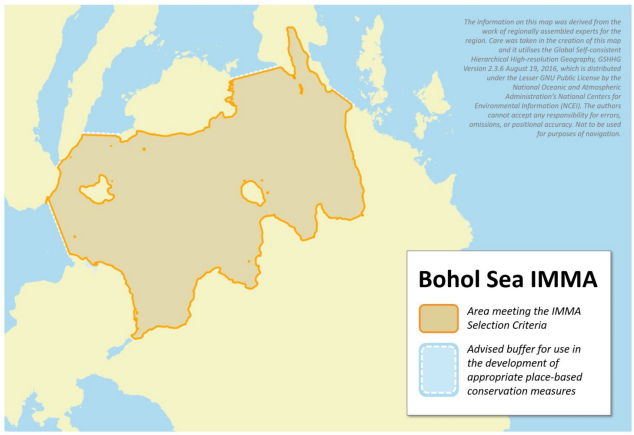


Area Size

29 517 km^2

Qualifying Species and Criteria

Sperm whale – *Physeter macrocephalus*

Criterion A

Blue whale – *Balaenoptera musculus*

Criterion A

Melon-headed whale – *Peponocephala electra*

Criterion B (2)

Fraser's dolphin – *Lagenodelphis hosei*

Criterion B (2)

Marine Mammal Diversity

Criterion D (2)

Balaenoptera edeni, Balaenoptera omurai, Feresa attenuata, Grampus griseus, Globicephala macrorhynchus, Kogia sima, Kogia breviceps, Mesoplodon densirostris, Orcinus orca, Pseudorca crassidens, Stenella attenuata, Stenella longirostris longirostris, Stenella longirostris roseiventris, Steno bredanensis, Tursiops truncatus

Summary

The Bohol Sea represents a biodiversity hotspot for cetaceans in the Philippines, and southeast Asia where 19 species of cetaceans are known to occur, including the blue whale (*Balaenoptera musculus*). The Bohol Sea is the only known area in the country where blue whales have been positively identified. *Balaenoptera edeni* and *Balaenoptera omurai* are also known to occur here and were hunted until the late 1990s. Sperm whales have also been historically hunted in this area and sightings have been reported during dedicated surveys, public reports and strandings. Highly productive and deep waters support large populations of small resident teuthophagous odontocetes, including melon-headed whales, short-finned pilot whales, Risso's dolphins and Fraser's dolphins. The deep waters also host beaked whales and several encounters with Blainville's beaked whale have been reported.

Bohol Sea IMMA

Description

The Bohol Sea is located in the central portion of the Philippines, and its deep waters represent the most direct deep passage connecting the Pacific Ocean and the Sulu Sea. Opening in the East to the Pacific Ocean through the Surigao Strait, allow a constant westward flow that brings nutrient and cold waters into this basin and allow the creation of a complex water circulation system. The northern side of the Bohol Sea is characterized by a deep canyon, which reaches over 2000 meters deep less than 5km from the shores of the Island of Bohol. The South portion is less deep and characterized by many large embayments, and the estuaries of several large rivers that contribute to the enrichments of these waters.

The Bohol Sea hosts at least 19 of the 27 species of cetaceans known to occur in the Philippines, representing the highest biodiversity in the country and a key habitat in southeast Asia (Alava et al., 2012;

Figure 1: Blue whale. Photo: Jo Marie V. Acebes

Ponzo et al., 2011) supporting the listing of the IMMA under criterion D2. These include various large whales: blue whales (IUCN status: EN, National Red List Assessment: DD), sperm whales (IUCN status: VU) and the poorly known Bryde's and Omura's whales (IUCN status: Data Deficient). The Bohol Sea is the only known area in the country where blue whales have been positively identified. Based on whaling logbooks and museum records available from the nineteenth century, blue whales were historically present in the Philippines, but no sightings had been recorded until 2004 (Acebes, 2014). Despite this there has been no dedicated survey conducted for blue whales in the Philippines, many records of sightings have come from reports from tourists and opportunistic sightings from general cetacean surveys. In 2010, a blue whale sighted in the northern Bohol Sea was photo-identified for the first time in the country. Blue whales have been sighted in different areas of the northern half of the Bohol sea and the same animal has been sighted in seven different years since (2011, 2012, 2015, 2016, 2017, 2018 and 2019) (Acebes et al., 2021).

