



Biota Neotropica  
ISSN: 1676-0611  
cjoly@unicamp.br  
Instituto Virtual da Biodiversidade  
Brasil

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Biota Neotropica, vol. 12, núm. 1, enero-marzo, 2012, pp. 1-8

Instituto Virtual da Biodiversidade

Campinas, Brasil

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*Batista, R.L.G. et al.*

Biota Neotrop. 2012, 12(1): 000-000.

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<http://www.biotaneotropica.org.br/v12n1/pt/abstract?article+bn00312012012>

Received/ Recebido em 18/01/2010 -

Revised/ Versão reformulada recebida em 03/10/2011 - Accepted/ Publicado em 04/10/2011

ISSN 1676-0603 (on-line)

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## Cetaceans registered on the coast of Ilhéus (Bahia), northeastern Brazil

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BATISTA, R.L.G., SCHIAVETTI A., SANTOS, U.A. & REIS, M.S.S. **Cetaceans registered on the coast of Ilhéus (Bahia), northeastern Brazil.** Biota Neotrop. 12(1): <http://www.biotaneotropica.org.br/v12n1/en/abstract?article+bn00312012012>

**Abstract:** Stranded cetaceans have scientific value and may confirm the occurrence of some species or indicate their geographical distribution in an area. The collection of biological material can also contribute to improve the knowledge of the species or populations inhabiting certain areas. This study aimed to record live or dead cetaceans found ashore along the coast of Ilhéus, Bahia State, northeastern Brazil. Data were collected through a campaign called “SOS strandings, whales, porpoises and dolphins.” Between 1997 and 1999 three hundred posters and five hundred folders were distributed to beach huts, shops, fishing associations and settlements, the city’s municipal government, the Brazilian Environmental Agency (IBAMA) and fire stations. During this campaign, which lasted until 2007 it was possible to record 38 cetaceans of ten species on the coast of Ilhéus: *Physeter macrocephalus*, *Megaptera novaeangliae*, *Globicephala macrorhynchus*, *Orcinus orca*, *Peponocephala electra*, *Stenella clymene*, *Feresa attenuata*, *Ziphius cavirostris*, *Steno bredanensis* and *Sotalia guianensis*. The greatest numbers of records were observed between 2000 and 2003, which was the period after the distribution of banners and posters. The majority of the carcasses were recovered near the city downtown area (<10 km) and there was not a relationship between the state of the carcasses and the distance from that area.

**Keywords:** occurrence, strandings, marine mammals, educational campaigns.

BATISTA, R.L.G., SCHIAVETTI A., SANTOS, U.A. & REIS, M.S.S. **Cetáceos registrados na costa de Ilhéus (Bahia), nordeste do Brasil.** Biota Neotrop. 12(1): <http://www.biotaneotropica.org.br/v12n1/pt/abstract?article+bn00312012012>

**Resumo:** Cetáceos encalhados tem valor científico e podem confirmar a ocorrência de algumas espécies ou indicar a sua distribuição geográfica em uma área. A coleta de material biológico também pode contribuir para ampliar o conhecimento das espécies ou populações que ocorrem em uma determinada região. Este estudo teve como objetivo registrar cetáceos encalhados vivos ou mortos no litoral de Ilhéus, Bahia, nordeste do Brasil. Os dados foram coletados através de uma campanha chamada “SOS encalhes, baleias, botos e golfinhos.” Entre 1997 e 1999, trezentos cartazes e quinhentos folders foram distribuídos em cabanas de praia, estabelecimentos comerciais, associações de pescadores e colônias de pesca, prefeitura municipal da cidade, o Instituto Brasileiro do Meio Ambiente e Recursos Naturais Renováveis (IBAMA) e o corpo de bombeiros. Com esta campanha, que durou até o ano 2007, foi possível registrar 38 cetáceos de dez espécies na costa de Ilhéus: *Physeter macrocephalus*, *Megaptera novaeangliae*, *Globicephala macrorhynchus*, *Orcinus orca*, *Peponocephala electra*, *Stenella clymene*, *Feresa attenuata*, *Ziphius cavirostris*, *Steno bredanensis* e *Sotalia guianensis*. O maior número de registros ocorreu entre os anos de 2000 e 2003, que foi o período após a distribuição de folders e cartazes. A maior ocorrência de encalhes foi em áreas próximas ao centro da cidade (<10 km) e não houve uma relação entre o estado das carcaças e a distância do centro da cidade.

