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Bryde's Whales (*Balaenoptera brydei*) off the North Coast of São Paulo, Brazil: First Photo-Identification Study

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Abstract

The waters off the north coast of São Paulo, Brazil, are used by several species of cetaceans, but little is known about their populations and habits. Bryde's whales (*Balaenoptera brydei*) are commonly sighted in this region, and the presence of this species has been monitored by the *Baleia à Vista* Project (PROBAV). A total of 106 Bryde's whale sightings were made between 2004 and 2019, comprising 163 individuals. From these, it was possible to catalog 44 individuals using the photo-identification technique, including six resightings in this period. In addition to this first published catalog of Bryde's whales off the north coast of São Paulo, whale behavior data and usage patterns are also presented. All these data reinforce the importance of the protection of these coastal waters and the conservation and knowledge of this yet poorly known species of tropical whale.

Key Words: Bryde's whales, *Balaenoptera brydei*, Brazil, photo-identification, catalog, cetaceans

Introduction

The Bryde's whale (*Balaenoptera brydei*) is a member of the Balaenopteridae family. They are found in the Atlantic, Pacific, and Indian Oceans in tropical and subtropical waters between the 40th parallel latitudes, and do not present the same migration patterns found in other balaenopterids. The females are slightly larger than males, and the largest specimen ever found was a female 15.51 m in length (Best, 1977). Bryde's whales were extensively hunted along the Brazilian coast during the 20th century (Omura, 1962; Williamson, 1975), with the size of the original population unknown. Bryde's whales are categorized in the International Union for Conservation of Nature's *Red List of Threatened Species* (Cooke & Brownell, 2018) as a species of "Least Concern."

The first records of Bryde's whales in Brazilian waters were made in the States of Rio de Janeiro (Omura, 1962) and Paraíba (Williamson, 1975), based on data collected during the whaling period off the Brazilian coast. With increasing efforts to document the species, strandings and opportunistic sighting records have steadily been reported along the Brazilian coast, from the State of Rio Grande do Sul to the coast of Pará (Bittencourt, 1983, 1984; Geise & Borobia, 1988; Zerbini et al., 1997; Siciliano et al., 2004; Lima et al., 2006; Magalhães et al., 2008; Santos et al., 2010; Sanfelice et al., 2012; Costa et al., 2017). However, to fill knowledge gaps, field work covering occurrence, habitat use, site fidelity, and photo-identification of Bryde's whales has been conducted in the last decades, mainly on the coasts of Rio de Janeiro and São Paulo in southeastern Brazil (Carneiro, 2005; Figueiredo et al., 2014; Gonçalves et al., 2015; Lodi et al., 2015; Tardin et al., 2017; Maciel et al., 2018; Santos et al., 2019).

Photo-identification studies of Bryde's whales date back to the 1980s when they took place in the Gulf of California, Mexico (Tershy, 1992). Since then, photo-identification techniques have proven to be highly effective for Bryde's whales worldwide as their dorsal fins have distinct nicks and shapes that can be easily tracked. As such, this technique, which also used mark-recapture in some cases, was successfully applied in populations of Bryde's whales of different regions such as in the Azores (Steiner et al., 2008), Cabo Frio, Brazil (Figueiredo et al., 2014), and New Zealand (Tezanos-Pinto et al., 2017).

The aim of this study is to present a photo-identification catalog of the Bryde's whales off the north coast of São Paulo, Brazil, to develop an information baseline for long-term studies, providing a better understanding of the habits and behaviors of this population, serving as a comparison tool for Bryde's whale populations from

neighboring regions, and ultimately contributing to species conservation plans in the region.

Methods

The survey was conducted along the north coast of São Paulo, Brazil, between the regions of Bertioga (23º 50.118' S, 46º 5.038' W), São Sebastião (23º 49.142' S, 45º 23.939' W), Ilhabela Archipelago (23º 48.735' S, 45º 22.019' W), and Ubatuba (23º 26.312' S, 45º 2.492' W). Most of the sightings were recorded around the Ilhabela Archipelago which is an important tourist region of the north coast of the State of São Paulo, located 213 km from the metropolitan region of São Paulo. The archipelago is formed by the main island, São Sebastião, and another 13 islets. It is in the central portion of the Southeast Brazilian Continental Shelf where it is influenced by four different water masses: all year long by the Coastal Waters (CW: T > 20ºC, S ~34.5‰), in the summer by the Tropical Waters (TW: T > 22ºC, S > 35.0‰) and South Atlantic Central Waters (SACA: T < 18ºC, S 35‰), and in the winter by the Southern Coastal Waters (SCW: T < 21ºC, S < 34‰) (Castro-Filho et al., 1987; Campos et al., 1996; Silva et al., 2001). Since 2008, this region has belonged to an environmental protection area called the APA Marinha Litoral Norte (316,242 ha) (Assembleia Legislativa de São Paulo, 2008) whose main objective is to join nature conservation with the sustainable use of part of its natural resources.

