



Recurrent sightings of a Southern elephant seal (*Mirounga leonina*) on the southeast coast of Brazil, 2012 – 2017

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Southern elephant seals (*Mirounga leonina*) have a circumpolar distribution in the Southern Ocean. Their breeding sites are scattered on sub-Antarctic islands, and their dispersal movements between breeding/moulting and feeding areas can span over several thousand kilometers (Hindell and McMahon, 2000; Campagna *et al.*, 2007). In South America, the species breeds at Península Valdéz (Argentina) and at the Malvinas/Falkland Islands, and vagrant individuals have been occasionally recorded in Brazil, Chile, Peru and Uruguay (Ling and Bryden, 1992; Sepúlveda *et al.*, 2007; Daneri, 2009; Moura *et al.*, 2010). There are records of vagrant elephant seals at the Galápagos Islands and in continental Ecuador, however in those cases it is not clear whether those were Northern (*Mirounga angustirostris*) or Southern elephant seals (Alava and Carvajal, 2005; Lewis *et al.*, 2006).

In Brazil, Southern elephant seals have been reported at Fernando de Noronha Archipelago and on the coast of Bahia, Espírito Santo, Rio de Janeiro, Santa Catarina, Paraná and Rio Grande do Sul states (Pinedo, 1990; Moura *et al.*, 2010). At Espírito Santo state, the only known records of Southern elephant seals are from July 2005 and June and August 2006, and are suspected to correspond to a single individual (Mayorga *et al.*, 2015).

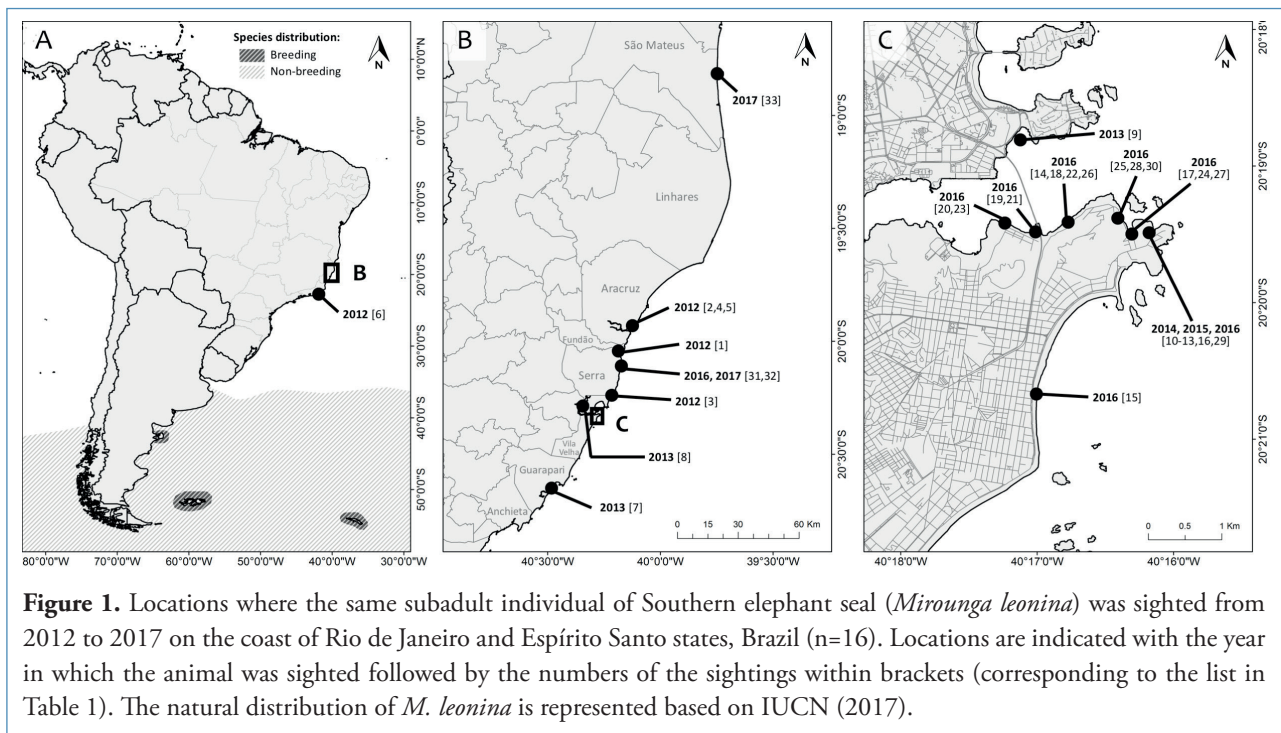
In this study, we report six years of consecutive observations of a subadult Southern elephant seal along the coast of Espírito Santo state, Brazil (Figure 1). The studied individual was first recorded in August 2012, and was later identified as the same individual based on its unique pattern of scars on its lower back, presumably caused by cookie-cutter shark (*Isistius* sp.) bites (Figure 2A). It was identified

