

## Large baleen whales on the coast of Brazil: a review of post-1997 data on strandings and sightings

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### Abstract

Brazilian whaling data indicates the capture of about 4,700 sei/Bryde's and 87 fin whales along five decades. During the same period only three blue whales were caught. Data on strandings and sightings of baleen whales on the coast of Brazil up to 1997 were summarized by Zerbini *et al.* (1997). Over the last three decades there was a remarkable increase in the amount of information on some coastal migrating whales (e.g. humpback and southern right), as well as other coastal dwelling species (dwarf minke and Bryde's whales). Nevertheless, information on the presence of large baleen whales migrating along the Brazilian coast is still scanty. A noticeable increase in monitoring efforts of long stretches of coastline could have resulted in the first stranding records of fin and sei whales for the northern Brazilian coast. In addition, monitoring efforts on board of research vessels has produced a considerable amount of new information. This poses new concern on the origin of these whales and the complexity of the migration patterns of such species in the Western South Atlantic Ocean.

### Introduction

Brazilian whaling data indicates the capture of about 4,700 sei/Bryde's and 87 fin whales along five decades. During the same period only three blue whales were caught: two off Costinha and one off Cabo Frio. Data on strandings and sightings of baleen whales on the coast of Brazil up to 1997 were summarized by Zerbini *et al.* (1997). Captures of fin (n=84) were more frequent off Cabo Frio than Costinha where only three were landed. Sei/Bryde's were not distinguished in the catch statistics prior to 1967. It is mentioned that at least 90% of the catches were represented by *B. borealis* (Zerbini *et al.* 1997).

Over the last three decades there was a remarkable increase in the amount of information on some coastal migrating whales (e.g. humpback and southern right), as well as other coastal dwelling species (dwarf minke and Bryde's whales). Nevertheless, information on the presence

of large baleen whales migrating along the Brazilian coast is still scanty. A noticeable increase in monitoring efforts of long stretches of coastline could have resulted in the first stranding records of fin and sei whales for the northern Brazilian coast. In addition, monitoring efforts on board of research vessels has produced a considerable amount of new information. This poses new concern on the origin of these whales and the complexity of the migration patterns of such species in the Western South Atlantic Ocean

## Results

Strandings and sighting records of large baleen whales along the Brazilian coast are showed in Figure 1 and listed in Table 1. Details on stranding and sighting events are given below.

### Blue whales

#### Strandings

A 23.12m female stranded alive in Chuí, southern Rio Grande do Sul, in 29 April 1992 (Dalla Rosa and Secchi, 1997) represents the only confirmed record of a blue whale along the Brazilian coast (Zerbini et al. 1997) (Figures 2a,b,c). A few baleen plates of this particular specimen are in exhibition at CECLIMAR/UFRGS, in Imbé, Rio Grande do Sul (as GEMARS 0021) (Fig. 3). Another specimen, cited in Pinedo *et al.* (1992) is represented by a mandible. Although the complete skeleton of the Chuí specimen was recovered just after the stranding (Dalla Rosa and Secchi, 1997) and was in exhibition in front of Museu Oceanográfico de Rio Grande (MORG) for more than a decade, it is now in weathered condition. In addition to this previous report, other possible stranding of a blue whale was informed by Siciliano et al. (2008) based on a very large whale stranded on the coast of Pará, northern Brazil, in the 1990's. Examination of vertebrae and ribs in exhibition in the town of Soure gives the idea of the proportion of this specimen (Figure 4a,b).

### Fin whales

#### Strandings

Only two stranding records of fin whales have been recorded in Brazil up to 1997 (Zerbini et al. 1997). More recently, four other stranding records of fin whales were confirmed along the Brazilian coast (Table 1). All recent records were of juvenile specimens, ranging from 7.5m to 14.90m, two of them stranded alive. We report on the first record of a fin whale for the northern Brazilian coast. GEMAM staff conducted a necropsy on the stranding site, specifically in Pirabas river estuary (00°52'14" S, 047° 04' 49" W). Fisherman and residents of Boa Vista Village and surroundings, affirm to have sighted the specimen still alive getting into the estuary by January 17, 2010. Technicians of ICMBio, DEMA, the fire department and researchers of GEMAM conducted short surveys in the area to locate the live stranded whale. Unfortunately the operation did not succeed due to the estuary geographic characteristics. Late afternoon in January 21, 2010, the carcass was found dead stranded in the location known as Cabeceira do Bambá, at Barra do Japerica, Pirabas municipality. The TL 14.90m male specimen had a large callosity on the top of the head and a scar from a cut on the caudal fin. The nearly complete skeleton is deposited in the mammal collection of Museu Paraense Emílio Goeldi (MPEG 39690). We also report on the stranding of a 13.6 male on the coast of Rio Grande do Sul, and an additional record is provided by Corrêa *et al.* (2010) for Santa Catarina. The skull of specimen G0826 is in exhibition at CECLIMAR/UFRGS, in Imbé, but is now in weathered condition (Figure 6a,b,c,d,e).