**Palavras-chave:** ocorrência, encalhes, mamíferos marinhos, campanhas educativas.

## Introduction

The conservation of marine mammals requires knowledge of many aspects of their biology, including causes and rates of mortality. Cetacean mortalities are the result of natural events (e.g., strandings, disease, birth defects) and human activities, including intentional (e.g., hunting, captures for display in oceanaria) and unintentional events (e.g., incidental capture in fishing gear, collisions with boats, direct and indirect effects of pollution) (Kemper et al. 2005).

The existence of some marine mammal species is known only from strandings, such as the distribution of some species of beaked whales (Heyning 1989, Mead 1989) worldwide and *Pseudorca crassidens* in Brazil (Andrade et al. 2001). Another poorly known species in Brazil is the pygmy killer whale, *Feresa attenuata*. For this species information come from only two strandings, one in the southeastern (Zerbini & Santos 1997) and another on the northern coasts (Magalhães et al. 2007), and one sighting in the northeastern region (Rossi-Santos et al. 2006). Stranded animals can also provide biometric data, osteological material and parasite data, which can contribute to the improve knowledge of the species, can help to understand how anthropic activities affect local populations and can help to identify peaks and locations of mortality. All this information can be useful for conservation efforts (Norman et al. 2004). Other examples include the work by Pinedo (1982) who provided a description of the diet of *Pontoporia blainvillei* and *Tursiops truncatus* using the carcasses found at the beach in southern Brazil and by Meirelles & Barros (2007) who reported the ingestion of plastic and the presence of ulcers in the stomach of a rough-toothed dolphin (*Steno bredanensis*) found stranded alive in northeastern Brazil.

In Brazil, a governmental organization (Centro Mamíferos Aquáticos - CMA) currently a branch of the Instituto Chico Mendes (ICMBio) established a Marine Mammal Stranding Network in Northeastern Brazil (REMANE) in 1999. This network was created by the Ordinance Nº 39, June 28, 2000 and included a document titled "Protocol of Conduct for Strandings of Marine Mammals" developed with the intent to assist and standardize the technical procedures relating to the handling, recovery or sampling of animals found alive and dead along the shore (Instituto... 2005).

To date, 21 species of cetaceans have been found ashore in Bahia. *Megaptera novaeangliae*, *Sotalia guianensis* and *Stenella clymene* are the most frequently recorded (Veloze 2007). *Grampus griseus* (Nogueira 2000) and *Mesoplodon layardii* (Nogueira & Nunes 2005) corresponded to the first occurrence of these species along the northeastern coast of Brazil and the discovery of a group of *Peponocephala electra* represented the first mass stranding registered in the South Atlantic (Lodi et al. 1990).

The aim of this study was to document the occurrence of cetaceans stranded on the coast of Ilhéus, northeastern Brazil, through educational campaigns, distribution of posters and of leaflets. Thus our intent was to contribute to improve the knowledge of the species found ashore and to show the importance of such campaigns to increase our efficiency in responding to strandings, particularly the ones involving living (which required veterinary aid) or dead animals in fresh conditions (which require collection of biological material before decomposition precluded further studies).

## Material and Methods

The city of Ilhéus is located on the southern coast of Bahia (between 39° 00' W and 39° 30' W, and 14° 20' S and 15° 00' S), northeastern Brazil. It has approximately 80 km of coastline (between the Sargi and Acuípe Rivers from north to south), and an average continental shelf width of 8 km (Reuss-Strenzel & Asuncion 2008). It has two estuaries, the main one being the Bay of Pontal (14° 48' S

and 39° 02' W) with 40 km<sup>2</sup>, formed by the junction of the Cachoeira, Fundação and Santana Rivers (Santos et al. 2010), which divide the city into two parts: the southern and northern area. The areas closer to the mouth of the estuary have no vegetation and make up the urban area. Mangroves are also found inside the estuary and river arms (Moraes 2010).