Bryde's whales, *Balaenoptera edeni* (Anderson, 1879) sightings were reported in the Bohol Sea throughout the 19th and 20th centuries (Slijper et al., 1964; Dolar et al., 1994; Perrin and Dolar, 1998; Acebes, 2009) and recorded in other areas around the country through dedicated cetacean surveys (Dolar and Wood, 1993; Leatherwood et al., 1992; Tan, 1995; Dolar et al., 2006; Dolar, 2006). Locally hunted since the 19th century, hunting continued until the 1990s with more than 100 baleen whales, locally known as *bongkaras* or *bugangsiso*, landed in one site between 1985 and 1993 (Dolar et al., 1994). The predominant species that was hunted was thought to be Bryde's whales (Dolar et al., 1994; Perrin et al., 1996), but subsequent osteological analysis by Yamada et al. (2008) showed that 83% of skeletons belonged to the recently described Omura's whale (Sasaki et al., 2006; Wada et al., 2003).

Sperm whales (*Physeter macrocephalus*) were locally hunted in the Bohol Sea by fishers from Limasawa Island from the early 1970s until the middle of the 1990s (Acebes, 2013). Sightings of sperm whales,

although uncommon have been regular for the last fifteen years with unpublished reports from early WWF surveys, surveys carried out from Silliman University and BALYENA.ORG on the north-western Bohol Sea and from reports from tourists.

This supports the proposal for listing the IMMA for the Bohol Sea under criterion A and D2.

Between 2010 and 2013 a total of 84 dedicated cetacean surveys were conducted in the northeast part of the Bohol Sea, covering 4643 km of transect for a total of 446.4 hours spent at sea (Ponzo 2011, Ponzo, Unpublished). During the surveys 12 species of cetacean (n=291 sightings) were encountered with 16.8% of the sightings involving more than one species. The melon-headed whale was the most frequently encountered species 41.8% (n= 121), followed by Fraser's dolphin and spinner dolphins. Similarly, surveys conducted by Sabater (2005, 2008) from 2002-2004 documented nine cetacean species (n=90 sightings) with the spinner dolphins, melon-headed whales and Fraser's dolphins as the three most frequently encountered species in decreasing order. Mean encounter rate (schools per 1000 km) of spinner dolphin was 19.17, for melon-headed whale was 17.85, and 13.43 for Fraser's dolphin.

Based on dorsal fin photo-identification, 415 unique individual melon-headed whales have been identified in this area with 59 individuals recaptured across years (from 2010 to 2013) and some individuals seen every year, suggesting some degree of residency. Sightings mostly overlap with small-scale squid fishery fishing ground and association of melon headed whales with squid fishing gear was common. Melon-headed whales' group size ranged between 1 and 100+ (median = 13; μ = 17.4) and on occasions, several groups converge in a 1 km area and form mega pod of up to 400 individuals. Based on Sabater's (2008) surveys, encounters with Fraser's dolphins were seldom seen in alone, rather often sighted in mixed species group, co-occurring 48% of the time with melon-headed whales. This supports criteria B2 for the melon-headed whales and Fraser's dolphins for the proposed IMMA.

Figure 2: Melon-headed whale. Photo: Jo Marie V. Acebes

Criterion A: Species or Population Vulnerability

Based on logbook and museum records available from the whaling era, blue whales were historically present in the Philippines. Surveys conducted between 2000 and 2004 in the area by WWF-Philippines and Silliman University, did not report any baleen whales. However, informal reports from fishermen and dolphin watching tour operators in Pamilacan Island in the North Bohol Sea, describe the sporadic presence of large whales, locally known as *bongkaras*, between January and June. The first confirmed sighting of a blue whale (*Balaenoptera musculus*) in the Bohol Sea occurred in 2004 but it was not until 2010 that the species was properly

documented and photo-identified. There have been 33 blue whale sightings recorded between 2004 and 2019, in the Bohol Sea (Acebes et al., 2021). One single individual blue whale, recognized through photo-identification, was re-sighted in the Bohol Sea during eight different years: 2010, 2011, 2012, 2015, 2016, 2017, 2018 and 2019 (Acebes et al., 2021). The geographic location and time of year—all sightings occurred between January and July—suggest that blue whales in the Philippines may extend the outer range edge of the Indo-Australian population that migrate between Western Australia, Indonesia, and East Timor (Acebes et al., 2021). Although blue whale sightings in the Bohol Sea coincide with times of high ocean productivity, further investigation is needed to determine if the whales are coming to the region to feed. Similarly, sightings of sperm whales have been uncommon but regular for the last fifteen years with reports from early WWF surveys, surveys carried out from Silliman University and BALYENA.ORG on the north-western Bohol Sea and from sightings of tourists.