#### Sightings

A six year observation effort of cetaceans off the Brazilian coast provided eight new sightings of fin whales off the southeastern Brazilian coast (Ramos *et al.* 2010). Sightings were all made in deeper waters, from 500 to 2,000m in depth.

## Sei whales

### Strandings

Although sei whales were once abundant off Brazil, reported strandings have been rare (Zerbini et al. 1997). Including the present data, only four strandings were attributed to this species to date on the Brazilian coast (Zerbini et al. 1997). A fifth specimen is represented by an incomplete skull recovered during trawling operations in southern Brazil. On 13 September 2008 a 10.32m female sei whale stranded alive on the north-east coast of Pará, northern Brazil. The dark whale body had patches of lighter gray and both sides of head were evenly dark, the head was slightly arched, throat grooves ended just behind flippers and baleen plates were grey-black and had a metallic sheen with plates near front of mouth lighter in colour (Figure 7a,b,c,d,e,g,h,i). All these features confirm the identity of this specimen as a sei whale, the first record for the northern Brazilian coast. After unsuccessful trials of pushing it back to the sea, the whale died on 20 September. The necropsy revealed a large amount of mud in the stomach, probably originated from the mangrove nearby the stranding site and unidentified parasites in the digestive tract.

### Sightings

Confirmed sightings of sei whales along the Brazilian coast are rare. Andriolo *et al.* (2010) reported two single sightings during a 5 year survey for minke whales off north-east Brazil. Ramos *et al.* (2010) provided new sightings of sei whales off southeastern Brazilian coast.

## Discussion

As pointed out by Zerbini et al. (1997), the highly migratory balaenopterids (blue, fin, sei and minke whales) were recorded as far north as 5°S in the whaling grounds off the north-eastern coast of Brazil, but none were so far observed along the northern coast. We here reported on the first strandings of fin, sei and a possible blue or fin whale on the northern Brazilian coast. The origin of such whales could be the southern hemisphere feeding grounds (off South Georgia?) but a possible origin from the Caribbean could be considered as well. Romero *et al.* (2001) reported on fin and sei whale strandings on the coast of Venezuela. Sei whales were recorded in February, July and September. The specimen reported on the coast of Pará, Brazil, is also from September. Migrating balaenopterids peak in numbers off the Brazilian coast during late austral winter and early spring (*i.e.* September and October). The data available from sei whale strandings and sightings probably suggests an expected pattern of baleen whale presence in a wintering ground in lower latitudes. But the possibility of a northern hemisphere origin could be considered as well.

The fin whale data probably indicate a distinct use of Brazilian waters. Sightings were conducted from January to July although strandings were more common in the austral winter. Nevertheless, the stranding on the coast of Sergipe was recorded in February and the one in Pará, near the Equator, in February. A possible origin of such specimen as a northern hemisphere migrant is a matter of great concern.

Data on blue whales confirm a previous indication of their rarity off the Brazilian coast. Using a sighting index, da Rocha (1983) and Branch (2007) have pointed out the lowest sighting rate known for the species (0.003 groups/1,000 km; only three sightings during 46,273 h/effort). In addition, an increase in observation effort off the Brazilian coast in the last decade did not provide any new sighting of blue whales (e.g. Zerbini *et al.*, 2004; Andriolo *et al.*, 2010; Ramos *et al.*, 2010; Tavares *et al.*, 2010). It is also worth to mention that Romero *et al.* (2001) did not cite the blue whale in their compilation of cetaceans of Venezuela.