A total of 300 instructional posters and 500 folders with contact information in case of a stranding were distributed through a campaign called "SOS stranding: whales, estuarine dolphins and dolphins", which began in November 1997 and ended in 1999; data collection began with the start of the campaign and ended in 2007. When an animal was found, a visual analysis was carried out to search for wound marks (e.g. from fishing nets, harpoons, knives, etc.), scars and parasites. Species identification was made according to Jefferson et al. (1993), and biometric measurements were taken according to standard measures from Norris (1961).

In the event of live animal strandings, we provided first aid according to the protocol established by the Northeast Marine Mammal Stranding Network (REMANE) of CMA (Instituto... 2005). Whenever necessary, we applied doses of Dexamethasone (glucocorticoid) by intramuscular injection as an anti-shock therapy (to reduce stress during the stranding) according to the estimated weight of the animal. In the event of dead animal strandings, each carcass was classified with a code ranging from one to five according to its status; living animal was classified as CODE 1 and a mummified carcass as CODE 5 (Geraci & Lounsbury 1993) and were subsequently macerated and cleaned at the Universidade Estadual de Santa Cruz (UESC). All material collected was cataloged in the Alexandre Rodrigues Ferreira mammals collection (CMARF) at UESC and all records, whether the carcasses were collected or not, were reported to the Instituto Mamíferos Aquáticos (IMA) in accordance with the REMANE.

The monitored area was divided into four area categories (<10, 10-20, 20-30, >30 km) according to the distance from the center of town, both to the north and to the south. A correlation analysis was conducted to assess if there was a relationship between the distance from the town center to the area where the animal was stranded and the state of the carcasses at the time investigators arrived on the site.

## Results and Discussion

After the initial poster distribution period, the reporting of stranded/beached cetaceans increased, reaching a peak during the period between 2000 and 2003. Afterwards, the stranding records decreased until our monitoring work was completed in 2007 (Figure 1).

During the period from 1997 to 2007 a total of 38 cetaceans of 10 species were recorded along 67 km of Ilhéus's monitored coast. Of the 38 stranded animals, eight were found alive (Table 1). According to MMA (2003) and IUCN (International... 2010), one species was listed as vulnerable (VU): *Physeter macrocephalus* (n = 3); five species presented a least concern status (LR/cd): *Peponocephala electra* (n = 1); *Globicephala macrorhynchus* (n = 1); *Megaptera novaeangliae* (n = 6); *Steno bredanensis* (n = 2) and *Ziphius cavirostris* (n = 3) and four species were categorized as Data Deficient (DD): *Orcinus orca* (n = 1); *Stenella clymene* (n = 1); *Feresa attenuata* (n = 1) and *Sotalia guianensis* (n = 17). For two individuals (*Balaenoptera*) identification was only possible to the genus level. These records are described below:

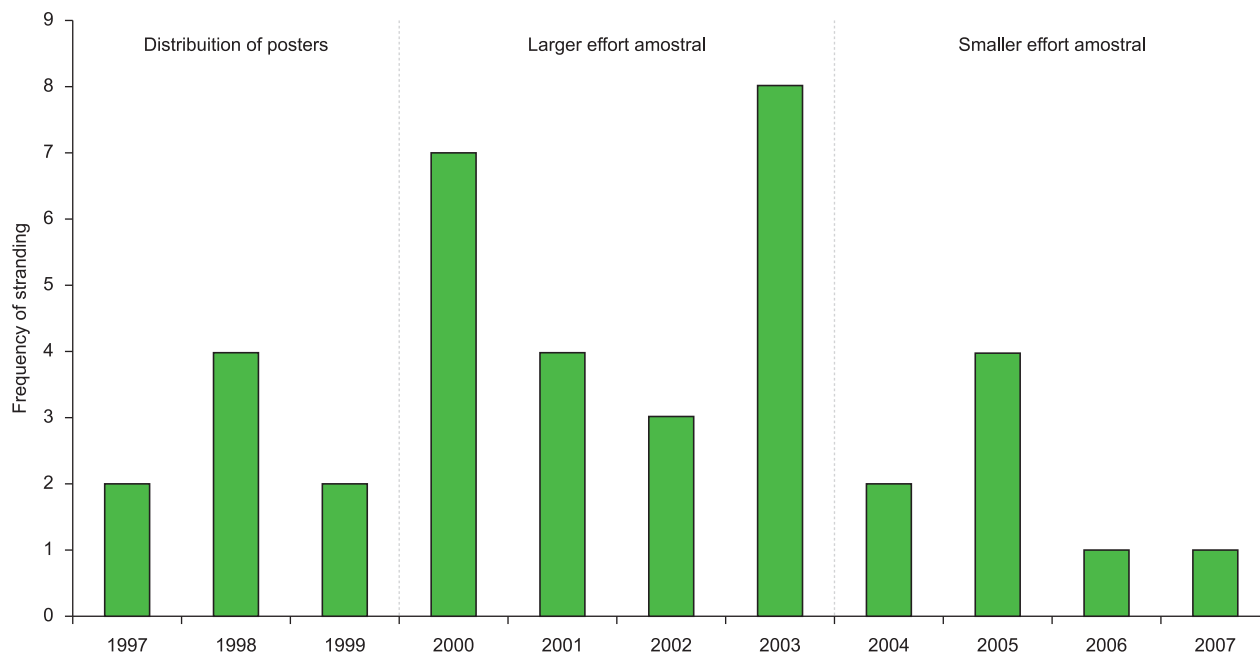
*Physeter macrocephalus* (Linnaeus 1758) – This species has a cosmopolitan distribution from the tropics to the Polar Regions (Rice 1989, Jefferson et al. 1993). In Ilhéus, individual CCPMIOS-004 was stranded on March 16<sup>th</sup>, 1998, had no tail flippers and presented

