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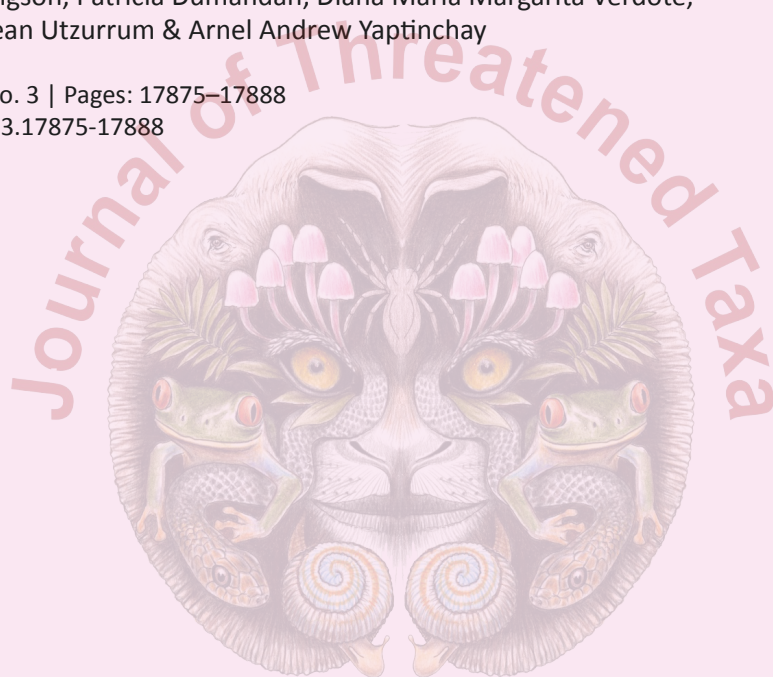
COMMUNICATION

FIRST CONFIRMED SIGHTINGS OF BLUE WHALES *BALAENOPTERA MUSCULUS* LINNAEUS, 1758 (MAMMALIA: CETARTIODACTYLA: BALAENOPTERIDAE) IN THE PHILIPPINES SINCE THE 19TH CENTURY

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INTRODUCTION

Blue Whales *Balaenoptera musculus* Linnaeus, 1758 are currently classified as Endangered by the International Union for the Conservation of Nature (IUCN) (Cooke 2018), and sightings in the Philippines are rare. Although historical data suggests Blue Whales occurred in Philippine waters (Acebes 2014), their presence was not reported between the end of the 19th century (1870) and 2004. Stories from fishers from Bohol suggest sightings of mother-calf pairs in the early 1990s (Jo Marie V. Acebes pers. comm. 8.xi.2011). While a whale skull of unknown source labeled “Blue Whale” was once displayed on the grounds of a village town hall in Lila, Bohol, the evidence of Blue Whale occurrence in the 20th century remains anecdotal (Acebes 2013). The first confirmed documentation of a Blue Whale in the Philippines occurred when a mother and calf were filmed off Pamilacan Island in the Bohol Sea in February 2004 (Dolar & Sabater 2012; Acebes 2014). The animal was initially thought to be a Bryde’s Whale *Balaenoptera edeni* Anderson, 1879, but was subsequently identified as a Blue Whale (Acebes 2006). Photographs of a baleen whale seen in the same area in May 2004 were also confirmed to be a Blue Whale (Sabater 2005). These sightings were brief and no detailed information on the animal and its behavior were recorded.

With such a gap in time between records, the subspecies and population of the Blue Whale seen in 2004 was unclear. There are four recognized subspecies of Blue Whale (Committee on Taxonomy 2019); however, many authorities do not recognize the northern Indian Ocean subspecies *Balaenoptera musculus indica* (Blyth, 1859) as separate from Pygmy Blue Whales *Balaenoptera musculus brevicauda* (Ichihara, 1966) because of a lack of morphological differences (Branch et al. 2007b; Branch & Mikhalev 2008; Jefferson et al. 2015). Antarctic Blue Whales (*Balaenoptera musculus intermedia* Burmeister, 1871) are restricted to Antarctic waters south of 60°S and are morphologically and genetically distinct from other subspecies (Rice 1998; Kato et al. 2002; Branch et al. 2007a,b; LeDuc et al. 2007; Branch & Mikhalev 2008; Branch et al. 2009). *Balaenoptera musculus musculus* (Linnaeus, 1758) are found only in the Northern Hemisphere and, while longer and heavier than *B.m. indica* and *B.m. brevicauda*, are still shorter and lighter

than *B.m. intermedia* (Jefferson et al. 2015).

Populations of Blue Whales can also be separated acoustically into at least 10 distinct populations (Rankin et al. 2005; McDonald et al. 2006, 2009; Stafford et al. 2011; Širović et al. 2018). The Philippines lie on the edge of the North Indian, Southeast Indian, North Pacific, and Southern Ocean acoustically-recognized populations.

The central Indian Ocean population (*B.m. indica*), is found in highest concentrations around Sri Lanka and appears to be resident in nature (de Vos et al. 2012, 2016), while at least some individuals from the Southeast Indian population (currently identified as *B.m. brevicauda*) undergo migrations from western Australia to Indonesia, arriving by June (Branch et al. 2007b; Double et al. 2014). North Pacific *B.m. musculus* are recognized as at least two acoustically separate populations, the eastern North Pacific population (ENP) and western North Pacific population (WNP), with almost none sighted south of northeastern Japan for decades (McDonald et al. 2006, 2009; Branch et al. 2019). The western North Pacific Blue Whales were historically hunted as far south as Taiwan (Tomilin 1957; Stafford et al. 2001; Wang et al. 2001), but were virtually extirpated from the southern part of their range, including southern Japan (National Marine Fisheries Service 1998; Clapham et al. 1999; Gilpatrick & Perryman 2008). Southern Ocean *B.m. intermedia* remain south of 52°S during the austral summer, but their acoustic song is heard throughout the Southern Hemisphere in the winter months (Stafford et al. 2004, 2011; Rankin et al. 2005; McDonald et al. 2006, 2009; Branch et al. 2007b; Samaran et al. 2013, 2019; Shabangu et al. 2019). The Philippines is geographically situated between the known ranges of *B.m. brevicauda*, *B.m. indica*, and *B.m. musculus* subspecies, but is closest to the Southeast Indian Ocean population of *B.m. brevicauda*. Since sub-specific taxonomy remains unresolved (Cooke 2018) (See Fig. 1), we consider all Blue Whale sightings here to be *B. musculus* sp.