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Table 1: Strandings and sightings of large baleen whales along the coast of Brazil

Strandings	Coordinates	Date of stranding	Field/Museum number	TL (m)	Gender	Specimen data	Source
<b><i>Balaenoptera musculus</i></b>							
Chui, RS	33°45'S, 53°22'W	29 Apr. 1992	MORG 0088	23.12	F	Stranded alive; weathered skeleton	Dalla Rosa and Secchi, 1997; Zerbini et al., 1997
Albardão, 130km S, Rio Grande, RS	32°07'S, 52°05'W		MORG 0003			mandible	Pinedo et al., 1992
<b><i>Balaenoptera physalus</i></b>							
Perube, SP	24°20'S, 47°01'W	08 Sep. 1941	MIPS in exhibition	20			Zerbini et al., 1997; Santos et al., 2010
Praia de Guarajuba, Camaçari, BA	12°41'S, 38°06'W	12 Aug. 1991		11.1		Stranded dead, in decomposition	Zerbini et al., 1997
Praia de Mariluz, Imbé, RS	29°55'S, 50°05'W	13 Jun. 2002	G0826	13.6	M	Stranded dead, fresh	Present study
Jaguaruna, SC	28°36'S, 49°01'W	29 Ago. 2003		9.2	F	Stranded dead, fresh	<a href="http://www.agirazu.com.br/fsn4/_fsm/000001ea.htm">http://www.agirazu.com.br/fsn4/_fsm/000001ea.htm</a>
Praia de Mosqueiro, Aracaju, SE	10°90'S, 37°07'W	25 Feb. 2009		7.5	F	Live stranding, emaciated	Correa et al. 2010
Pirabas river estuary, Pirabas PA	00°52'14"S, 47°04'49"W	17 Jan. 2010	MPEG 39690	14.9	M	Live stranding, emaciated	Present study
<b>Sightings</b>							
	Coordinates	Date of sighting	Research vessel/Field number	Group size	Effort	Depth	Source
<b><i>Balaenoptera physalus</i></b>							
BS-400 Santos	24°18,8'S, 44°11,8'W	10 Apr. 2002	R. Explorer/C080	1	on effort	100-500	Ramos et al., 2010
BS-400 Santos	24°47,6'S, 43°53,4'W	20 May,2002	Sanco Sea/C103	1	off effort	1,500-2,000	Ramos et al., 2010
BM-S-12 Santos	21°17'S, 47°05'W	29 Jan.2004	R. Viking/C621	1	on effort	200-500	Ramos et al., 2010
BM-S-39 Santos	26°01,47'S, 46°37,70'W	01 Mar.2004	R. Viking/C645	2	on effort	100-200	Ramos et al., 2010
BM-CAL-40 Camamu/Almada	13°20,05'S, 38°45,90'W	16 Apr. 2004	R. Viking/C698	1	on effort	500	Ramos et al., 2010
Marinhá/Campus	22°40,29'S, 40°29,75'W	24 May. 2005	Falcon/C780	1	on effort	500-1,000	Ramos et al., 2010
BM-S-4 Santos	24°11,98'S, 43°05,11'W	04 Jul. 2006	R. Challenger/C1052	2	on effort	718	Ramos et al., 2010
BM-S-4 Santos	24°19,02'S, 43°31,67'W	24 Jul. 2006	R. Challenger/C1078	3	on effort	621	Ramos et al., 2010
<b><i>Balaenoptera borealis</i></b>							
80 miles off PE, NE Brazil	08°28'S, 33°40'W	Aug. 2000	NF 'Alte Graça Aranha'	1	off effort	3200	Andriolo et al., 2010
100 miles off PE, NE Brazil	08°41'S, 33°17'W	Aug. 2000	NF 'Alte Graça Aranha'	1	on effort	4100	Andriolo et al., 2010
BS-400 Santos	24°24,6'S, 44°00,8'W	27 May. 2002	Sanco Sea / C111	3	off effort	500	Andriolo et al., 2010