**Table 1.** Records of stranded cetaceans on the coast of Ilhéus (Bahia), northeastern Brazil.**Tabela 1.** Registro de encalhe de cetáceos na costa de Ilhéus (Bahia), nordeste do Brasil.

| Species                 | Date     | Nº encalhe (IMA) | Nº tombo (UESC) | State | TL (cm) | Local (Praia)                                   | Code |
|-------------------------|----------|------------------|-----------------|-------|---------|---|------|
| <i>Balaenoptera</i> sp. | 05/10/97 | CCPMIOS 01       |                 | Dead  | -       | Mamoa (Norte)                                   | 3    |
|                         | 12/08/05 | CCPMIOS 38       |                 | Dead  |         | Olivença (Sul)                                  | 5    |
| <i>Z. cavirostris</i>   | 25/11/97 | CCPMIOS 02       | ZUESC 01        | Dead  | 590     | Águas de Olivença (Sul)                         | 3    |
|                         | 29/01/00 | CCPMIOS 11       | ZUESC 09        | Dead  | -       | Mar e Sol 14.6691° S and 39.0616° W             | 5    |
|                         | 06/02/04 | CCPMIOS 32       | ZUESC 17        | Dead  | 500*    | Olivença (Sul) 15.5000° S and 39.1203° W        | 3    |
| <i>S. bredanensis</i>   | 26/02/98 | CCPMIOS 03       | ZUESC 02        | Dead  | -       | Águas de Olivença (Sul)                         | 3    |
|                         | 07/06/01 | CCPMIOS 18       | ZUESC 14        | Dead  | -       | Ponta do Ramo (Norte) 14.8303° S and 39.0218° W | 5    |
| <i>P. macrocephalus</i> | 16/03/98 | CCPMIOS 04       |                 | Dead  | 372*    | Jd Atlântico (Sul)                              | 2    |
|                         | 02/01/05 | CCPMIOS 35       |                 | Dead  | 736     | Ponta do Ramo (Norte) 14.6088° S and 39.0530° W | 2    |
|                         | 26/06/07 | CCPMIOS 44       |                 | Dead  | *1500   | Acuípe (Sul)                                    | 4    |
| <i>S. guianensis</i>    | 25/06/98 | CCPMIOS 05       | ZUESC 03        | Dead  | 209     | Baia do Pontal (Centro)                         | 2    |
|                         | 11/12/98 | CCPMIOS 06       | ZUESC 04        | Dead  | 186     | AABB (Sul)                                      | 3    |
|                         | 27/03/99 | CCPMIOS 07       | ZUESC 05        | Dead  | 186     | São Domingos (Norte)                            | 4    |
|                         | 29/01/00 | CCPMIOS 09       | ZUESC 07        | Dead  | -       | São Miguel (Norte)                              | 5    |
|                         | 00/02/00 | CCPMIOS 10       | ZUESC 08        | Dead  | -       | Olivença (Sul)                                  | 5    |
|                         | 22/10/00 | CCPMIOS 14       | ZUESC 11        | Dead  | 181     | Praia do Sul                                    | 2    |
|                         | 28/10/00 | CCPMIOS 15       | ZUESC 12        | Dead  | 194     | Jd Atlântico (Sul)                              | 2    |
|                         | 18/11/00 | CCPMIOS 16       | ZUESC 13        | Dead  | 196*    | Mar e sol (Norte) 14.6691° S and 39.0616° W     | 5    |
|                         | 22/02/01 | CCPMIOS 17       |                 | Dead  | 160*    | Praia do Pontal (Sul)                           | 5    |
|                         | 09/12/01 | CCPMIOS 20       |                 | Alive | 147     | Litoranea (Norte) 14.7421° S and 39.0597° W     | 1    |