We describe all documented encounters with Blue Whales in the Philippines since 2004. We investigate the distribution and ecology of Blue Whales in the Philippines by reviewing the timing and location of these sightings and examining the behavior of animals encountered, and photographically identifying the whales to initiate a photo-identification catalogue for the country.

Abbreviations: ENP—Eastern North Pacific | GPS—Geographic Positioning System | IUCN—International Union for the Conservation of Nature | LAMAVE—Large Marine Vertebrates Institute Philippines | PCBs—Polychlorinated Biphenyls | SHBWP—Southern Hemisphere Blue Whale Photo-ID | SLR—Single Lens Reflex | SU-IEMS—Silliman University - Institute of Environmental and Marine Sciences | SWIMS-HK—Swire Institute of Marine Science of the University of Hong Kong | WNP—Western North Pacific.

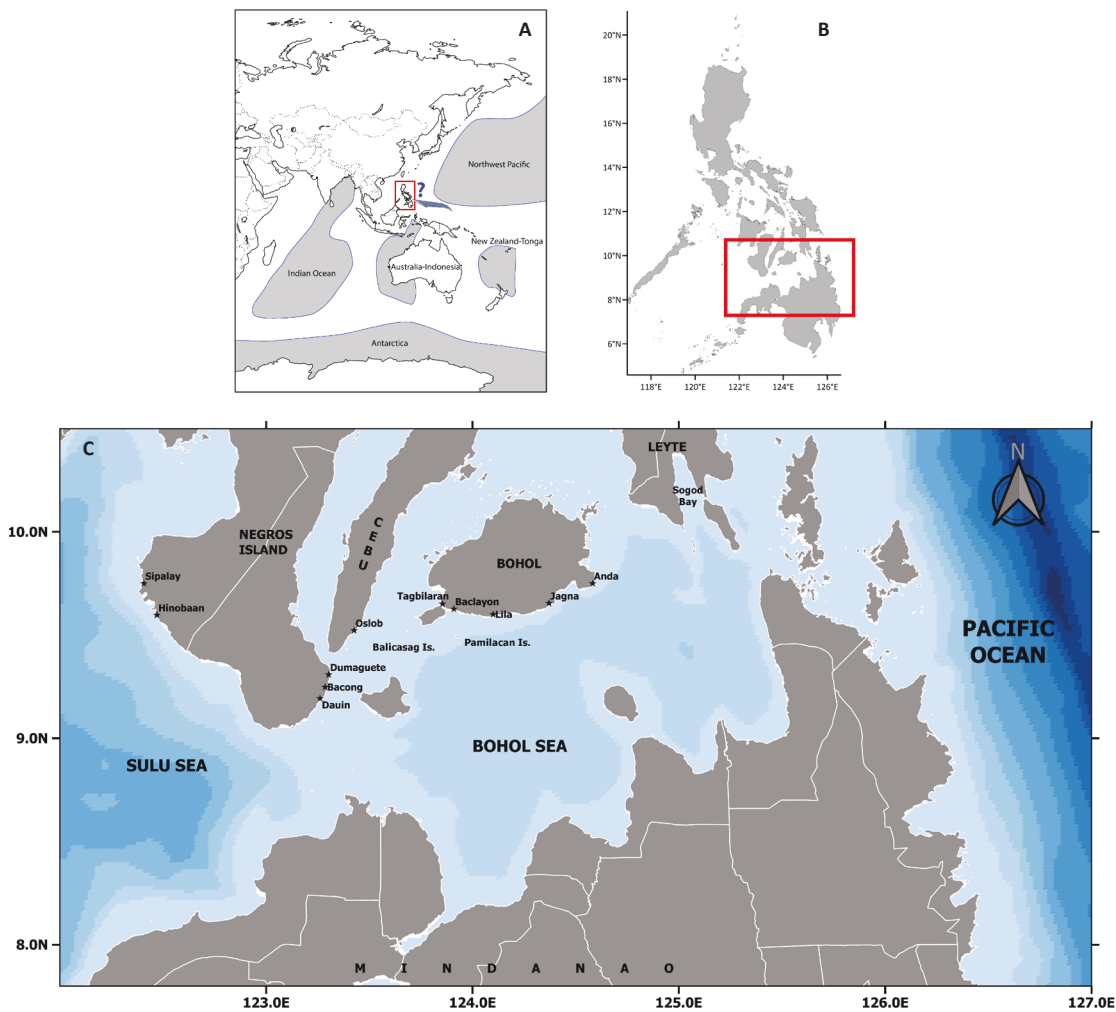


Figure 1. Known geographic ranges of blue whales in relation to the Philippines: A—shows the location of the Philippines in relation to the known geographic ranges of blue whale populations | B—shows the map of the Philippines and the location of the Bohol Sea | C—shows the Bohol Sea in the Central Visayas region of the Philippines.

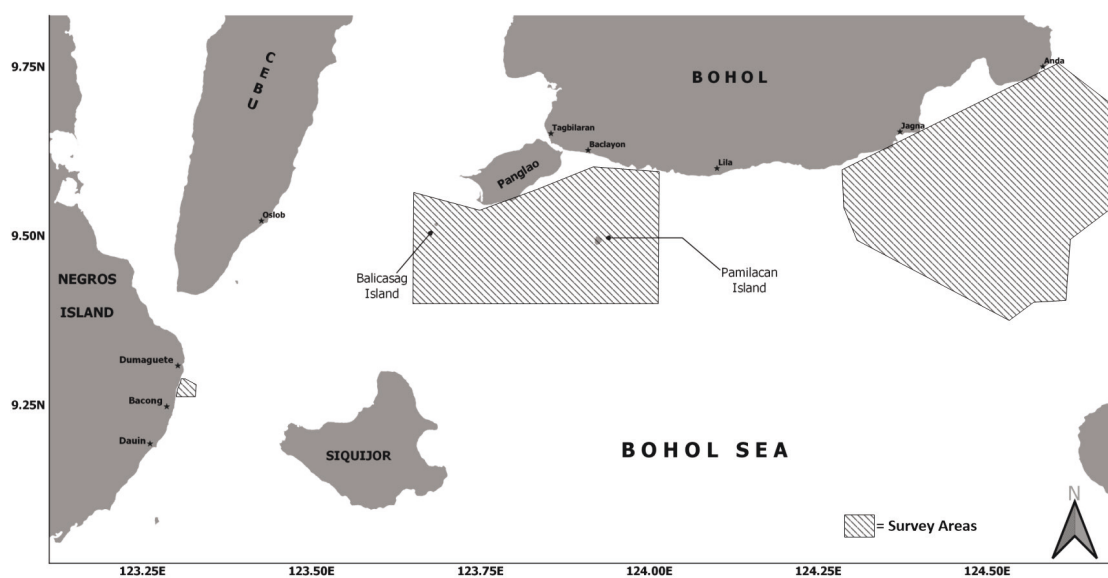


Figure 2. Study site in the Bohol Sea with areas surveyed marked with polygons with diagonal lines.