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

During 84 surveys conducted by Ponzo and colleagues in the northern Bohol Sea from 2010 to 2013, the melon-headed whale was the most encountered species 41.8% (n= 121), followed by Fraser's dolphin and spinner dolphins. This shows similar findings as earlier surveys conducted by Sabater (2005) from 2002-2004 wherein the most frequently sighted species were the spinner dolphins, melon-headed whales and Fraser's dolphins, and Tiongson and Sabater (2013) from 2010-2012 with the melon-headed whales and Fraser's dolphins as the two most commonly encountered species. Based on dorsal fin markings, 415 unique individual melon-headed whales have been identified in this area with 59 individuals recaptured across years (from 2010 to 2013) and some individuals photographed in all 4 years, suggesting some degree of residency. Group size ranged from 1 to 70 individuals (median = 20; μ = 21) and on occasions, several groups converge in a 1 km area and form mega pod of up to 400 individuals. Encounters with Fraser's dolphins were in numbers of more than 18 animals and in mixed species group, the most frequent association was with melon-headed whales (Sabater, 2005).

Criterion D: Special Attributes Sub-criterion D2: Diversity

The Bohol Sea hosts a diversity of cetaceans, with 19 species confirmed from sightings during survey, strandings or verified reports from tourists. From March 2010 to June 2013, a total of 12 species were encountered in the Bohol Sea (n = 291 sightings) by Ponzo and colleagues, with melon-headed whales was the most encountered species 41.8% (*Peponocephala electra*, n= 121) followed by Fraser's dolphin 21.6 % (*Lagenodelphis hosei*, n= 63), spinner dolphins (*Stenella longirostris*, n= 41), pantropical spotted dolphins (*Stenella attenuata*, n= 2), bottlenose dolphins (*Tursiops* sp., n= 1), short-finned pilot whales (*Globicephala macrorhynchus*, n= 9), Risso's dolphin (*Grampus griseus*, n= 8), dwarf sperm whale (*Kogia sima*, n= 5), Blainville beaked whales (*Mesoplodon densirostris* , n= 3), rough-toothed dolphin (*Steno bredanensis*, n= 1), Bryde's whale (*Balaenoptera edeni*, n= 4), blue whale (*Balaenoptera musculus*, n= 2). Other species were encountered off effort, including pygmy killer whales (*Feresa attenuata*) and sperm whale (*Physeter macrocephalus*). Systematic boat surveys conducted by the Institute of Environmental and Marine Sciences, Silliman University between 2010-2012, recorded 11 cetacean species in which, five were seen in mixed-species groups of two or more species (Tiongson and Sabater 2014). Eight species were encountered, in decreasing frequency: melon-headed whale (*Peponocephala electra*),

Figure 3: Melon-headed whales in Bohol Sea. Photo: Jo Marie V. Acebes

Fraser's dolphin (*Lagenodelphis hosei*), spinner dolphin (*Stenella longirostris*), Risso's dolphin (*Grampus griseus*), Indo-pacific bottlenose dolphin (*Tursiops aduncus*), dwarf sperm whale (*Kogia sima*), short-finned pilot whale (*Globicephala macrorhynchus*), and Pantropical spotted dolphin (*Stenella attenuata*). Mixed-species encounters were observed to be most frequent between the melon-headed whale and Fraser's dolphin (i.e. 66% of the time) followed by Fraser's and Risso's dolphin mixed-groups.