|                         | 02/01/02 | CCPMIOS 21       |                 | Dead  | 158     | Marciano (Norte)                                | 2    |
|                         | 02/01/02 | CCPMIOS 22       |                 | Dead  | -       | Marciano (Norte)                                | 2    |
|                         | 18/02/03 | CCPMIOS 24       |                 | Dead  | 162     | Praia do Sul                                    | 2    |
|                         | 28/02/03 | CCPMIOS 26       |                 | Alive | 120     | Rio Cachoeira 14° 47' S and 039° 06' W          | 1    |
|                         | 28/02/03 | CCPMIOS 27       |                 | Alive | 150     | Rio Cachoeira 14° 47' S and 039° 06' W          | 1    |
|                         | 21/04/05 | CCPMIOS 36       |                 | Dead  | 207     | Rio Santana                                     | 2    |
|                         | 11/03/06 | CCPMIOS 43       |                 | Dead  | 165     | Baia do Pontal (Centro)                         | 4    |
| <i>M. novaeangliae</i>  | 07/07/99 | CCPMIOS 08       |                 | Dead  | 444     | Águas de Olivença (Sul)                         | 2    |
|                         | 14/09/01 | CCPMIOS 19       |                 | Dead  | -       | Cururupe (Sul)                                  | 2    |
|                         | 04/09/03 | CCPMIOS 30       |                 | Dead  | -       | Soares Lopes (Centro)                           | 4    |
|                         | 21/09/03 | CCPMIOS 31       |                 | Alive | 389     | Olivença (Sul)                                  | 1    |
|                         | 25/08/04 | CCPMIOS 34       |                 | Alive | 443     | Litoranea (Norte) 14.7421° S and 39.0597° W     | 1    |
|                         | 16/10/05 | CCPMIOS 40       |                 | Dead  | 347     | Olivença (Sul)                                  | 2    |
| <i>G. macrorhynchus</i> | 17/10/00 | CCPMIOS 13       | ZUESC 10        | Dead  | 250     | Ponta do Ramo (Norte) 14.6088° S and 39.0530° W | 2    |
| <i>S. clymene</i>       | 19/11/02 | CCPMIOS 23       | ZUESC 15        | Alive | 179     | Litoranea (Norte) 14.7421° S and 39.0597° W     | 1    |
| <i>F. attenuata</i>     | 27/02/03 | CCPMIOS 25       | ZUESC 16        | Dead  | 124*    | Olivença (Sul)                                  | 5    |
| <i>P. electra</i>       | 14/03/03 | CCPMIOS 28       |                 | Dead  | 172     | Litoranea (Norte)                               | 2    |
| <i>O. orca</i>          | 17/07/03 | CCPMIOS 29       |                 | Alive | -       | Espigão (Centro) 14.7848 S and 39.0253 W        | 1    |

\*Estimated length of the animal due to the advanced state of decomposition, **Nº encalhe (IMA)** – Record of stranding from the Instituto Mamíferos Aquáticos (IMA), **CCPMIOS** (Coleção Científica Projeto MAMA Ilhéus), **Nº tombo (UESC)** – Record number of osteological material deposited in the Alexandre Rodrigues Ferreira mammal collection, at Universidade Estadual de Santa Cruz (UESC). **ZUESC** (Zoologia Universidade Estadual de Santa Cruz), **STATE** – state of the animal in the time of the stranding, **TL** – Total length, **CODE** – Decomposition state of the carcass according to the classification of Geraci & Lounsbury (1993).

