Relatório de estágio do Curso de Licenciatura em Biologia Marinha e Pescas, Universidade do Algarve, Faro, Portugal, 70 p.

PERRIN, W. F. & R. L. BROWNELL JR.:

2002. Minke whales. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 750-754, Academic Press, San Diego.

PERRYMAN, W. L.:

2002. Melon-Headed Whale. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 733-735, Academic Press, San Diego.

PRIETO, R. & M. FERNANDES:

2007. Revision of the occurrence of the long-finned pilot whale *Globicephala melas* (Traill, 1809), in the Azores. *Arquipélago, Life and Marine Sciences*, **24**: 65-69.

PRIETO, R., D. JANIGER, M. A. SILVA, G. T. WARING & J. M. GONÇALVES:

2011. The forgotten whale: a bibliometric analysis and literature review of the North Atlantic sei whale *Balaenoptera borealis*. *Mammal Review*, **42** (3): 235-272.



REEVES, R. R., B. S. STEWART, P. J. CLAPHAM & J. A. POWELL:

2002. *Sea Mammals of the World. A Complete Guide to Whales, Dolphins, Seals, Sea Lions and Sea Cows*. A & C Black, London, 528 p.

REEVES, R. R., B. D. SMITH, E. A. CRESPO & G. N. di SCIARA (compilers):

2003. *Dolphins, Whales and Porpoises: 2002-2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, U. K., 54 p.

REINER, F.:

1981. Nota sobre a ocorrência de um caldeirão *Steno bredanensis* (Lesson, 1828) nas águas do Arquipélago da Madeira. *Memórias do Museu do Mar, Série Zoológica*, **2** (14): 1-5.

REINER, F. & R. S. SANTOS:

1984. On the occurrence of the false killer whale *Pseudorca crassidens* (Owen, 1846) in the waters of Azores (Cetacea, Delphinidae). *Memórias do Museu do Mar, Série Zoológica*, **3** (26): 1-7.

REINER, F., J. M. GONÇALVES & R. SANTOS:

1993. Two new records of Ziphiidae (Cetacea) for the Azores with an updated checklist of cetacean species. *Arquipélago, Life and Marine Sciences*, **11A**: 113-118.

REINER, F., M. E. dos SANTOS, & F. W. WENZEL:

1996. Cetaceans of the Cabo Verde Archipelago. *Marine Mammal Science*, **12** (3): 434-443.

RICE, D. W.:

1998. *Marine Mammals of the World, Systematic and Distribution*. Society for Marine Mammalogy, Special Publication 4, Lawrence, K. S., 55 p.

RITTER, F. & B. BREDERLAU:

1998. First report of blue whales (*Balaenoptera musculus*) frequenting the Canary Islands waters. In: *Abstract Volume of the First World Marine Mammal Science Conference* (eds.: P. G. H. Evans & E. C. M. Parsons), pp. 95-98, Monaco 20-24 January.

RITTER, F. & K. NEUMANN:

2006. The year of the whale: extraordinary occurrence of Bryde's whales off La

Gomera (Canary Islands). In: *Guidelines and Abstract Book of the twentieth Annual Conference of the European Cetacean Society* (ed.: I. Kuklik), pp. 143, Gdynia, 2-7 April.

SANTOS-REIS, M. & M. L. MATHIAS:

1996. The historical and recent distribution and status of mammals in Portugal. *Hystrix*, **8** (1-2): 75-89.

SARMENTO, A. A.:

1936. *Mamíferos do Arquipélago da Madeira*. Funchal. Junta Geral do Distrito Autónomo do Funchal, 96 p.

1948. *Vertebrados da Madeira, Mamíferos-Aves-Répteis-Batráquios*, Junta Geral do Distrito Autónomo do Funchal, 2.<sup>a</sup> edição, vol. I, 317 p.

SEARS, R.:

2002. Blue Whale. In: *Encyclopedia of Marine Mammals* (eds.: W. F. Perrin, B. Würsig & J. G. M. Thewissen), pp. 112-116, Academic Press, San Diego.

SILVA, F. A. & C. A. MENESES:

1940. *Elucidário Madeirense*, Junta Geral do Distrito Autónomo do Funchal, vol. I, 826 p.

SILVA, M. A., L. STEINER, I. CASCÃO, M. JOÃO CRUZ, R. PRIETO, T. COLE,

P. K. HAMILTON, & M. F. BAUMGARTNER:

2012. Winter sighting of a known Western North Atlantic right whale in the Azores. *Journal of Cetacean Research and Management*, **12**: 65-69.

SIMAS, E. M., B. HERBERT, W. THOMPSON & J. H. AZEVEDO:

1998. New Cetacean observations from the Azores. In: *Abstract Volume of the First World Marine Mammal Science Conference* (eds.: P. G. H. Evans & E. C. M. Parsons), p. 78, Monaco 20-24 January.

SNPRCN:

1990. *Livro vermelho dos vertebrados de Portugal. Mamíferos, Aves, Répteis e Anfíbios*, Serviço Nacional de Parques, Reservas e Conservação da Natureza, Lisboa, vol. I, 219 p.

STEINER, L., M. A. SILVA, J. ZEREBÁ & M. J. LEAL:

2008. Bryde's whales, *Balaenoptera edeni*, observed in the Azores: a new species

record for the region. *Marine Biodiversity Records*, **1**: e66. doi: 10.1017/S1755267207007282.

TAYLOR, B. L., R. BAIRD, J. BARLOW, S. M. DAWSON, J. FORD, J. G. MEAD,  
G. NOTARBARTOLO di SCIARA, P. WADE & R. L. PITMAN:

2008. *Feresa attenuata*. In: IUCN 2009. *IUCN Red List of Threatened Species*. Version 2009.1. <www.iucnredlist.org>.

TOWNSEND, C. H.:

1935. The distribution of certain whales as shown by logbook records of American whalships. *Zoologica*, **19** (1): 1-50.

VONK, R. & V. MARTÍN:

1988. First list of odontocetes from the Canary Islands, 1980-1987. *Proceedings of the second Annual Conference of the European Cetacean Society* (ed.: P. G. Evans), pp. 31-35, Setúbal, 5-7 February.

1989. Goose-beaked whales (*Ziphius cavirostris*) mass strandings in the Canary Islands. In: *Proceedings of the third Annual Conference of the European Cetacean Society* (eds.: P. G. H. Evans & C. Smeenk), pp. 73-77, La Rochelle, 24-26 February.

WILLIAMS, A. D., R. WILLIAMS, & T. BRERETON:

2002. The sighting of a pygmy killer whale (*Feresa attenuata*) in the Southern Bay of Biscay and their association with cetacean calves. *Journal of the Marine Biological Association of the United Kingdom*, **82**: 509-511.