as a subadult male based on the presence of a small proboscis and body length of approximately 3.5 meters.

Table 1 provides details on the locations and dates in which the study specimen was seen. It should be noted that there is an unconfirmed record of a subadult male elephant seal at Praia de João Fernandes (Búzios, RJ) in 2012¹; however, because there are no photographs of this record we were not able to evaluate whether this was the same individual. Furthermore, we should note that the Southern elephant seal recorded in June 2009 at Abrolhos Archipelago, Bahia (Buloto and Mayorga, 2015), had a clearly distinct size and complexion and did not present the pattern of scars that was unique to the individual in this study (L.F.S.P. Mayorga, pers. obs.).

In April 2015 a small open wound was seen on the lower back of the elephant seal in this study. The lesion was round and relatively deep (approximately 10 x 10 x 5cm), reaching subcutaneous tissue and with minor bleeding/exudation (Figure 3B). Based on its size and shape, we speculate it was caused by cookie-cutter shark bites. A sterile swab was used to sample the internal area of the lesion (SISBIO permit 34510); the swab was stored in Stuart's medium and transported to the laboratory on the same day. *Escherichia coli* (Ec), *Klebsiella pneumoniae* (Kp) and *Providencia stuartii* (Ps) were isolated using routine methods of bacterial culture and identification (Brain Heart Infusion followed by Blood and MacConkey agars) (Nogueira and Miguel, 2010).

¹Araújo, P.R. (2012) Elefante-marinho vira atração para turistas em Búzios. *Jornal O Globo*. Available at <https://oglobo.globo.com/rio/elefante-marinho-vira-atracao-para-turistas-em-buzios-6647796>. Consulted on 29 July 2017



Resistance to the following antimicrobials was identified (disk-diffusion method in Müller Hinton agar): Doxycycline (Ec), Metronidazole (Ec, Kb, Ps), Penicillin (Ec, Kb, Ps), Tetracycline (Ec), Cephalexin (Ec, Kb, Ps), Ampicillin (Ps), Amoxicillin (Ps), Amikacin (Ec). None of the strains were resistant to Enrofloxacin or Ceftiofur.

In August 2015 this lesion was completely healed; however, a depression was visible on the fur covering the scar (Figure 3A), with a barnacle attached to the scar tissue (Figure 3B). A large number of barnacles (approximately 50 individuals) were seen attached to the fur of other body regions, especially on the pelvic limbs and lower back (Figure 3C). We collected 12 barnacles from different body areas, and identified all of them as Eared barnacles (*Conchoderma aurita*) (Darwin, 1851), with capitulum length ranging from 9.0 to 29.1mm (Figure 3B). This barnacle species is cosmopolitan and has been previously reported as epibionts on Southern elephant seals (Best, 1971; Magalhães *et al.*, 2003). Additionally, a sample of feces was obtained and analyzed through simple flotation in saturated solution of sodium chloride (Foreyt, 2001), revealing helminth eggs compatible with *Contracaecum* sp. (Figure 3D).