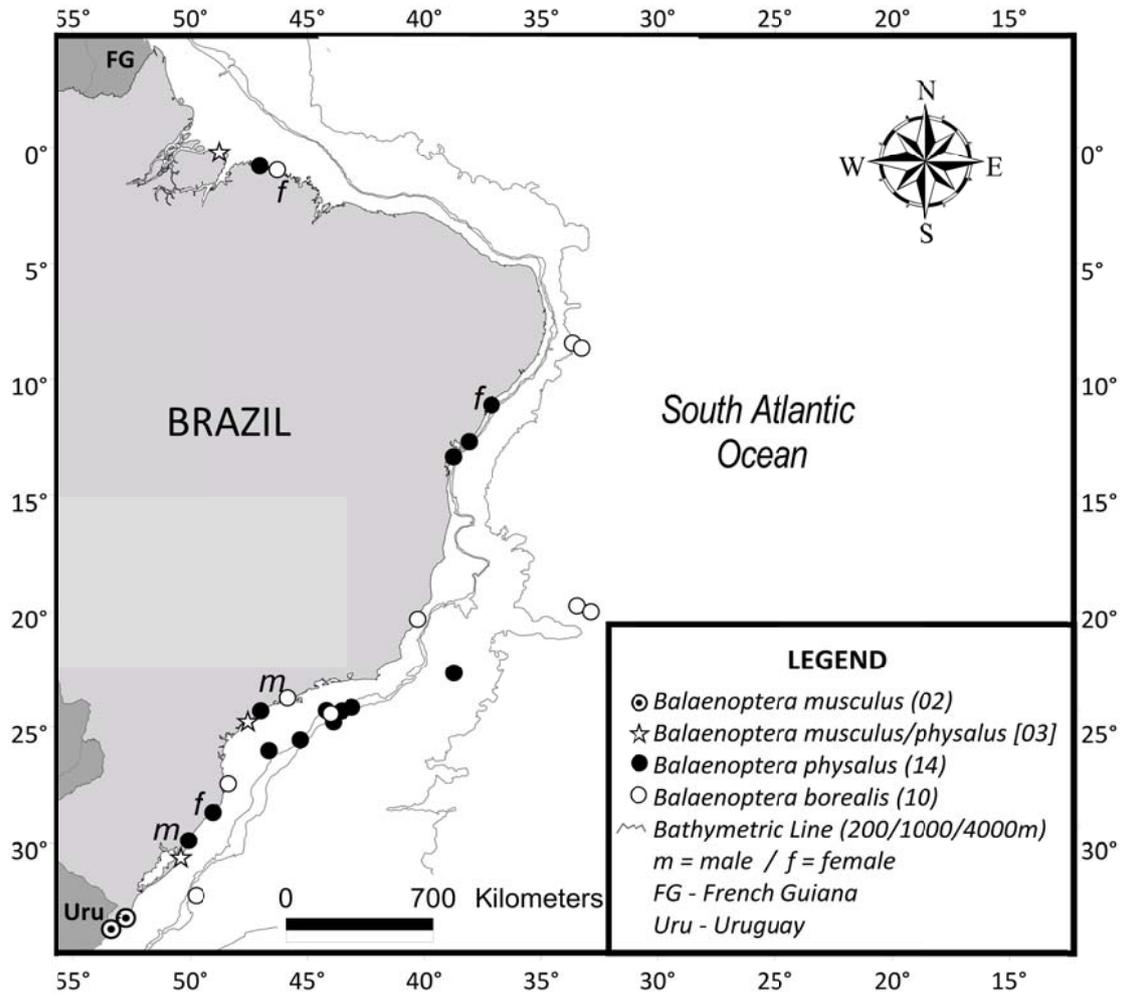


Fig 1: Locations of post-1997 strandings and sightings of large baleen whales along the coast of Brazil.