MATERIALS AND METHODS

Study site

The primary study site was the Bohol Sea, also known as the Mindanao Sea (Fig. 2). The Bohol Sea is located in the central Philippines (9°N & 124°E) and is surrounded by the island of Bohol in the north, southern Leyte in the east, and northwestern Mindanao in the south. It covers 29,000km² and measures 270km east to west (Indab & Suarez-Aspilla 2004; Green et al. 2004). Located in the centre of the Philippine archipelago, the Bohol Sea connects to the Sulu Sea to the west and to the Pacific Ocean in the east. Because the Bohol Sea has a relatively short continental shelf, there is considerable pelagic ocean habitat close to the shores of the surrounding islands — distinctive bathymetric conditions that contribute to deep water upwelling and associated high primary productivity (Cabrera et al. 2011; Gordon et al. 2011), and are similar to regions favored by Blue Whales off California and Australia. Cetaceans in the Bohol Sea are relatively understudied compared to cetaceans in other areas of the Philippines, owing to the sea's large area. Confirmed sightings of *B. musculus* sp. in the Philippines since 2004 have all been in the Bohol Sea region.

Sighting reports review

We collected and reviewed reports of sightings of Blue Whales and other large baleen whales in local news and social media, and examined photographs and videos to verify the species by looking for distinctive characteristics. Other photos and videos of large baleen whales submitted to the authors were included when quality was sufficient to verify that it was a Blue Whale. We counted separate encounters of the same individual whale on one day as a single sighting.

Blue Whales were morphologically distinguished from other baleen whales through several distinctive characteristics: 1) the “splash guard” or the prominent fleshy ridge anterior to the blowhole; 2) the large, broad, U-shaped head; 3) the relatively small dorsal fin positioned far back on the body; and 4) the mottled pigmentation in light and dark shades of gray found dorsoventrally along the body of the animal except the head and fluke (Sears 2002). Out at sea on a calm day from a distance, a Blue Whale projects a tall, dense, broad blow which can also be used to distinguish it from the Fin Whale *Balaenoptera physalus* Linnaeus, 1758.

Small vessel-based surveys

Small vessel surveys were conducted in the Bohol

Table 1. Survey effort of different research groups from 2010 to 2019.

Research Group	Survey period	No. of Days
LAMAVE	iii.2010	1
	iv.2010	2
	v.2010	8
	11.vi.2010	1
	iv.2011	4
	v.2011	3
	vi.2011	7
	iii.2012	4
	iv.2012	2
	v.2012	13
	vi.2012	2
	iv.2013	4
	v.2013	11
	vi.2013	6
	TOTAL	68
SU-IEMS	vi.2010	2
	x.2010	4
	xi.2010	10
	iv.2011	15
	v.2011	8
	x.2011	2
	iii.2012	2
	iv.2012	6
	v.2014	5
	vi.2014	4
	TOTAL	58
BALYENA.ORG	18–25.v.2015	9
	19–27.v.2016	9
	19–27.v.2017	9
	19 & 21.vii.2017	2
	26–29.i.2018	4
	23.v–1.vi.2018	10
	10–12.iii.2019	3
	16–18.iii.2019	3
	26–28.iii.2019	3
	15–17.iv.2019	3
	23–26.iv.2019	4
	21–27.v.2019	7
	22.vii.2019	1
	TOTAL	67
SWIMS-HKU	25.v.2016	1
	TOTAL	1

Sea between 2010 and 2019 by four different research groups (described further below, for a summary see Table 1 and Fig. 2). In all surveys, cetacean encounters were documented by recording the species, pod composition, number, and behaviour. We used a handheld Geographic Positioning System (GPS) to record the location of sightings. We photographed all cetacean species encountered, and estimated the sizes of animals using known boat length, when possible.

The Institute of Environmental & Marine Sciences of Silliman University (SU-IEMS) conducted systematic line-transect surveys using the distance sampling technique (Buckland et al. 2001), between June 2010 and June 2014 in the northwestern Bohol Sea using 20m long outrigger boats (See Table 1 and Fig. 2). Equal-distance zigzag design was followed. Transect legs were 20–25 km in length, 10km apart at the base, covering an area of 766km². This survey was strategically developed to investigate cetacean distribution and abundance in the study area over time.

The Large Marine Vertebrates Institute Philippines (LAMAVE) conducted non-systematic, non-random surveys in the northeastern Bohol Sea and the area around Pamilacan Island using 7–10 m long outrigger boats. The primary objective of these surveys was to photo-identify Melon-headed Whales *Peponocephala electra* (Gray, 1846), hence the search pattern was set to maximize these sightings by searching between three and 25km from shore across depths ranging between 200 and 2,000 m. In addition, if there were local reports of large whales in the area, a survey was conducted as soon as possible.

BALYENA.ORG conducted strip transect surveys in the northern Bohol Sea from Anda in the East to Valencia in the West, including the area around Pamilacan Island using an 18–20 m long outrigger boat from 2015 to 2019 (see Table 1 for details). The transect lines were set at 1km from the coastline, radiating five to 6km out and were approximately 1km apart. Opportunistic surveys were conducted in July 2017, January 2018, and March 2019 around Pamilacan Island when Blue Whale sightings were reported.

An opportunistic survey was conducted by a team from the Swire Institute of Marine Science of the University of Hong Kong (SWIMS-HKU) along the southern coast of Negros Oriental in May 2016 after receiving reports of a sighting of a Blue Whale in the area. An inflatable rubber boat about five to 7m long with a 25hp engine was used to survey along the coast about one to two kilometres from shore.

Photographic identification

We used 35mm digital single lens reflex (SLR) cameras with 70–400 mm zoom lenses. We photo-identified the animals using standard techniques used for Blue Whales (Sears 1990; Calambokidis & Barlow 2004; Gendron & De La Cruz 2012). We photographed both sides of the flank from a perpendicular angle, and included the dorsal fin as a point of reference. As much as possible, we photographed the entire flank of the animal in one sequence as the whale rounded out to dive. We also photographed the head and fluke. We used photographs of the fluke as part of the identification whenever possible. Photographs were considered good for photo-identification based on the sharpness of the image, the lighting and if the image was large enough for the markings to be clearly seen (Sears 1990). We compared good quality photographs taken of Blue Whales encountered with the BALYENA.ORG catalogue, and conducted an informal comparison with Geographe Bay and New Zealand photos included in the Southern Hemisphere Blue Whale Photo-ID (SHBWP) Catalogue (e.g., Galletti-Vernazzani et al. 2019), which included left-side comparisons with 74 images (Chandra Salgado-Kent pers. comm. 13.iv.2019).