There are relatively few sandy beaches along the southern coast of Espírito Santos that are not densely populated and/or subject to intense tourism. In 2012 and 2013, large numbers of visitors attended to see the elephant seal at the beaches where it hauled-out, which may have discouraged it from returning. In 2014 and 2015, the elephant seal consistently returned to Praia Secreta de Vila Velha (“Vila Velha’s Secret Beach”), a small and isolated beach with limited disturbance by humans and dogs (Figure 2B). Despite being relatively isolated, it is worth noting that Praia Secreta de Vila Velha is

not a pristine environment, but it is often covered by litter (in some cases, the seal was seen biting PET bottles). In September 2014 a rotting dog carcass was beach-cast a few meters away from the area occupied by the seal. In January 2016, however, the elephant seal begun once again hauling-out at different locations, some of which were densely populated (Figures 2C and 2E); in these circumstances, the seal was clearly distressed and would occasionally act aggressively towards the local population. In February 2016, the seal begun attacking small vessels at Praia do Ribeiro (Figure 2D). When it returned in December 2016, the seal was visibly debilitated; unlike in previous sightings, it was in extremely poor body condition and had a number of wounds on its back (Figure 2F). The seal was monitored in the following weeks but did not show signs of improvement and the decision was made by local authorities, in cooperation with local NGOs, to capture it for rehabilitation in 25 January 2017.

The reasons that lead the studied elephant seal to haul-out to the Espírito Santo coast in consecutive springs/summers are unclear. Most records of vagrant Southern elephant seals correspond to immature males (Lewis *et al.*, 2006; Moura *et al.*, 2010), and individuals found along the Atlantic coast of South America are thought to be predominantly related to dispersion of individuals from the Península Valdéz colony (Lewis *et al.*, 2006). Two hypotheses have been proposed to explain the occurrence of vagrant Southern elephant seals in north-central Chile during spring/summer: (a) the elephant seals seek isolated and calm areas where they can rest and moult, and (b) upwelling events in these areas provide abundant food for these elephant seals (Sepúlveda *et al.*, 2007). In Brazil, Rio de Janeiro state stands out in having the highest number of records of vagrant Southern elephant

Table 1. Sightings of a subadult Southern elephant seal (*Mirounga leonina*) on the coast of Espírito Santo (except as noted), Brazil.

Sighting	Date	Location (municipality, state)
1	12 Aug 2012	Praia Grande (Fundão) ²
2	12 Sep 2012	Praia dos Padres (Aracruz) ²
3	16 Sep 2012	Praia Mole (Serra) ²
4	26 Oct 2012	Praia dos Padres (Aracruz) ²
5	27 Oct 2012	Praia dos Padres (Aracruz) ²
6	06 Nov 2012	Praia Azeda (Búzios) ²
7	04 Dec 2013	Praia do Morro (Guarapari)
8	12 Dec 2013	Bairro Grande Vitória (Vitória)
9	13 Dec 2013	Ilha do Boi (Vitória)
10	8-12 Jul 2014	Praia Secreta de Vila Velha (Vila Velha)
11	16-21 Sep 2014	Praia Secreta de Vila Velha (Vila Velha)
12	26 Apr-03 May 2015	Praia Secreta de Vila Velha (Vila Velha)
13	22-29 Aug 2015	Praia Secreta de Vila Velha (Vila Velha)
14	15-22 Jan 2016	Morro do Moreno (Vila Velha)
15	22 Jan 2016	Praia da Costa (Vila Velha)
16	22 Jan 2016	Praia Secreta de Vila Velha (Vila Velha)
17	23 Jan 2016	Praia do Ribeiro (Vila Velha)
18	24-28 Jan 2016	Morro do Moreno (Vila Velha)
19	28 Jan 2016	Canal Bigossi (Vila Velha)
20	29 Jan 2016	38th Infantry Battalion (Vila Velha)
21	30 Jan 2016	Canal Bigossi (Vila Velha)
22	31 Jan-02 Feb 2016	Morro do Moreno (Vila Velha)
23	03 Feb 2016	38th Infantry Battalion (Vila Velha)
24	07 Feb 2016	Praia do Ribeiro (Vila Velha)
25	10 Feb 2016	Praia do Bananal (Vila Velha)
26	11 Feb 2016	Morro do Moreno (Vila Velha)
27	12-18 Feb 2016	Praia do Ribeiro (Vila Velha)
28	18 Apr 2016	Praia do Bananal (Vila Velha)
29	19 Apr 2016	Praia Secreta de Vila Velha (Vila Velha)
30	20-25 Apr 2016	Praia do Bananal (Vila Velha)
31	31 Dec 2016	Praia de Capuba (Serra)
32	1-7 Jan 2017	Praia de Capuba (Serra)
33	22-25 Jan 2017	Praia de Campo Grande (São Mateus)