Since 2004, opportunistic cetacean sighting cruises in these waters have been carried out; and in 2016, the *Baleia à Vista"* Project (PROBAV), a citizen science project focused on creating cetacean conservation awareness (Cardoso et al., 2019; Siciliano et al., 2019), was founded and has been organizing sighting data systemically. From June 2004 to December 2019, an average of 321.68 h of navigation/year were conducted, resulting in 241 sightings of whales, including Bryde's whales, humpback whales (*Megaptera novaeangliae*), and southern right whales (*Eubalaena australis*).

Cetacean sighting cruises were conducted aboard three motorboats—*Ballerina* (Ferretti, 16.2 m) from 2004 until 2019, *Kavala* (Fishing, 9.8 m) from 2004 until September 2018, and *Cetacea* (Boston Whaler, 8.2 m) from September 2018 until 2019—at an average speed of 12 kts, during daylight hours, under good sea conditions (Beaufort scale < 4), and maintaining a minimum distance of 100 m from the whale(s). For each whale encounter, the geographic coordinates were recorded using the *Raymarine Chartplotter GPS*, and the depth and sea surface temperature were captured by *Raymarine Sonar*. Searches were conducted both by the naked eye and with the use of reticulate binoculars (Swarovski 10 × 32). Photos were taken using Nikon D4S, Nikon D850, and Canon 5D Mark IV cameras and a Nikon 300 mm f/4, Nikon 70/200 mm f/2.8, and Canon 100/400 f/4.5-5.6 lens, respectively. To plot the location of whales on a map and analyze the data, *QGIS 3.12* software was used. For the photo-identification study, a system that identified cetaceans from fin profiles in digital images called *Darwin Software* (http://darwin.eckerd.edu), developed by Eckerd College of Florida, was used. Only photos of good quality in which the dorsal fin had a clear outline, and nicks and scars were fully visible, were considered. When possible, both sides of the dorsal fin were photographed. Photo-identified whales were named with the prefix BRY SP followed by a number. When a mother was seen with a calf, the calf was given the same BRY SP number code plus a letter to identify the birth order. So, if the mother is BRY SP01, the calf will be BRY SP01A. If she is seen again at another time with another calf, that one will be given the name BRY SP01B and so on. With this naming system, in addition to verifying if the individuals return to the region, it will be possible to identify an individual's maternal lineage for population and behavioral studies. This is the same method used to catalog the transient orcas (*Orcinus orca*) of the west coast of the United States and Canada in Pacific waters (Ford & Ellis, 1999).

Results

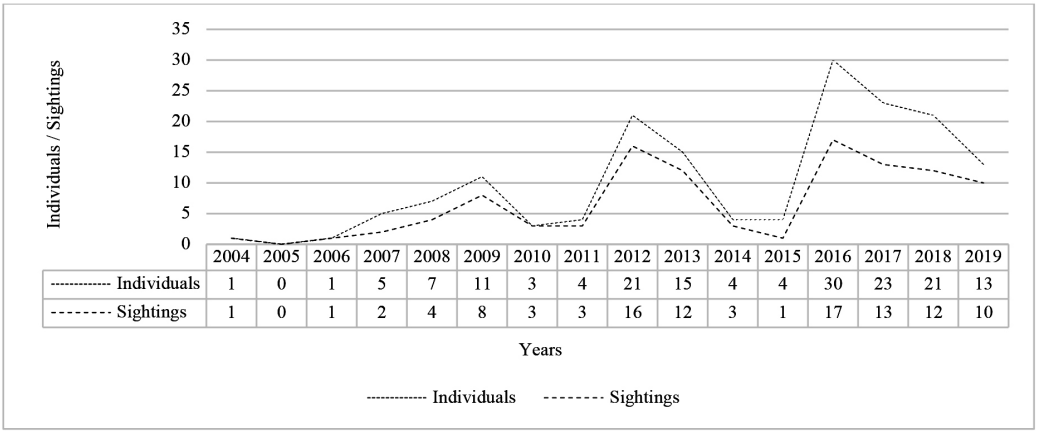
This study was based on 16 consecutive years of observation of Bryde's whales in the waters off the north coast of São Paulo, Brazil, between 2004 and 2019. During this period, 106 records of Bryde's whales were confirmed, with a total of 163 individuals. There was a considerable increase in sightings from 2012 to 2019 due to the intensification of efforts for cetacean observation by the PROBAV team (Table 1). The years with the lowest number of Bryde's whale sightings were 2005 ($n = 0$) and 2004, 2006, and 2015 ($n = 1$); and the years with the highest number of sightings were 2017 ($n = 13$), 2012 ($n = 16$), and 2016 ($n = 17$), with an average sighting of 6.63 whales per year. Bryde's whales were exclusively sighted in coastal shallow waters, and the farthest whale sighted during the present study was observed approximately 72.4 km off the continental coast in waters 90 m deep.