\*Comprimento estimado do animal em avançado estado de decomposição, **Nº encalhe (IMA)** – Registro de encalhe do Instituto Mamíferos Aquáticos (IMA), **CCPMIOS** (Coleção Científica Projeto MAMA Ilhéus), **Nº tombo (UESC)** – Número de registro do material osteológico depositado na coleção de mamíferos Alexandre Rodrigues Ferreira da Universidade Estadual de Santa Cruz (UESC). **ZUESC** (Zoologia Universidade Estadual de Santa Cruz), **Estado** – Estado do animal no momento do encalhe, **TL** – Comprimento total, **CODE** – Estado de decomposição da carcaça de acordo com a classificação Geracy & Lounsbury (1993).



**Figure 1.** Temporal distribution of the records of stranded cetaceans on the coast of Ilhéus (Bahia), northeastern Brazil, during and after the campaign “SOS stranding: whales, estuarine dolphins and dolphins”.

**Figura 1.** Distribuição temporal dos registros de encalhe de cetáceos na costa de Ilhéus, nordeste, Brasil, durante e depois da campanha “SOS encalhe baleias, botos e golfinhos”

several shark bites (non-identified) along its body. The carcass was taken to the dump (no biological material was collected). The individual CCPMIOS-35, found on the Ponta do Ramo beach on January 2<sup>nd</sup>, 2005, presented rounded bite marks of the shark *Isistius* spp. (Jones 1971) that were already healed and another set of unhealed bite marks from a non-identified species of shark. The carcass was buried on site (no biological material was collected). Individual CCPMIOS-44 was found on Acuípe beach on June 26<sup>th</sup>, 2007 (with the head separated from the body) and was also buried on the beach without collection of biological material. In Brazil, strandings of this species occur from the region of Pará (north) to Rio Grande do Sul (south), with a higher incidence in the northeast coast (Ramos et al. 2001).

*Megaptera novaeangliae* (Borowski 1781) – This is a cosmopolitan species that occurs in all oceans of both hemispheres and migrates between winter breeding grounds and summer feeding destinations. It is more likely to occur in coastal waters on the continental shelf (Jefferson et al. 1993). Five individuals stranded in Ilhéus were calves, measuring 347 cm (CCPMIOS-40), 389 cm (CCPMIOS-31), 443 cm (CCPMIOS-34) and 444 cm (CCPMIOS-08). One individual (CCPMIOS-19) was not measured because the fluke was lacking. This whale was considered a neonate as it presented vestiges of the umbilical cord. The individuals CCPMIOS-31 and CCPMIOS-34 presented unidentified ectoparasites on the body. Individual CCPMIOS-19, stranded on September 14<sup>th</sup>, 2001 on the beach of Cururupe, was killed by a local fisherman with heavy knife stabs. These individuals were arrested, taken to trial and served time assisting Instituto Mamíferos Aquáticos. All the carcasses of humpback whales were buried on the beach.

Sightings and strandings of humpback whales are common along the northeastern coast of Brazil (Lodi 1994, Simões et al. 2005, Danilewicz et al. 2008) because this region corresponds to the main breeding ground for the western South Atlantic humpback whale population. The calves stranded had lengths between 347 and 444 cm. According to Clapham et al. (1999), humpback whale calves are 396

to 457 cm in length at birth. The cause of stranding of newly born calves (alive and dead) is still not known. These records confirm the area as a calving ground for the species and the observed increase in the number of stranded whales can be a consequence of the recovery observed for this population. According to Morete (2007), from 1998 to 2003, there was poor evidence of the abundance of calves in Abrolhos, Brazil northeast. However in 2004 there was an increase on sightings of calves.

*Globicephala macrorhynchus* (Gray 1846) – This species is founded in every ocean in deep waters of temperate or tropical regions throughout the world (Jefferson et al. 1993). The individual CCPMIOS-10 was found in Ilhéus at Ponta do Ramo on October 17<sup>th</sup>, 2000, presented round injuries resulting from *Isistius* spp. (Jones 1971) bites that were already healed. We found two types of parasites; both in the eyes and the blowhole. Haney et al. (2004) identified them as two new records of parasites for the species: *Isocyamus delphinii* and *Syncyamus ilheusensis*, the last of which was recorded as a new species for the family Cyamidae.