RESULTS

Reported sightings in local news and social media

A total of 23 Blue Whale sightings were reported since 2004 based on reports in the local news and social media (Table 2). All reports were verified by examining the photographs or videos. Although all the photographs and videos examined were adequate for species identification, only one was suitable for photo-identification.

Ten sightings occurred in the area off Pamilacan Island, while three occurred off Panglao Island, both in the province of Bohol (Fig. 3). Two sightings were observed off the southern point of Sogod Bay in the province of Southern Leyte at the far eastern edge of the Bohol Sea. One sighting was from Oslob in southwestern Cebu, directly south-east of Bohol. Five sightings occurred off the coast of Dauin and Dumaguete in southwestern Negros Oriental, and an additional two sightings were reported from Sipalay and Hinoba-an along the southwestern shore of Negros Occidental. All sightings were of a solitary animal except for the first sighting in 2004, which was of a mom and calf. No detailed description of the behaviour was recorded because almost all sightings were made by tourists who

Table 2. Confirmed sightings of blue whales in the Philippines from 2004 to 2019.

Date sighted	Reported sightings	Location	Estimated size (m)	Group composition
ii.2004	Sports Unlimited (local TV crew)	Pamilacan Island	-	Mother and calf
1.v.2004	Pet Digidigan & Virginia Montgomery	Pamilacan Island	-	single
20.v.2008	Eulo Valeroso	east of Pamilacan Island	-	single
12.iii.2010	Louise Dixon	Two nautical miles from Napantao, east of Sogod Bay, So. Leyte	-	single
14.iii.2011	GMA Born-To-Be-Wild (local TV crew)	Pamilacan Island	25–30m	single
24.v.2015	Suzette Pepito	Between Panglao Island and Balicasag Island	-	single
iii.2016	Jojo Baritua	Pamilacan Island	-	single
3.iv.2016	-	Oslob, Cebu	-	single
13–14.iv.2016	Nemesia Pingkian	Pamilacan Island	-	single
28.iv.2016	Justin Jordan Reloj	Padre Burgos, So. Leyte	-	single
17.v.2016	Danny Ocampo	Canday-ong, Dumaguete, Negros Oriental	-	single
20.v.2016	Joseph Jasper Acay	Panglao Island	-	single
23.v.2016	Lyka Marie Abella	Dauin, Negros Oriental	-	single
24–26.v.2016	GB Aguilar, Harold Biglete, Judalyn Flores Partlow	San Miguel, Bacong-Dumaguete City, Negros Oriental	-	single
29.v.2016	-	Sipalay, Negros Occidental	-	single
4.vi.2016	-	Hinoba-an, Negros Occidental	-	single
18.vii.2017	Manong Sonny	off Pamilacan Island	-	single
11.viii.2017	Rico Ramos	5km off Dauin, Negros Oriental	-	single
1–5.iii.2018	Jojo Baritua	off Pamilacan Island	-	single
3.iii.2018	Jojo Baritua	Cervera shoal, west of Pamilacan	-	single
12–18.iii.2018	Jojo Baritua	off Pamilacan Island	-	single
22.iii.2018	Zita Lin	off southern coast of Panglao	-	single
10.iii.2019	Vanela Grace Torres	off Dauin, Negros Oriental	-	single
	Survey sightings			
11.vi.2010	LAMAVE	9.47835N & 123.94426E	22m	single
29.iii.2012	LAMAVE	Pamilacan Island	19m	single
25.v.2015	BALYENA.ORG	09.51238N & 124.11468E	22m	single
25.v.2016	SWIMS-HKU	09.26222N & 123.32779E	20–21m	single
19.vii.2017	BALYENA.ORG	9.53003N & 123.8391E	less than 30m	single
21.vii.2017	BALYENA.ORG	9.469N & 123.85447E	less than 30m	single
26.i.2018	BALYENA.ORG	9.516725N & 123.90106E	Under 30m	single
27.i.2018	BALYENA.ORG	9.47678N & 123.88336E	Under 30m	single
29.i.2018	BALYENA.ORG	9.54751N & 123.91459E	Under 30m	single
29.i.2018	BALYENA.ORG	9.5594N & 123.93287E	Under 30m	single
26.iii.2019	BALYENA.ORG	9.46154N & 123.87368E	19–20m	single

happened to be on a boat passing the area. According to the local TV crew that documented the encounter with a Blue Whale in March 2011, the whale excreted a reddish-brown liquid twice while they were following it. The whale was estimated to have a dive interval of 15 to 20 minutes.

The longest, almost continuous sighting of an individual Blue Whale in the Philippines was in 2016, over 19 days from May to June along the southern coasts of Negros Oriental and Occidental. Tracking the sighting locations within this period seems to indicate that the whale was moving northwest, exiting the Bohol Sea and