From the 106 confirmed records of Bryde's whales, it was possible to photo-identify 44 individuals (see Appendix). From these 44 individuals, six were resighted on different dates from the original sighting: BRY SP13, BRY SP15, BRY SP17,

BRY SP22, BRY SP24, and BRY SP32 (Table 2). Regarding BRY SP22, it was possible to photo-identify this animal because of the deep scars on its dorsal fin and back that can be easily observed, probably caused by a collision with a vessel. This whale was nicknamed "Escondidinha" due to its pronounced runaway behavior, often swimming fast in a zigzag direction to a greater extent than the other individuals observed in the region (Figure 1).

In 66.98% (n = 71) of the sightings, an individual (singleton) was sighted; in 18.87% (n = 20), pairs (including mother–calf pairs) were sighted; in 9.43% (n = 10), groups of three were sighted; in 2.83% (n = 3), groups of four were sighted; and in 1.89% (n = 2), groups of five were sighted. On six occasions, it was clearly possible to observe mothers accompanied with a calf. These mother–calf pairs were sighted once in the

Table 1. Number of individuals and sightings of Bryde's whales (*Balaenoptera brydei*) observed off the north coast of São Paulo, Brazil, from June 2004 to December 2019



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Individuals	1	0	1	5	7	11	3	4	21	15	4	4	30	23	21	13
Sightings	1	0	1	2	4	8	3	3	16	12	3	1	17	13	12	10

Table 2. Bryde's whale sighting records off the north coast of São Paulo, Brazil, by PROBAV (June 2004 to December 2019). In some records, it is possible to notice more than one individual counted but a smaller number cataloged. This is because in a sighting there may be one or more individuals, but it was not possible to identify all individuals, or their photos did not have high enough quality for photo-identification.

#	Date	Photo ID code	# individual(s)	Geographic coordinates
1	24 June 2004		1	23º 49.660' S, 45º 08.805' W
2	25 November 2006		1	23º 57.598' S, 45º 32.895' W
3	7 December 2007		1	23º 55.000' S, 45º 34.000' W
4	30 December 2007		4	23º 56.000' S, 45º 18.000' W
5	4 January 2008		3	23º 49.000' S, 45º 38.000' W
6	23 February 2008		2	23º 50.740' S, 45º 38.260' W
7	20 December 2008	BRY SP01	1	24º 22.010' S, 45º 43.040' W
8	27 December 2008		1	23º 56.494' S, 45º 31.376' W
9	14 January 2009		1	24º 05.443' S, 45º 42.047' W
10	18 January 2009		1	23º 50.538' S, 45º 12.310' W
11	30 January 2009		1	24º 00.941' S, 45º 31.110' W
12	8 February 2009		1	23º 52.509' S, 45º 37.642' W
13	21 February 2009	BRY SP02	4	23º 56.895' S, 45º 38.513' W
14	23 February 2009		1	23º 55.048' S, 45º 30.688' W
15	28 February 2009		1	23º 58.458' S, 45º 44.540' W
16	28 December 2009	BRY SP03	1	23º 55.571' S, 45º 27.925' W
17	15 January 2010		1	23º 52.869' S, 45º 33.549' W
18	13 March 2010		1	23º 49.426' S, 45º 11.315' W
19	30 October 2010		1	23º 53.107' S, 45º 28.271' W