*Orcinus orca* (Linnaeus 1758) – This is considered to be a cosmopolitan species that occurs in all seas and oceans from the North to the South Pole, but is more common in temperate oceanic and sub-polar waters (Jefferson et al. 1993). On July 17<sup>th</sup>, 2003 a female stranded alive on the beach of Espigão (CCPMIOS-29) in Ilhéus. The animal stranded on a rocky beach and due to tidal conditions had to be returned to the water, avoiding the risk of being injured on the rocks, but it was found stranded again the following day. Once more the animal was returned to the water by local inhabitants and was not seen again. This is the first documented occurrence of a live stranding of a killer whale along the northeastern coast of Brazil. The species is poorly known on the Brazilian coast where strandings and opportunistic sightings are the main sources of information (Santos & Netto 2005).

*Peponocephala electra* (Gray 1846) – This species is distributed between 40° N and 35° S, usually in temperate and tropical oceanic waters (Jefferson et al. 1993). In Ilhéus, the individual CCPMIOS-28

was stranded on March 14<sup>th</sup>, 2003 on the northern coast. The individual presented *Isistius* spp. (Jones 1971) bite marks that were already healed; the carcass was buried on the beach (no biological material was collected). Mass strandings of this species have been documented in Brazil; the first was in the northeastern region of the state of Bahia (Lodi et al. 1990). Subsequent records of this species along the Brazilian coast have been made on the island of Fernando de Noronha (Hetzl & Lodi 1993) and in the northeastern states of Alagoas (Fragoso et al. 1994), Ceará (Alves Junior et al. 1996), Sergipe (Serra et al. 2000) and Rio Grande do Norte (Medeiros 2003), and the southeastern state of Espírito Santo (Gasparini & Sazima 1996).

*Stenella clymene* (Gray 1850) – This species is usually found in the tropical and sub-tropical Atlantic ocean such as the Caribbean and the Gulf of Mexico (Jefferson et al. 1993). A live stranding was recorded on the northern beach of Ilhéus on November 19<sup>th</sup>, 2002. Upon our arrival, the animal had already been transferred to the estuary of Almada's river by the local population. It was then decided to transfer the animal for rehabilitation, but the animal died on site. The cause death is unknown. Injuries observed on the body were caused by collisions with rocks upon stranding. As yet unidentified parasites were recovered in the blowhole. They were collected and stored along with the skeleton in the lab UESC (ZUESC-18).

*Feresa attenuata* (Gray 1874) – This species has been documented in sub-tropical and tropical waters (Donahue & Perryman 2002). In Ilhéus, the individual (CCPMIOS-025), measuring nearly 1.20 m, was found dead on Olivenças' beach on February 27<sup>th</sup>, 2003. After cleaning the skeleton, it was possible to confirm the species using the methods of Jefferson et al. (1993). This individual was young as judged by its small size, hollow teeth and unfused the bone of the skull. Its skeleton is in UESC (ZUESC-16). This is the first record of stranding of this species on Bahia's coast and the third record in Brazil.

Information about *Feresa attenuata* along the coast of the Brazil is still very limited. There were only two strandings and one sighting. A 2.3 m long female was found ashore in Mongaguá beach, southeastern Brazil. Its stomach contained beaks of *Loligo plei*, a relatively coastal species, suggesting that the animal had foraged close to the shore before stranding (Zerbini & Santos 1997). The second stranding was recorded in Maranhão, northeastern Brazil (Magalhães et al. 2007). Finally, a group of six individuals was seen 7.5 nautical miles from shore in off Praia do Forte on the north-eastern Brazilian coast (Rossi-Santos et al. 2006).

*Ziphius cavirostris* (Cuvier 1823) – This species is known as the most cosmopolitan of the beaked whales and is found in deep waters across all oceans (Heyning 1989, Jefferson et al. 1993). Individual CCPMIOS-02, was found ashore near Olivença on November 25<sup>th</sup>, 1997, was missing the left eye and presented a deep round wound in the dorsal fin. This wound could have been caused by a firearm because the edge of the hole was circular in shape with regular edges 20 mm in diameter, which is different from a harpoon hole that has 4 to 6 mm in diameter. Its carcass was taken and listed at UESC (ZUESC-01). The skeleton of another individual (CCPMIOS-11) was found on the beach Mar e Sol on March 18<sup>th</sup> and placed at the UESC collection (ZUESC-11). A third individual (CCPMIOS-32) was found on the beach of Olivença on February 6<sup>th</sup>, 2004 was also placed at UESC (ZUESC-17) but was subsequently donated to Instituto Baleia Jubarte.