Supporting Information

Acebes J.M.V., Silberg J.N., Gardner T.J., Sabater E.R., Tiongson A.J.C., Dumandan, P., Verdote D.M.M., Emata C.L., Utzurrum J., & Yaptinchay A.A. 2021. 'First confirmed sightings of blue whales *Balaenoptera musculus* Linnaeus, 1758 (Mammalia: Cetartiodactyla: Balaenopteridae) in the Philippines since the 19th century.' Journal of Threatened Taxa 13(3): 17875-17888.

Acebes, J.M.V. 2014. A History of Whaling in the Philippines: A Glimpse of the Past and Current Distribution of Whales. In: J. Christensen and M. Tull (Eds), *Unsettled Seas: Historical Perspectives of Fisheries Exploitation in the Indo-Pacific.* MARE Publication series, Vol. 12.

Acebes, J.M.V. 2013. Hunting "Big Fish": a marine environmental history of a contested fishery in the Bohol Sea. Unpublished PhD dissertation. Asia Research Center, Murdoch University, Perth, WA, Australia.

Acebes, J.M.V. 2009. Historical whaling in the Philippines: origins of 'indigenous subsistence whaling', mapping whaling grounds and comparison with current known distribution: a HMAP Asia Project Paper. Working Paper No. 161. Asia Research Centre at Murdoch University. Available at [http://wwwarc.murdoch.edu.au/publications/wp/wp161.pdf]

Clarke, D., Ponzo, A., Silberg, J.N., Senigaglia, V., Hughes, K., and Birdsall, C. 2013. Site fidelity of Risso's dolphins (*Grampus griseus*) in the Northern Bohol Sea, Philippines. 2013. 'A potentially small and resident population.' Presented at the 20th Biennial Conference of the Society of Marine Mammalogy, 9-13 December 2013. University of Otago, Dunedin, New Zealand.

Dolar, M.L.L., Leatherwood, S.J., Wood, C.J., Alava, M.N.R., Hill, C.L. and Aragones, L.V. 1994. 'Directed fisheries for cetaceans in the Philippines.' Rep. int. Whal. Commn 44:439-49.

Dolar, M.L.L., Perrin, W.F., Taylor, B.L., Kooyman, G.L. and Alava, M.N.R. 2006. 'Abundance and distributional ecology of cetaceans in the central Philippines.' J. Cetacean Res. Manage. 8(1): 93-111.

Pahang, K.A., Ponzo, A., Acebes, J.M., Silberg, J.N., Yaptinchay, A.A., Clarke. D. and Birdsall. C. 2013. 'The Bohol Rescue Unit for Marine Wildlife, an example of successful networking in a developing country.' Presented at the 20th Biennial Conference of the Society of Marine Mammalogy, 9-13 December 2013. University of Otago, Dunedin, New Zealand.

Leatherwood, S., Dolar, M.L.L., Wood, C.J., Aragones, L.V. and Hill, C.L. 1992. 'Marine mammal species confirmed from Philippine waters.' Silliman Journal 36(1):65-86. (Special Issue on Biodiversity).

Perrin, W. F., Dolar, M. L. L. and Ortega, E. 1996. 'Osteological comparison of Bryde's whales from the Philippines with specimens from other regions.' SC/47/NP2: 1–14, 8 figs.

Ponzo, A., Senigaglia, V., Silberg, J.N., and Clarke, D. 2013. 'Peps' peeps. Socioecology of *Peponocephala electra* in the Bohol Sea, Philippines.' Presented at the 20th Biennial Conference of the Society of Marine Mammalogy, 9-13 December 2013. University of Otago, Dunedin, New Zealand.

Ponzo, A., Pahang, K.A., Silberg, J., Haskins, G., Emata, C.L.P., and Acebes, J.M. 2011. 'Presence and distribution of cetaceans in the north-eastern Bohol Sea.' Presented at the 19th Biennial Conference of the Society of Marine Mammalogy, 26 November – 2 December 2011. Tampa, Florida, USA.

Sabater E.R. 2008. Relative abundance, distribution, and species association of cetaceans in the Bohol Marine Triangle, Philippines. MSc Thesis. Philippines: Silliman University.

Sabater, E.R. 2005. 'Cetaceans of the Bohol Marine Triangle Area, Bohol, Philippines: Assessment and Monitoring.' Presented at the 16th Biennial Conference of the Society of Marine Mammalogy, 12-16 December 2005, San Diego, C.A.