20	18 December 2011		1	23º 32.918' S, 44º 58.683' W
21	21 December 2011		2	23º 47.655' S, 45º 12.352' W
22	28 December 2011		1	23º 58.901' S, 45º 19.671' W
23	6 January 2012		1	23º 49.067' S, 45º 48.315' W
24	12 January 2012		1	23º 48.660' S, 45º 46.731' W
25	25 January 2012		2	23º 54.299' S, 45º 31.703' W
26	5 April 2012		1	23º 47.056' S, 45º 12.298' W
27	14 April 2012		1	23º 55.067' S, 45º 39.452' W
28	14 April 2012		1	24º 02.691' S, 45º 39.752' W
29	21 April 2012		1	23º 49.548' S, 45º 33.817' W
30	21 July 2012		1	24º 03.017' S, 45º 41.000' W
31	10 September 2012	BRY SP04/BRY SP04A	3	23º 52.500' S, 45º 13.400' W
32	6 October 2012		1	24º 03.000' S, 45º 40.000' S
33	1 November 2012	BRY SP05/BRY SP06	2	23º 54.500' S, 45º 11.200' W
34	2 November 2012		1	24º 15.579' S, 45º 39.673' W
35	3 November 2012	BRY SP07	1	23º 43.037' S, 45º 12.096' W
36	19 November 2012		1	23º 49.580' S, 45º 12.600' W
37	29 December 2012		2	23º 50.843' S, 45º 09.960' W
38	31 December 2012	BRY SP08	1	23º 55.654' S, 45º 11.128' W
39	20 January 2013		1	23º 45.133' S, 45º 11.632' W
40	25 January 2013		1	23º 51.083' S, 45º 45.203' W
41	28 January 2013		1	23º 50.903' S, 45º 48.413' W
42	11 February 2013		1	23º 55.495' S, 45º 19.860' W
43	11 February 2013		3	23º 55.774' S, 45º 09.840' W
44	3 May 2013		1	23º 58.306' S, 45º 12.097' W
45	1 September 2013		1	23º 50.504' S, 45º 32.102' W
46	1 September 2013		1	23º 28.480' S, 45º 03.580' W
47	19 October 2013		1	23º 41.900' S, 45º 02.500' W
48	29 November 2013		1	23º 53.681' S, 45º 47.046' W
49	6 December 2013		2	23º 55.052' S, 45º 30.600' W
50	29 December 2013	BRY SP09	1	23º 46.000' S, 45º 13.000' W
51	7 February 2014	BRY SP10	1	23º 49.855' S, 45º 09.466' W
52	3 March 2014		1	23º 48.658' S, 45º 12.575' W
53	20 April 2014	BRY SP11	2	23º 46.570' S, 45º 12.410' W
54	1 January 2015	BRY SP12	4	23º 14.700' S, 44º 26.400' W
55	23 January 2016	BRY SP13	3	23º 49.707' S, 45º 11.513' W
56	1 April 2016	BRY SP14	3	23º 55.029' S, 45º 13.379' W
57	2 April 2016		1	23º 49.707' S, 45º 11.513 W
58	2 April 2016		1	23º 55.029' S, 45º 13.379' W
59	8 July 2016	BRY SP15	2	23º 43.787' S, 45º 14.176' W
60	9 July 2016		1	23º 47.153' S, 45º 09.890' W
61	9 July 2016	BRY SP15	1	23º 44.899' S, 45º 13.322' W
62	9 July 2016		1	23º 48.335' S, 45º 13.346' W
63	13 July 2016		1	23º 48.581' S, 45º 11.721' W
64	8 September 2016		1	23º 48.517' S, 45º 12.450' W
65	9 September 2016		1	23º 44.683' S, 45º 14.013' W
66	18 September 2016		2	23º 48.734' S, 45º 03.663' W
67	8 October 2016	BRY SP16	3	23º 46.721' S, 45º 11.897' W
68	15 October 2016	BRY SP17	2	23º 49.177' S, 45º 35.201' W
69	16 October 2016	BRY SP17	1	23º 50.793' S, 45º 32.999' W
70	12 November2016	BRY SP18/BRY SP19/BRY SP20/ BRY SP21/BRY SP21A	5	23º 48.488' S, 45º 13.117' W
71	11 December 2016		1	23º 56.297' S, 45º 05.945' W
72	19 June 2017	BRY SP22	1	23º 46.170' S, 45º 01.177' W

73	10 July 2017	BRY SP22	1	23º 52.445' S, 45º 12.583' W
74	25 July 2017		1	23º 53.263' S, 45º 13.623' W
75	26 August 2017	BRY SP13	1	23º 42.879' S, 45º 19.302' W
76	14 September 2017		2	23º 47.103' S, 45º 13.288' W
77	19 September 2017		1	23º 47.659' S, 45º 12.313' W
78	10 October 2017	BRY SP23	2	23º 50.890' S, 45º 42.950' W
79	23 November 2017	BRY SP24	3	23º 54.303' S, 45º 13.050' W
80	24 November 2017	BRY SP25	3	23º 55.316' S, 45º 12.564' W
81	25 November 2017	BRY SP24	3	23º.53.794' S, 45º 13.350' W
82	15 December 2017	BRY SP26	2	23º 56.038' S, 45º 27.064' W
83	16 December 2017	BRY SP13/BRY SP27	2	23º 50.437' S, 45º 13.277' W
84	16 December 2017	BRY SP28	1	23º 45.207' S, 45º 13.079' W
85	3 January 2018		1	23º 23.324' S, 44º 47.142' W
86	4 January 2018	BRY SP29/BRY SP30/BRY SP31	5	23º 27.108' S, 44º 50.072' W
87	14 January 2018	BRY SP32	1	23º 56.756' S, 45º 26.227' W
88	16 January 2018	BRY SP32	1	23º 48.243' S, 45º 36.740' W
89	25 January 2018	BRY SP32	2	23º 54.245' S, 45º 29.399' W
90	31 January 2018	BRY SP33/BRY SP34	3	23º 54.006' S, 45º 30.322' W
91	8 July 2018		1	23º 52.617' S, 45º 07.134' W
92	4 August 2018	BRY SP35	1	23º 53.050' S, 45º 14.617' W
93	11 November 2018	BRY SP22	1	23º 46.815' S, 45º 10.165' W
94	24 November 2018		1	23º 49.012' S, 45º 11.022' W
95	30 November 2018	BRY SP36	2	23º 48.250' S, 45º 04.459' W
96	20 December 2018	BRY SP37	2	23º 54.310' S, 45º 12.424' W
97	21 January 2019	BRY SP38/BRY SP39	2	23º 41.046' S, 45º 10.315' W
98	9 March 2019	BRY SP22	1	23º 44.215' S, 45º 09.470' W
99	12 October 2019		1	24º 0.002' S, 44º 40.893' W
100	25 October 2019	BRY SP40	2	23º 51.559' S, 45º 25.393' W
101	30 November 2019		1	23º 50.661' S, 45º 31.028' W
102	1 December 2019		2	23º 44.804' S, 45º 21.441' W
103	8 December 2019	BRY SP41	1	23º 50.358' S, 45º 07.041' W
104	8 December 2019		1	23º 53.721' S, 45º 15.086' W
105	8 December 2019	BRY SP42	1	23º 49.039' S, 45º 13.666' W
106	12 December 2019		1	23º 45.517' S, 45º 14.730' W