²Petrobras (2014) Petróleo Brasileiro S/A. Projeto de Monitoramento de Praias Bacia de Campos e Espírito Santo. 3º Relatório Anual. Processo Administrativo Nº 02022.001407/2010 CGPEG/DILIC/IBAMA. Volume Único. 250pp.

seals (Moura *et al.*, 2010); this coincides with the existence of the Cabo Frio upwelling system off the coast of Rio de Janeiro, an area of unusually high biological productivity on the Brazilian coast (Valentin, 2001). It is therefore plausible that the studied elephant seal had been foraging at the Cabo Frio upwelling region and sought the more sparsely-populated coast of Espírito Santo to rest.

Whatever the reasons that led the seal to consistently return to the beaches of Espírito Santo may be, this case illustrates the challenges that arise when vagrant marine mammals from remote subpolar areas come to human-populated tropical areas. The studied seal, which came to be nicknamed “Fred” by the local population, became a recurrent celebrity in local news, leading tens to hundreds of people to visit it whenever it hauled-out. While this could arguably have had positive effects in terms of environmental education and public concern for the state of the coastal and marine environment, these interactions also led to considerable distress to the seal. There were instances where people would approach excessively and try to touch the animal, take “selfies” or throw objects at it to elicit a reaction, leading to situations where there was significant risk to the safety of humans and the seal. Tensions escalated when the animal attacked boats in February 2016, leading some fishermen to threaten hurting it if it would approach their vessels. The seal was captured in early 2017 due to a marked decrease in its body condition; it is possible this was related to changes in food abundance as a result of the very strong El Niño of 2015-2016³.

In conclusion, remote areas where vagrant pinnipeds can haul-out without being disturbed are becoming increasingly scarce along the Brazilian coast (and elsewhere). The implementation of procedures to isolate areas where vagrant pinnipeds haul-out to allow them to rest without disturbance by humans and dogs would therefore be a valuable strategy to ensure the protection and welfare of these animals in densely-inhabited coastal areas.

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³Null, J. (2017) El Niño and La Niña years and intensities. Available at <http://ggweather.com/enso/oni.htm>. Consulted on 31 July 2017.



Figure 2. Photographic record of a subadult male Southern elephant seal (*Mirounga leonina*) on the coast of Espírito Santo, Brazil. Legend: (A) unique pattern of scars used to identify the individual (September 2014); (B) elephant seal resting at Praia Secreta de Vila Velha (August 2015); (C) local population gathering around the elephant seal at the densely-populated Praia da Costa (January 2016); (D) elephant seal attacking a fishing boat at Praia do Ribeiro (February 2016); (E) local population and policeman attempt to improvise a blockade to prevent the elephant seal from entering an urban area at Praia do Ribeiro (January 2016); (F) elephant seal in poor body condition at Praia de Capuba (January 2017). Photo credits: (A-C, E, F) Luis Felipe S.P. Mayorga, (D) Victor Barbosa.