Sasaki, T., M. Nikaido, S. Wada, T. K. Yamada, Y. Cao, M. Hasegawa and N. Okada. 2006. *Balaenoptera omurai* is a newly discovered baleen whale that represents an ancient evolutionary lineage. Molecular Phylogenetics and Evolution 41:40–52.

Silberg, J., Ponzo, A., Pahang, K.A., Haskins, G., and Emata, C.L.P. 2011. 'Site fidelity of melon-headed whales in the northern Bohol Sea, Philippines.' Presented at the 19th Biennial Conference of the Society of Marine Mammalogy, 26 November – 2 December 2011. Tampa, Florida, USA.

Slijper, E.J., Van Utrecht, W.L. and Naaktgeboren, C. 1964. Remarks on the distribution and migration of whales, based on observation from Netherlands ships. Bijbragen Tot De Djerkunde XXXIV. 34:3-93.

Tan, J.M.L. 1995. A Field Guide to Whales and Dolphins in the Philippines. 1st ed. Bookmark, Metro

Manila. 125pp.

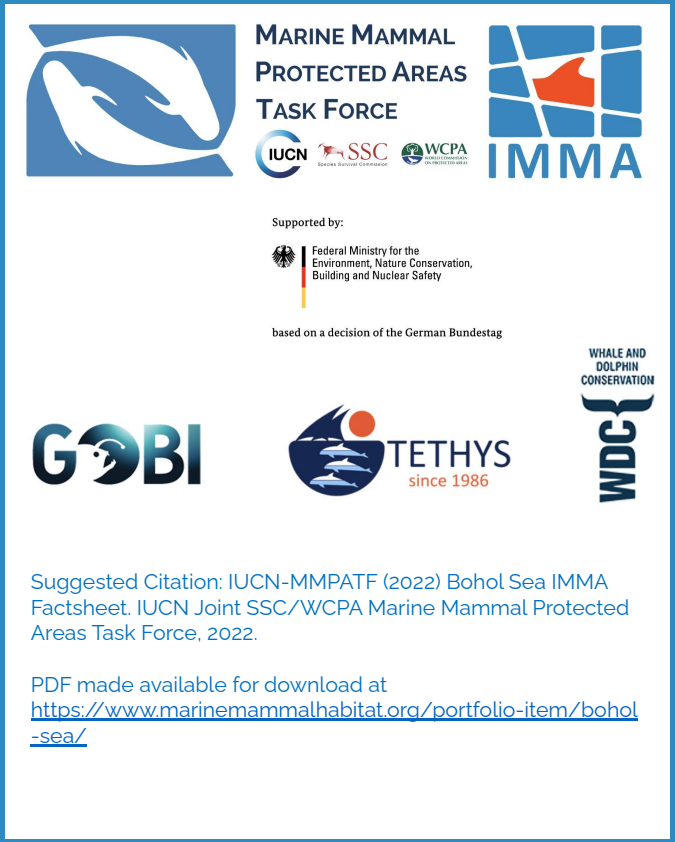
Tiongson A.J.C. and Sabater, E.R. 2013. 'Patterns of mixed-species associations of small cetaceans in the northwest Bohol Sea.' Presented at the 20th Biennial Conference of the Society of Marine Mammalogy, New Zealand, 9-13 December 2013. University of Otago, Dunedin, New Zealand.

Wada, S., M. Oishi and T. K. Yamada, 2003. A. newly discovered species of living baleen whale. Nature, 426: 278–281.

Yamada, T.K, Kakuda T., and Tajima, Y. 2008. Middle sized balaenopterid whale specimens in the Philippines and Indonesia. Mem. Natl. Mus. Nat. Sci., Tokyo, (45): 75–83.

Acknowledgements

We would like to thank the participants of the 2018 IMMA Regional Expert Workshop for the identification of IMMAs in the Northeast Indian Ocean and Southeast Asian Seas region. Funding for the identification of this IMMA was provided by the Global Ocean Biodiversity Initiative funded by the German government's International Climate Initiative (IKI). Support was also provided by Whale and Dolphin Conservation and the Tethys Research Institute.



Suggested Citation: IUCN-MMPATF (2022) Bohol Sea IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2022.

PDF made available for download at https://www.marinemammalhabitat.org/portfolio-item/bohol-sea/