summer (30 December 2007), twice in the winter (10 September 2012 and 14 September 2017), and three times in the spring (12 November 2016, 23 November 2017, and 25 November 2017).

The most observed behaviors were travelling and milling, followed by foraging. On 16 occasions (15.09%), Bryde's whales were seen feeding on a school of small epipelagic fish (unidentified species). Some seabirds, such as frigatebirds (*Fregata magnificens*), brown booby (*Sula leucogaster*), kelp gull (*Larus dominicanus*), Cabot's tern (*Thalasseus acuflavidus*), South American tern (*Sterna hirundinacea*), and Manx shearwater (*Puffinus puffinus*), could always be noted in association with the whales during the feeding period.

During these 16 years of study, sightings were made during all seasons (Table 3): spring (35.85%), summer (35.85%), winter (18.87%), and autumn (9.43%).

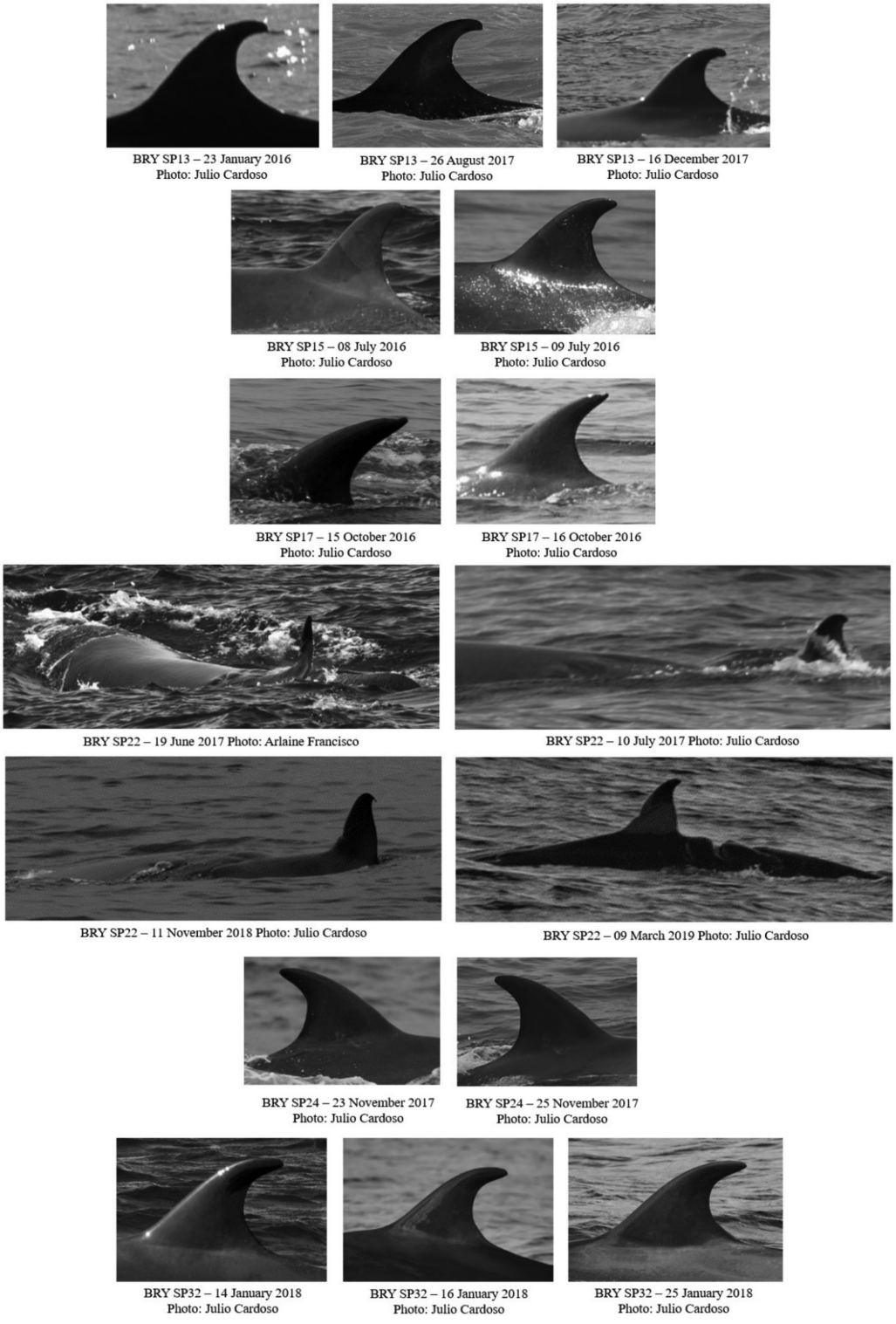


Figure 1. Resights of six Bryde's whales (*Balaenoptera brydei*) during the research period