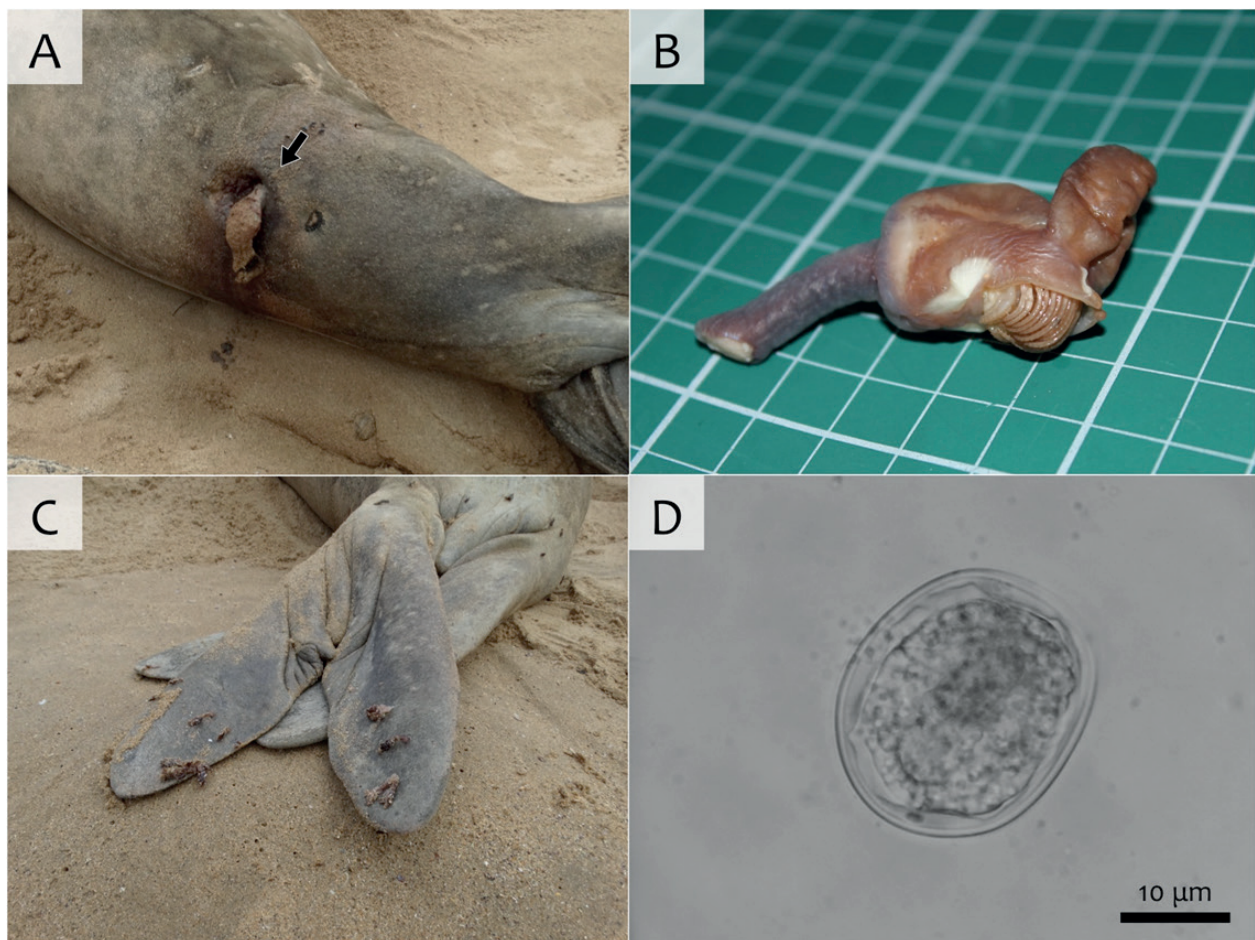


Figure 3. Epibionts and parasites retrieved from a sub-adult Southern elephant seal (*Mirounga leonina*) on the coast of Espírito Santo, Brazil. Legend: (A) Skin lesion on the lower back of the elephant seal (April 2015); (B) Eared barnacle (*Conchoderma aurita*) retrieved from the scar of the skin lesion previously reported (August 2015; grid = 1 cm); (C) Barnacles attached to the lower back and pelvic limbs, covered with sand (August 2015); (D) *Contracecum* sp. egg identified through coproparasitology (April 2015). Photo credits: (A, C, D) Luis Felipe S.P. Mayorga, (B) Ralph E.T. Vanstreels.

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