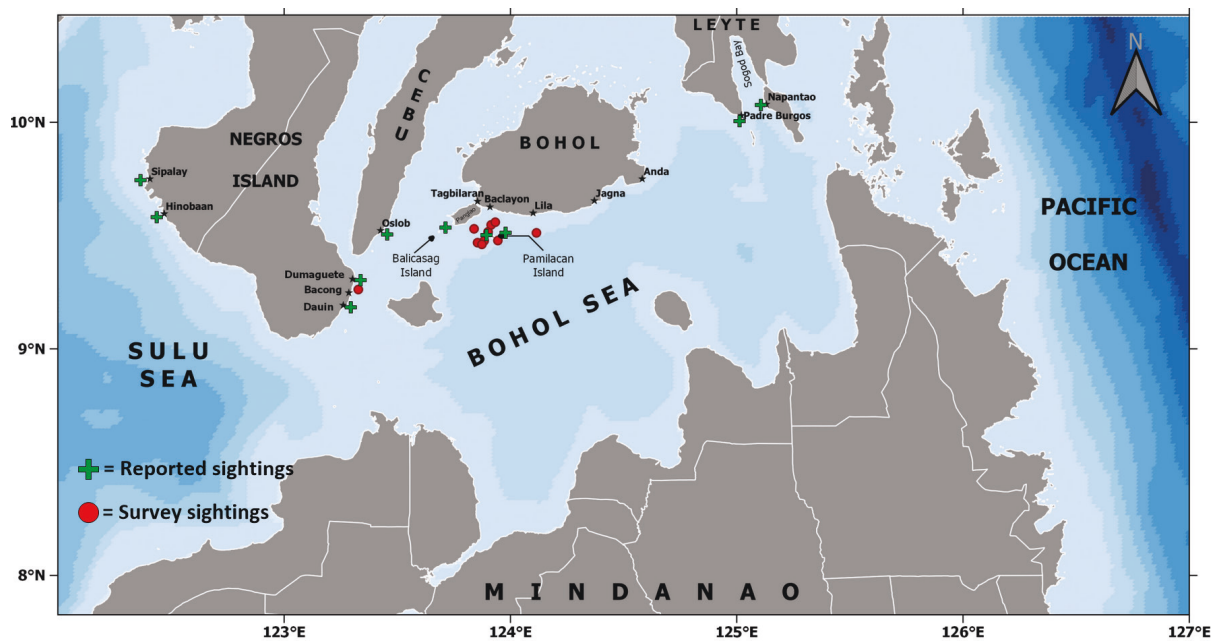


Figure 3. Point locations of blue whale sightings from surveys and sightings. Red circles are sightings from vessel surveys while green crosses are from reported sightings.

traveling towards the Sulu Sea, as it was last sighted off the southwestern coast of Negros Occidental.

Sightings from small vessel-based surveys

Eleven Blue Whale encounters were documented based on small vessel surveys between 2010 and 2019 (Table 2). All sightings occurred in the area off Pamilacan Island, Bohol (Fig. 3) except for the 25 May 2016 sighting from the coast of Dumaguete City in southern Negros Oriental.

LAMAVE conducted surveys in 2010, 2011, 2012, and 2013. In 2010, 12 survey days were conducted between March and June. In 2011, 14 survey days were conducted from April to June. In 2012, 21 survey days were conducted from March to June. In 2013, 21 survey days were conducted from April to June. During all surveys, a Blue Whale was encountered twice—June 2010 and March 2012 (Table 2).

SU-IEMS surveys were conducted in June 2010, October–November 2010, April–May 2011, October 2011, March–April 2012, and May–June 2014. The total effort was 58 survey days covering 766km² of the area. No Blue Whales were encountered in any of the surveys but other balaenopterids were seen.

The BALYENA.ORG surveys were conducted from 2015 to 2019 for a total of 67 combined dedicated strip-transect and opportunistic survey days. Dedicated strip-transect surveys during 61 days covered 1,191km² of area (Figure 2). A Blue Whale sighting was recorded

on 25 May 2015 during the 2015 dedicated survey, but no Blue Whales were sighted during the subsequent 2016 to 2019 dedicated surveys (See Table 2). Following reported Blue Whale sightings off of Pamilacan Island, a Blue Whale was encountered on 19 and 21 July 2017; 26, 27, and 29 January 2018; and March 26, 2019 during opportunistic surveys. On 29 January 2018, a Blue Whale was encountered twice, in the morning and afternoon.

On 25 May 2016, a large whale sighting was reported off Dauin, Negros Oriental. A team from SWIMS-HKU headed southeast along the coast of Dumaguete City and was able to locate the animal about 2km from shore and confirmed the species as Blue Whale. The team followed it for one hour and 11 minutes as it moved up and down the coast off Bacong town and Dumaguete City before eventually losing the animal due to unfavorable conditions. The whale was sighted again several hours later as close as 900m from shore. The whale was observed milling.

All individuals fit the description of ‘pygmy’ Blue Whales by Kato et al. (2002) based on the body shape, coloration, dorsal hump, and blowhole morphology. The individual encountered in June 2010, May 2015, and May 2016 was estimated to be 20 to 22 m long, while the individual encountered in 2012 and 2019 was estimated to be 19 to 20 m. The difference in size estimation is most likely due to the subjectivity of observers.

All Blue Whales encountered during the surveys were solitary. The whale encountered on 29 March 2012 was

associated with Spinner Dolphins *Stenella longirostris*. At all encounters, except in May 2016, the whale appeared to be resting. When approached, the whale swam away or dove, resurfacing a hundred meters away or more from the research boat. In 2015, the whale's surface interval was brief. Two or so breathing bouts were observed, followed by a dive, and the whale would resurface 500m or more away from the boat after the completion of its dive. In 2018, surface intervals were for approximately one to five minutes, with about 10–15 breathing bouts, and the whale resurfaced 500 or more meters away after the completion of its dive. In 2019, the surface interval was longer at approximately nine to ten minutes, with about 10–14 breathing bouts.

Photographic identification

The photograph of the left flank of a Blue Whale taken by the host of the local TV show on 2011 was compared with the photographs of the Blue Whale encountered during the survey in 2010 and 2015, and was confirmed to be the same individual.

Photographs of the left and right side of the Blue Whale encountered in vessel-based surveys in 2010, 2012, 2015, 2016, 2017, 2018, and 2019 were taken.

Based on comparison of the photographs of the left side of the Blue Whales encountered it was found that the same individual was photo-identified on 11 June 2010, 29 March 2012, 25 May 2015, 25 May 2016, and 21 July 2017 (Image 1). Closer examination of the photographs of the left side of the dorsal fin of the blue whale encountered in 2010, 2012, 2015, 2016, 2017, and 2019 revealed an identical semi-circular indentation, which further confirmed the identification (Image 2). A good photograph of the ventral side of the fluke of the Blue Whale encountered in May 2015, May 2016, January 2018, March 2018, and March 2019 was also taken. Examination of the fluke photos revealed identical notches on the left and right sides of the tip of the fluke of all whales photographed (Image 3). Results show that all 13 sightings of Blue Whales in eight different years were of the same individual.