Table 3. Sightings of Bryde's whales off the north coast of São Paulo, Brazil, per season, from June 2004 to December 2019

Year	Summer	Autumn	Winter	Spring
2004	--	--	1	--
2005	--	--	--	1
2006	--	--	--	1
2007	1	--	--	1
2008	3	--	--	--
2009	8	--	--	1
2010	2	--	--	2
2011	1	--	--	5
2012	5	4	2	3
2013	6	1	2	--
2014	2	1	--	--
2015	1	--	--	5
2016	1	3	8	7
2017	--	1	5	4
2018	6	--	2	8
2019	2	--	--	--
Total	38	10	20	38

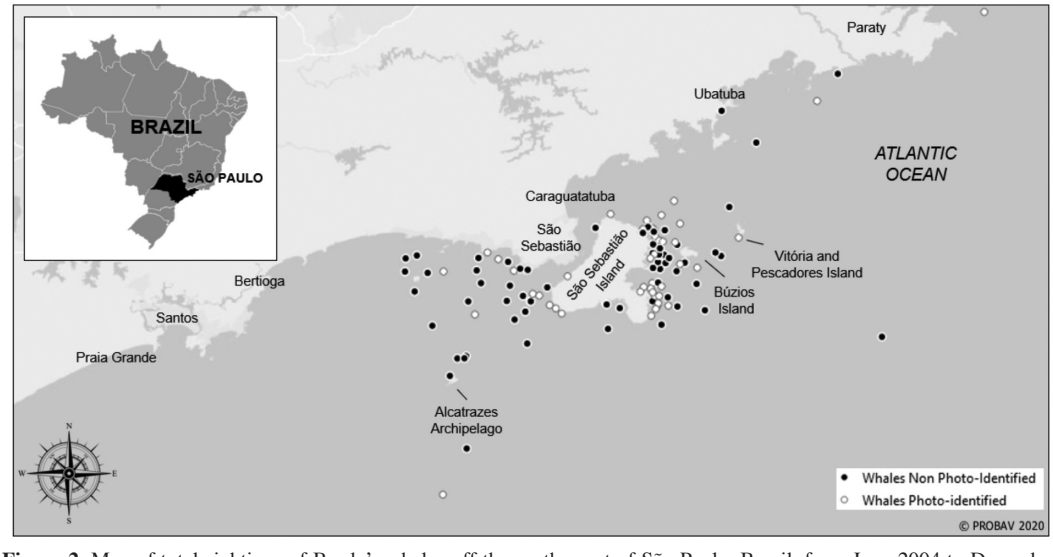


Figure 2. Map of total sightings of Bryde's whales off the north coast of São Paulo, Brazil, from June 2004 to December 2019 (n = 106)

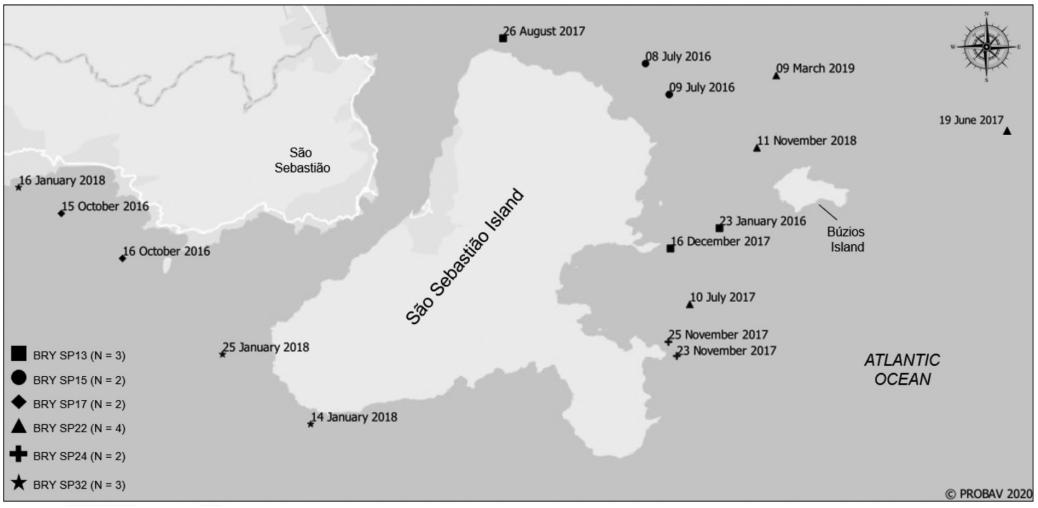


Figure 3. Map of six Bryde's whales resighted during the study off the north coast of São Paulo, Brazil