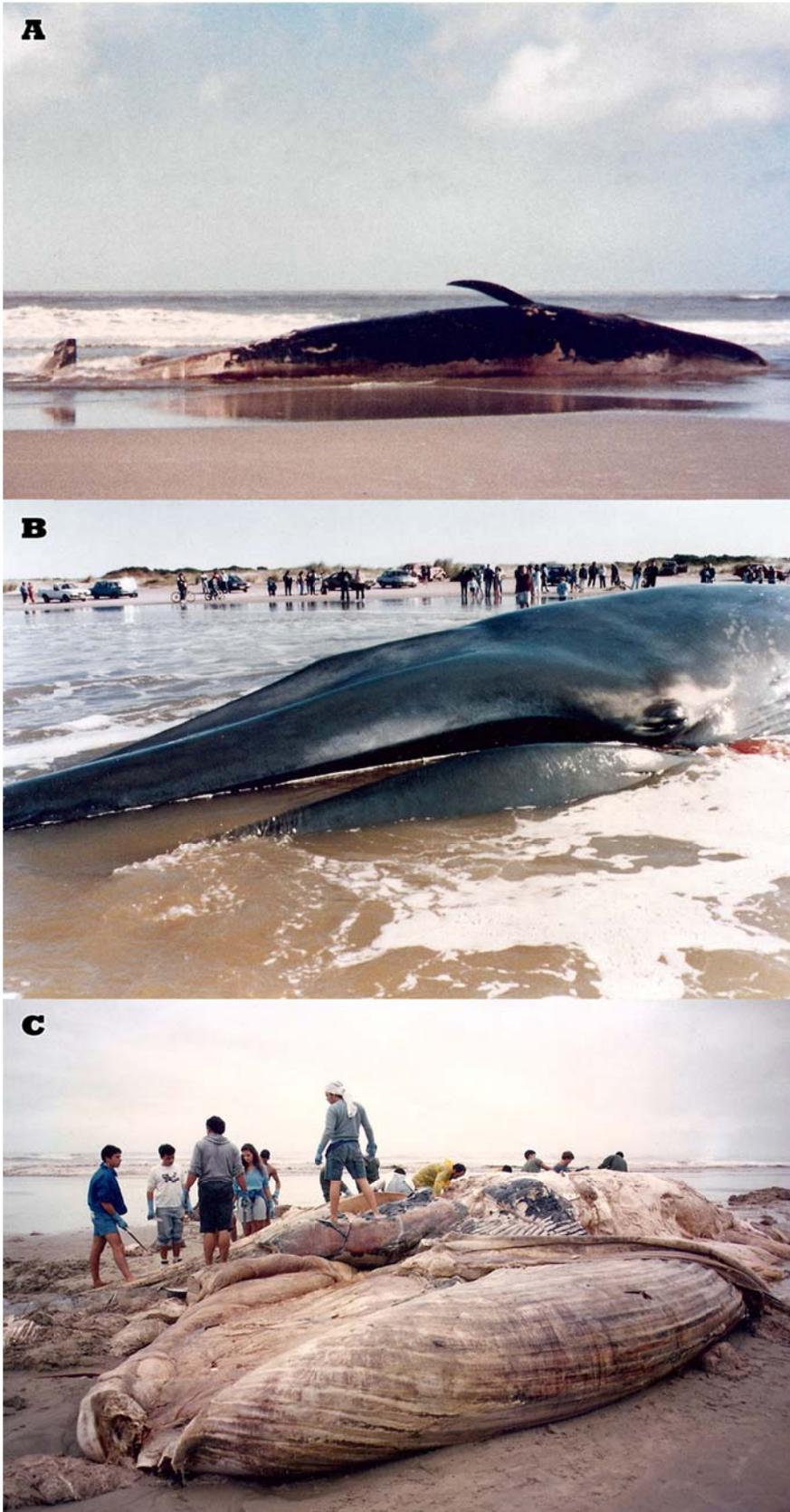


Fig 2 (a,b,c): Blue whale stranded on Chuí, Brazil, near the border of Uruguay in 29 April 1992. It was a 23.12m female (MORG 0088) reported by Dalla Rosa and Secchi (1997) and Zerbini *et al.*, (1997). Photos by GEMARS.



Fig. 3. Baleen plate of specimen MORG 0088 (also GEMARS 0021), 23.12 female blue whale stranded on Chuí, southern Brazil in 29 April 1992. Photo by Rodrigo Machado (GEMARS/UNISINOS).



Fig 4 (a,b): Vertebrae of a very large baleen whale (*Balaenoptera musculus/physalus*) stranded on the North coast of Brazil, cited in Siciliano *et al.* (2008). It is in exhibition, as well as some ribs, in Soure, Marajó, Is., Pará, Brazil. Photo by A.L.F. Rodrigues (GEMAM)



Fig 5. Stranded fin whale (*Balaenoptera physalus*) on the coast of Pará, Brazil in January 21, 2010. (a) carcass lying on low tide on mudflat; (b) details of baleen plates; (c) dorsal fin; (d) callosity on the top of the head and (e) right side of the specimen, note coloration. Photos by GEMAM/MPEG.



Fig 6: Stranded fin whale (*Balaenoptera physalus*) on the coast of Rio Grande do Sul, southern Brazil, on 13 June 2002. (a) details of the head showing typical coloration; (b) detail of the peduncle and dorsal fin; (c) skull in exhibition at CECLIMAR/UFRGS, Imbé, Rio Grande do Sul; (d) details of the same skull in weathered condition in April, 2011 and (e) details of the left mandible and skull in weathered condition in April, 2011. Photos by Paulo H. Ott (GEMARS) and Salvatore Siciliano.



Fig 7: Stranded sei whale (*Balaenoptera borealis*) on the coast of Viseu, Pará, Brazil, in 13 September 2008. (a) Carcass on the burying place, note dark body with patches of lighter gray; (b) the baleen plates; (c) detail of the head, note lightly arched head typical of *B. borealis*; (d) necropsy on site; (e) dorsal fin; (f) details of the ventral grooves; (g) details of the baleen, note baleen plates grey-black with metallic sheen; plates near front of mouth may be lighter in colour; (h) detail of the head, note both sides of head evenly dark; (i) necropsy on site.



Fig 8: Fin whale sighted off Southeastern coast of Brazil, at 24°11,98'S, 43°05,11', on 04 July, 2006.



Fig 9: Fin whale sighted off Southeastern coast of Brazil (Santos Basin), at 24°19,02'S, 43°31,67'W on 24 July 2006.