DISCUSSION

Despite the efforts of four research groups with an accumulated effort of 194 days over 10 years between the months of January and July, and between October

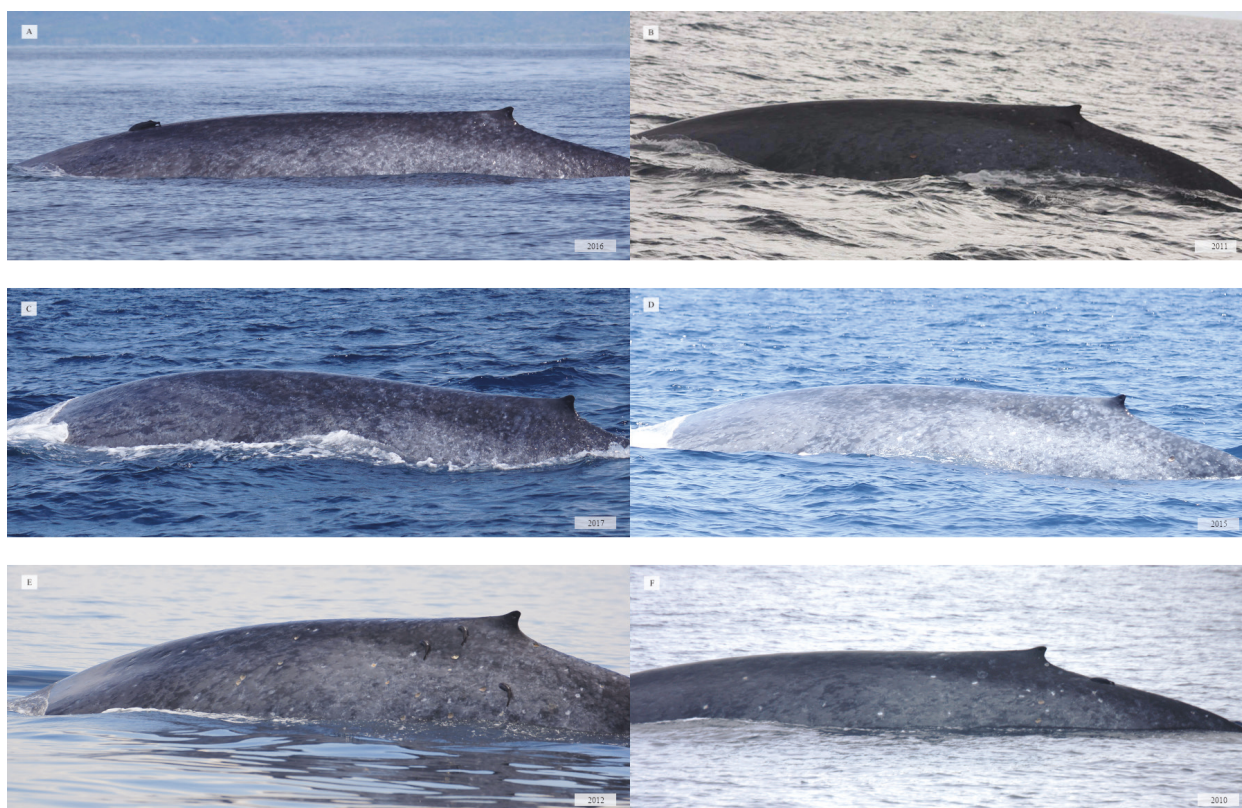


Image 1. Photographic identification of the blue whale sighted in A—2016 © Angelico Tiongson | B—2011 © Ferdinand Recio | C—2017 © Maita Verdote | D—2015 © Jom Acebes | E—2012 © Josh Silberg | F—2010 © Jom Acebes, showing similar pigmentation on the left flank.

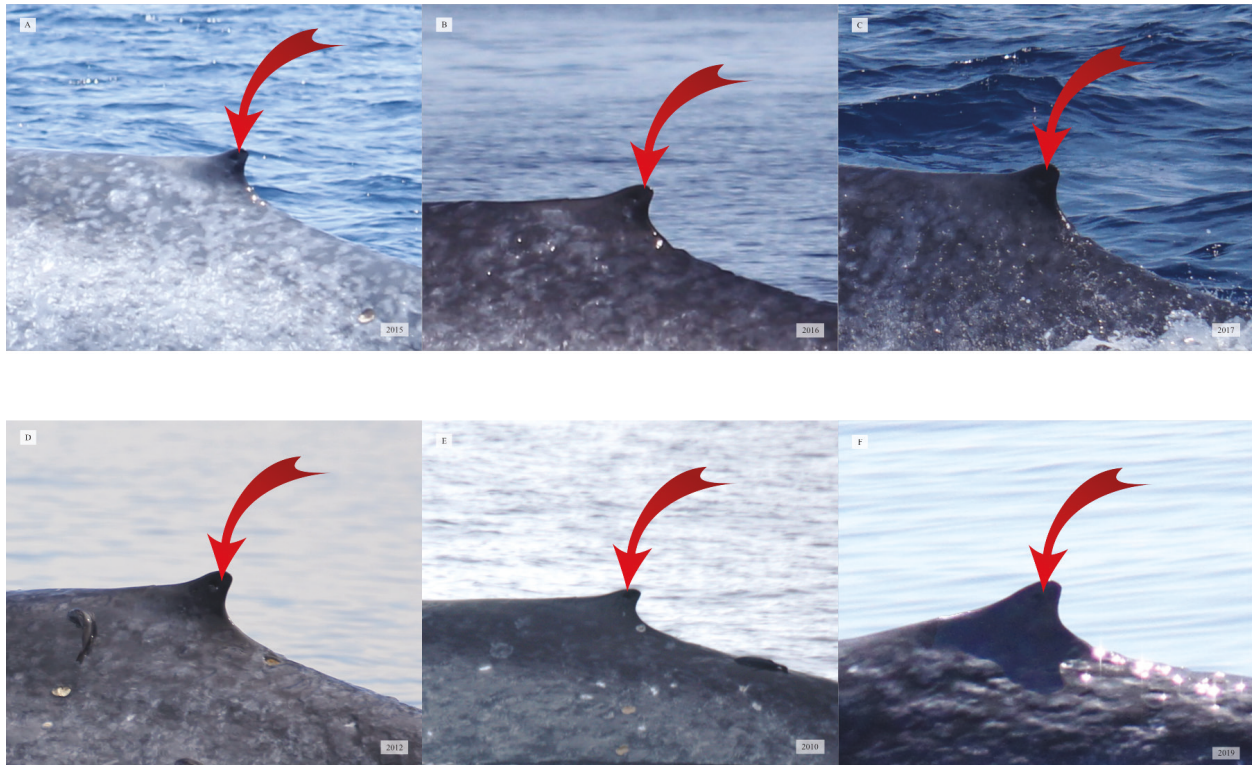


Image 2. Left side of the dorsal fin of the blue whale encountered in A—2015 © Jom Acebes | B—2016 © Angelico Tiongson | C—2017 © Maita Verdote | D—2012 © Josh Silberg | E—2010 © Jom Acebes | F—2019 © Angelico Tiongson, showing identical semi-circular indentation.