Discussion

This study presents the first published photo-identification catalog of Bryde's whales from the north coast of São Paulo, Brazil (see Appendix). Following the conclusions from previous field studies off the coast of southeastern Brazil (Carneiro, 2005; Figueiredo et al., 2014; Gonçalves et al., 2015; Lodi et al., 2015; Tardin et al., 2017; Maciel et al., 2018; Santos et al., 2019), our results suggest that Bryde's whales can remain year-round off the north coast of São Paulo in shallow waters, but most sightings were made during summer and spring. This concentration of sightings during austral spring–summer could be related to a combination of better sea conditions (and consequently sightability) and the period of epipelagic recruitment of schooling fishes in coastal waters. As such, the occurrence of Bryde's whales in these coastal waters seems to be for opportunistic feeding (Zerbini et al., 1997; Siciliano et al., 2004; Moura & Siciliano, 2012; Gonçalves et al., 2015) rather than for breeding since in different seasons of the year only 6% of the sightings were females in parental care with their calves. Related to this, travelling and milling behavior were the most common activities of Bryde's whales off the southeastern Brazilian coast, similar to the reports by Gonçalves et al. (2015) and Lodi et al. (2015). Moving in search of schooling fish may represent an important expenditure of energy for these highly vagile organisms, forcing them to disperse in a vast foraging ground. Santos et al. (2019) reported movements of several hundred nautical miles for some individual Bryde's whales along the coasts of São Paulo and Rio de Janeiro, which suggests that this species may need to constantly search for profitable feeding grounds.

During the study period, BRY SP13 was first photo-identified on 23 January 2016 (austral summer), was resighted on 26 August 2017 (winter), and was sighted a third time on 16 December 2017 (spring). On all three occasions, it was likely feeding on schooling fish. BRY SP22, Escondidinha, was sighted for the first time on 19 June 2017 (autumn), resighted for the second time 1 month later on 10 July 2017 (winter), was sighted a third time on 11 November 2018 (spring) and a fourth time on 9 March 2019 (summer), moving erratically in all sightings. These two resightings support the use of these waters in different years by the same individuals.

For the other four confirmed resightings, Bryde's whales were observed the day after the first sighting or on dates close to the first sighting suggesting that they found good feeding opportunities in the region. In most cases, the whales were likely feeding on epipelagic fish. BRY SP15 was sighted for the first time on 8 July 2016 (winter) and a second time on 9 July 2016 (winter). BRY SP17 was sighted for the first time on 15 October 2016 (spring) and was sighted milling on 16 October 2016 (spring). BRY SP24 was sighted on 23 November 2017 and on 25 November 2017 (spring) accompanied by a calf. BRY SP32 was sighted three times in the austral summer of 2018: 14 January 2018, 16 January 2018, and 25 January 2018. On all three occasions, it was seen feeding in association with brown booby and frigatebirds.

It is recommended that efforts to detect Bryde's whales in Brazilian waters farther along the continental slope and offshore will be necessary to compare biological and population parameters with the ones reported in this study. Periodic

updating of this Bryde's whale catalog may provide long-term information on population health and how it relates to the region's ecosystem, as well as allowing comparisons with other catalogs or photos from various regions to study whale distribution and movements patterns.

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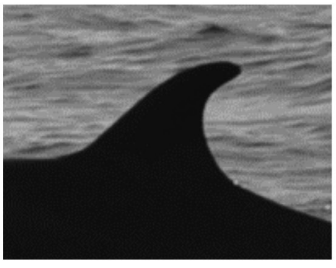
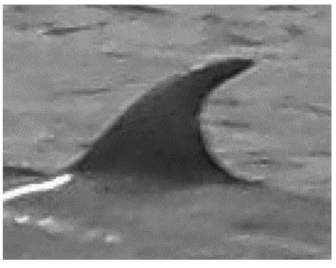
Appendix

Catalog of Bryde's Whales (*Balaenoptera brydei*) off the North Coast of São Paulo State, Brazil

BRY SP01 – 20 December 2008
Photo: Julio Cardoso



BRY SP02 – 21 February 2009
Photo: Julio Cardoso



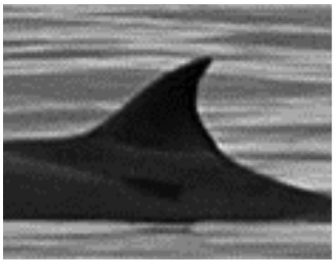
BRY SP03 – 28 December 2009
Photo: Julio Cardoso

BRY SP04 – 10 September 2012
Photo: Julio Cardoso

BRY SP04A – 10 September 2012
Photo: Julio Cardoso

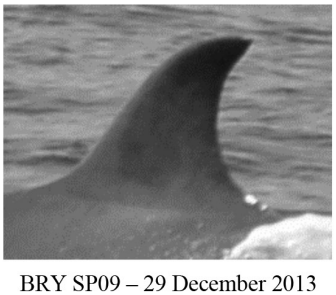
BRY SP05 – 01 November 2012
Photo: Julio Cardoso

BRY SP06 – 01 November 2012
Photo: Julio Cardoso



BRY SP07 – 03 November 2012
Photo: Leo Francini

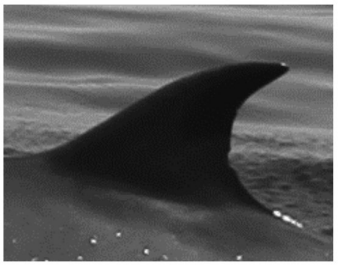
BRY SP08 – 31 December 2012
Photo: Julio Cardoso



BRY SP09 – 29 December 2013
Photo: Julio Cardoso

BRY SP10 – 07 February 2014
Photo: Julio Cardoso

BRY SP11 – 20 April 2014
Photo: Julio Cardoso



BRY SP12 – 01 January 2015
Photo: Adauto Martins

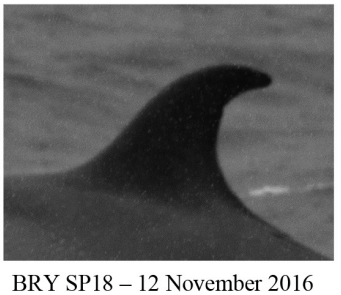
BRY SP13 – 26 August 2017
Photo: Julio Cardoso

BRY SP14 – 01 April 2016
Photo: Julio Cardoso

BRY SP15 – 09 July 2016
Photo: Julio Cardoso

BRY SP16 – 08 October 2016
Photo: Julio Cardoso

BRY SP17 – 15 October 2016
Photo: Julio Cardoso



BRY SP18 – 12 November 2016
Photo: Julio Cardoso

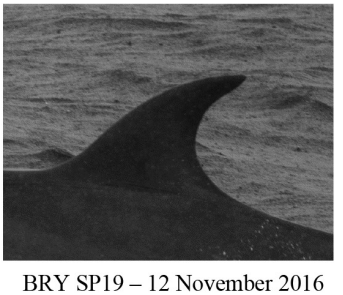


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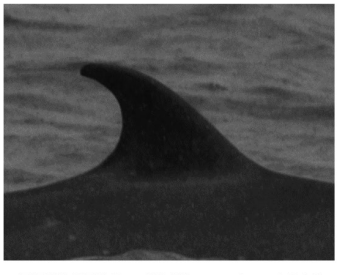
Photo: Julio Cardoso

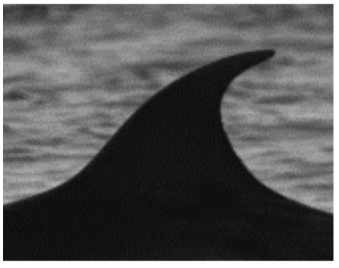


BRY SP20 – 12 November 2016
Photo: Julio Cardoso

BRY SP21 – 12 November 2016
Photo: Julio Cardoso

BRY SP21A – 12 November 2016
Photo: Julio Cardoso

BRY SP22 – 09 March 2019
Photo: Julio Cardoso



BRY SP23 – 10 October 2017
Photo: Julio Cardoso

BRY SP24 – 23 November 2017
Photo: Julio Cardoso

BRY SP25 – 24 November 2017
Photo: Julio Cardoso

BRY SP26 – 15 December 2017
Photo: Julio Cardoso

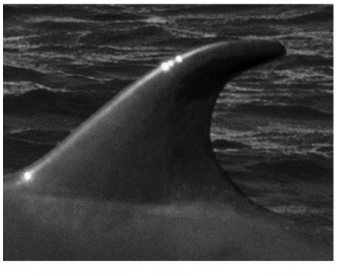
BRY SP27 – 16 December 2017
Photo: Julio Cardoso

BRY SP28 – 16 December 2017
Photo: Julio Cardoso

BRY SP29 – 04 January 2018
Photo: Julio Cardoso

BRY SP30 – 04 January 2018
Photo: Julio Cardoso

BRY SP31 – 04 January 2018
Photo: Julio Cardoso



BRY SP32 – 14 January 2018
Photo: Julio Cardoso

BRY SP33 – 31 January 2018
Photo: Arlaine Francisco

BRY SP34 – 31 January 2018
Photo: Julio Cardoso

BRY SP35 – 04 August 2018
Photo: Julio Cardoso

BRY SP36 – 30 November 2018
Photo: Julio Cardoso

BRY SP37 – 20 December 2018
Photo: Julio Cardoso

BRY SP38 – 21 January 2019
Photo: Julio Cardoso

BRY SP39 – 21 January 2019
Photo: Julio Cardoso

BRY SP40 – 25 October 2019
Photo: Arlaine Francisco

BRY SP41 – 08 December 2019
Photo: Julio Cardoso

BRY SP42 – 08 December 2019
Photo: Julio Cardoso