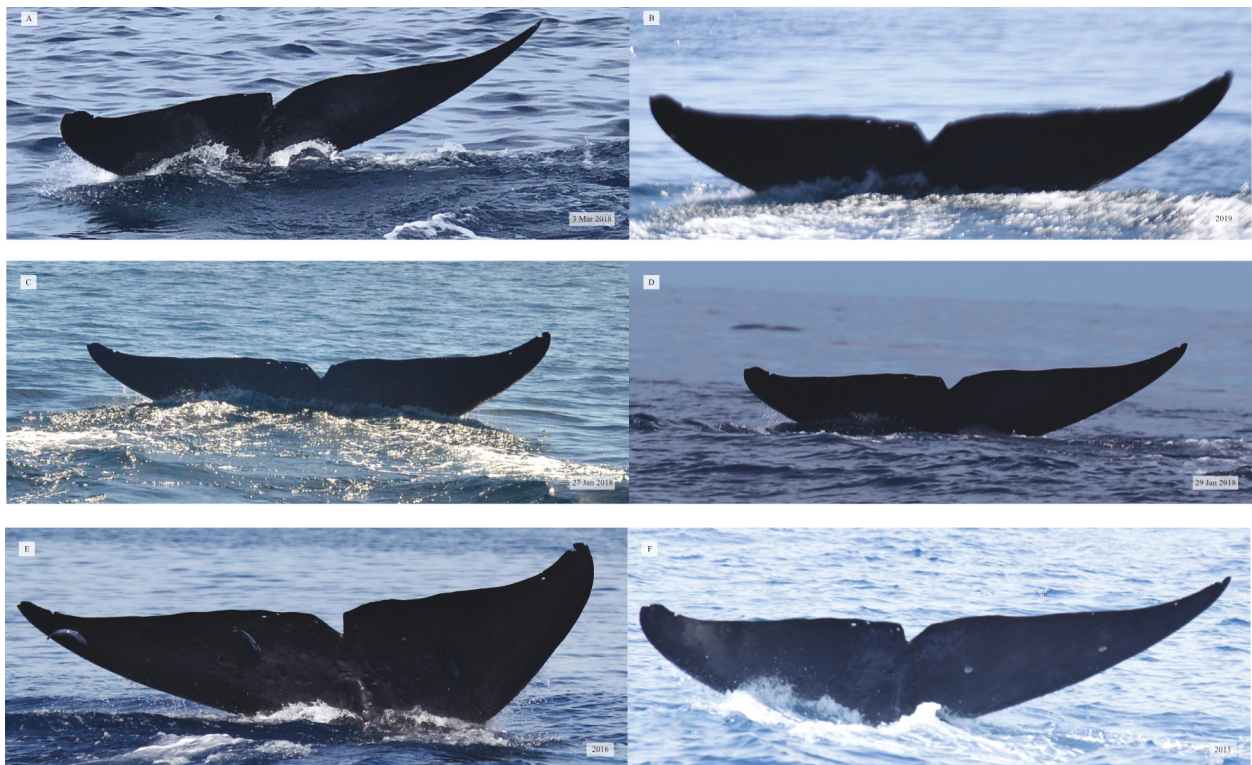


Image 3. Ventral side of the fluke of the blue whale encountered on A—3 March 2018 © Jojo Baritua | B—2019 © Angelico Tiongson | C—27 Jan. 2018 © Zerlina Leung | D—29 January 2018 © Kent Truog | E—2016 © Angelico Tiongson | F—2015 © Jom Acebes, showing identical nicks or notches.

and November, covering a total area of approximately 2,092km² of the northern Bohol Sea (Table 1 and Fig. 2), there was a paucity of Blue Whale encounters. This suggests that the species is not common in the region; however, given the size of the area of the Bohol Sea, the combined survey effort of these groups was probably not sufficient to cover the possible area of occurrence of the species. It must also be noted that most surveys were not conducted consistently during the same month within the same area each year, nor did they cover the entire month.

Although inconsistent, sightings of Blue Whales in the Bohol Sea are significant because they represent the only area in the Philippines that this Endangered species has been sighted and photo-documented. Sightings reported and recorded during the surveys were between the months of January and July, with most sightings having occurred in May. This coincides with local ecological knowledge about the seasonal presence of large marine vertebrates in the Bohol Sea. According to local fishers and residents, baleen whales come to the Bohol Sea between January and June with a peak from March to May (Acebes 2013).

It is possible that baleen whales come to the Bohol Sea to feed, as evidenced by their presence during the months of high productivity and observations of former whale hunters (Acebes 2013). Blue Whale feeding is often associated with coastal upwelling and other oceanographic features (Fiedler et al. 1998; Palacios 1999; Gill 2002; Best et al. 2003; Etnoyer et al. 2004, 2006; Croll & Marinovic 2005; Rennie et al. 2009). The Bohol Sea's connections with deep basins, the Pacific Ocean to the east and the Sulu Sea in the west, give it "unique circulation and physicochemical properties" (Cabrera et al. 2011). Furthermore, the water movements—sea surface currents, formation of eddies, and entrainments—cause upwelling and brings seasonal variations in productivity, food supply, and subsequently, fish abundance in the Bohol Sea (Cabrera et al. 2011; Gordon et al. 2011).

Some site fidelity exists, as evidenced by the re-sighting of an individual Blue Whale 13 times between 2010 and 2019. Only one mother-calf pair has been recorded in the Philippines (See Table 2). The relatively low frequency of sightings suggests the area is unlikely to be a prominent breeding ground similar to the situation in Chile (Hucke-Gaete et al. 2004). There are still very limited sightings data to give any idea on the movements or habitat-use of this Blue Whale in the Philippines.

The population identity of Philippine Blue Whales remains unclear. The estimated size of all of the

encountered Blue Whales (≤ 22 m) falls within the maximum length of *B.m. brevicauda* (24.2 m) (Ichihara 1966; Omura 1984). The Philippines may represent a northward extension of the Australia/Indonesia stock. This is highly likely as Blue Whales have been reported in south-east Asian waters in southern Indonesia between May and November (Kahn et al. 2000; Branch et al. 2007b; Kahn 2007) and off Timor-Leste between September and November (Dethmers et al. 2012). In 2006, one animal stranded in Sabah, Malaysia (Ponnampalam 2012) suggesting that the stock range may extend farther north. Recent satellite telemetry studies indicate that Pygmy Blue Whales feeding off western Australia migrate north to Indonesia, reaching the northern end of their migration by June (Double et al. 2014). It also showed that the Banda and Molucca Seas are potential breeding grounds based on the timing of the movement of tagged Pygmy Blue Whales (Double et al. 2014).

Other populations of Blue Whales inhabit the Indian Ocean (Branch et al. 2007b). Acoustical comparisons suggest that at least some of the Indian Ocean populations migrate between Madagascar and Diego Garcia and between the Maldives/Sri Lanka and Diego Garcia (Branch et al. 2007b). This acoustical population has also been recorded off Crozet Island to the south (Samaran et al. 2010) and off Angola in southwestern Africa (Cerchio et al. 2010; Figueiredo & Weir 2014). The 2006 stranding in Sabah, Malaysia (Ponnampalam 2012) could also have belonged to this population. While north-south migration has been noted within the Indian Ocean, no eastward migration of Blue Whales has been recorded in the Andaman Sea, Malacca Strait, or Gulf of Thailand.

Philippine Blue Whales may also belong to the mostly extirpated western North Pacific stock owing to its proximity to Taiwan. The most recent record of a Blue Whale in this region is a 20 m long carcass found on the beach of Taitung County, Taiwan on 25 January 2020 (NAMR 2020). There are no other records of sightings of Blue Whales between Taiwan and the central Philippines. Blue Whale calls from the western North Pacific are different than those from the eastern North Pacific (Stafford et al. 2001; Monnahan et al. 2014) with calls recorded least often in winter and spring, suggesting a possible migration. Both vocalization types were recorded in the central Pacific (Stafford et al. 2001) and have been noted from Midway Island (Northrup et al. 1971).

It is important to gather additional data on the species, given the existing threats to cetaceans in the region such

as the risk of entanglement with fishing gear and ship strike (Laist et al. 2001; NOAA 2009; de Vos et al. 2016), especially around the busy shipping lanes in the vicinity of Dumaguete City and Cebu, the third largest city in the Philippines. The Bohol Sea is one of the main fishing grounds in the Central Visayas region (Green et al. 2004) where commercial and municipal fishing vessels may potentially pose risk of gear entanglement to whales. Overfishing of high trophic level species in the Bohol Sea (Lavides et al. 2010) may have unknown impacts to large whales in the region by reducing predation on plankton-feeding fish leading to increased competition for prey resources. Other unassessed anthropogenic threats in the area include noise associated with shipping and seismic exploration (National Marine Fisheries Service 1998; Di Iorio & Clark 2010; Melcón et al. 2012), pollutants such as polychlorinated biphenyls (PCBs) and organochlorines (Metcalfe et al. 2004), and unregulated dolphin and whale watching operations.

Blue Whales have been seen in the Philippines for the first-time since the end of the 19th century. The re-sighting of a single animal on 13 occasions across eight years suggests potential site fidelity for at least certain individuals. Acoustic studies and increased photo-identification survey effort with matching with other Blue Whale catalogues will help clarify the stock identity of Blue Whales in the Philippines and their relation to the rest of the Blue Whale population. The timing of Blue Whale sightings in the Bohol Sea coincides with sightings of the Indo-Australian Blue Whale population and may represent an extension of the outer edge of this population's range.

Longer, dedicated surveys must be conducted in the areas in the Bohol Sea where these sightings occurred to determine the species' habitat-use and distribution. Increased survey effort all along the northern Bohol Sea and perhaps around the eastern and western straits will help determine the regularity of occurrence of the species in the region. Although preliminary data indicate that occurrence of the Blue Whale coincides with the areas and season of high productivity in the Bohol Sea, further investigation is needed to validate that whales are feeding in these waters.

The confirmation of the presence of Blue Whales in the Philippines contributes to our knowledge on the ecology and distribution of this endangered species. It further highlights the high marine biodiversity of the southeastern Asian seas region and the Coral Triangle and the need for further research and conservation in the region.

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Filipino abstract: Mahigit na dalawang siglo na walang naitala na blue whales *Balaenoptera musculus* sa Pilipinas. Ang mga blue whales ay naitala ng mga mananagat na nanghuhuli ng balyena noong ikalabinsiyam na siglo, at ang sumunod na pagkakita nito dito sa bansa ay ang mag-inang balyena noong 2004. Simula noon, 33 na pagkakita ng blue whales na maaaring isang indibidwal na balyena ang naitala sa pagitan ng 2004 at 2019, lahat sa loob ng Bohol Sea sa gitnang bahagi ng Pilipinas. Ang indibidwal na ito na nakilala sa pamamagitan ng photo-identification, ay nakita ng 13 na pagkakataon sa loob ng walong magkakaibang taon: 2010, 2011, 2012, 2015, 2016, 2017, 2018, at 2019. Ang lugar at panahon ng pagkakakita (Enero hanggang Hulyo) ay nagpapahiwatig na ang blue whales sa Pilipinas ay maaaring magpapalawak ng pinakadulo na paninirahan ng Indo-Australian na populasyon ng blue whales na lumilipat sa pagitan ng western Australia, Indonesia, at East Timor. Ang pagkakakita ng blue whale sa Bohol Sea ay sumasabay sa panahon ng mataas na produksyon ng dagat subalit kinakailangan pa ng masinsin na pag-aaral para malaman kung ang mga balyenang ito ay tiyak na nangangina sa rehiyon na ito. Mga pag-aaral gamit ang acoustic at photo-identification na paraan na magpapakita ng pagkakapareho sa ibang mga blue whale catalogue ang makakapagbigay linaw sa stock identity ng mga blue whale sa Pilipinas at ang kanilang relasyon sa iba pang populasyon ng blue whales, na may implikasyon rin sa pangangalaga ng endangered species na ito sa ibayo ng maraming hurisdiksyon.

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Author contribution: JMVA analysed the identification photos, organized, participated in and took photographs for the boat-based surveys for BALYENA.ORG, collated the reported and survey sightings information and was a major contributor in writing and revising the manuscript. JNS participated in and took photos for the LAMAVE surveys and was a major contributor in writing the manuscript. TJG participated in the 2018 and 2019 surveys for BALYENA.ORG and was a major contributor in revising the manuscript. ERS organized, participated in and took photographs for the SU-IEMS surveys; made the maps for the manuscript and contributed in revising the manuscript. AJCT organized, participated in and took photographs for the SWIMS-HK survey. He also participated in and took photographs for the BALYENA.ORG 2019 survey and contributed in revising the manuscript. PD organized and participated in the BALYENA.ORG 2017 survey. DMMV helped organize, participated in and took photographs for the BALYENA.ORG 2017 survey. CLE helped organize and participated in the LAMAVE 2010 survey and the SU-IEMS surveys. JU participated in and took photographs for the BALYENA.ORG 2019 survey and the SU-IEMS surveys. AAY helped collect reported sightings information from social media.

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