According to Heyning (1989), *Ziphius cavirostris* is the most common beaked whale and is often found ashore throughout its range. The records of this species described above, among beaked whales, the most common recorded stranding; this indicates that it is probably

not as rare as originally thought. Also these numbers could reflect a distribution of this species closer to the shore of the Brazilian coast.

*Steno bredanensis* (Lesson 1828) – This species occurs in temperate and tropical oceans (Jefferson et al. 1993). In Ilhéus, the skeletons of the two specimens were found on the beach. The first (CCPMIOS-03) was found Águas de Olivença on January 26<sup>th</sup>, 1998 and the second (CCPMIOS-18) on the northern coast on June 7<sup>th</sup>, 2001. Both were identified by their skull and teeth and deposited in UESC (ZUESC-02 and ZUESC-14).

*Sotalia guianensis* (van Benédén 1864) – This is a coastal species that ranges from Honduras to Florianópolis in Brazil (Borobia et al. 1991, Silva & Best 1994). From 1998 to 2006, 17 strandings from the south beach to the north coast of Ilhéus were reported. Of the total number of stranded animals, 69% presented evidence of human interaction, 33.33% were found without one of their eyes and one individual (CCPMIOS-07) was found without its genitals. Individual CCPMIOS-09 was found with its cranium broken and some knife marks on its bones. On January 2<sup>nd</sup>, 2002, according to locals, two animals stranded together (CCPMIOS-21 and 22). For one, only the head was found because, according to the locals, the fishermen had already removed the rest of the body. The two carcasses were buried together on the beach, with the help of local inhabitants. The following day, we found only the heads, and the body of the second individual had been taken. In Ilhéus, the local fishermen admitted that they accidentally captured *Sotalia guianensis*. They appreciate its meat and described how they traditionally cook it.

Individual CCPMIOS-43 was seen floating dead toward the mouth of the estuary of Pontal's bay on June 25<sup>th</sup>, 1998, with a rock tied with a rope around the dolphin's fluke, stranded after on the beach of Av. 2 de Julho. According to the population, this is commonly done by the fishermen to sink and prevent the recovery of the carcasses of individuals incidentally killed in nets.

Among the 17 *Sotalia* recorded, three individuals were found alive. One (CCPMIOS-21) presented a flying fish (unidentified) jammed in its mouth. After removal of the fish, the animal was returned to the sea. The other two dolphins were found confined in natural pool of the Cachoeira River. They remained trapped in pool for nine days, apparently unable to work their way back to sea. These were rescued from the Cachoeira River and taken to the Pontal's bay (CCPMIOS-26 and 27) (further information see Batista et al. 2005).

The present study is consistent with stranding patterns of *S. guianensis* along the coast of Brazil as the species is represented by nearly 45% of the records near Ilhéus. This is the same proportion observed on the entire northeast coast of Brazil since the creation of REMANE in 2000 and is considered a high incidence (Rossi-Santos & Reis 2008).

Despite studies conducted in the region such as interaction with fishing activities (Reis 2002) and studies of behavioral ecology (Batista 2001, Santos 2001, 2007, Batista et al. 2005, Assis 2008, Izidoro 2009), which show site fidelity of *S. guianensis* to coastal areas, studies about population parameters are not known. These are important in to assess its status given potential conservation issues. The high percentage of interactions with human activities is likely a consequence of the species preference for estuaries, which are regions targeted by fishermen. However, it is not known if bycatch is a significant source of mortality for the local dolphin population. According to Alarcon et al. (2009), the use of dolphin meat was reported by 7.69% of the fishermen interviewed, not only for consumption but also as baits for shark fisheries. The catch is accidental in trawl and in beach seine net (calão), with the difference that individuals in the trawl are found already dead and the seine net are released alive. In other parts of the range, interactions with fisheries represent an important source of mortality for *S. guianensis*.

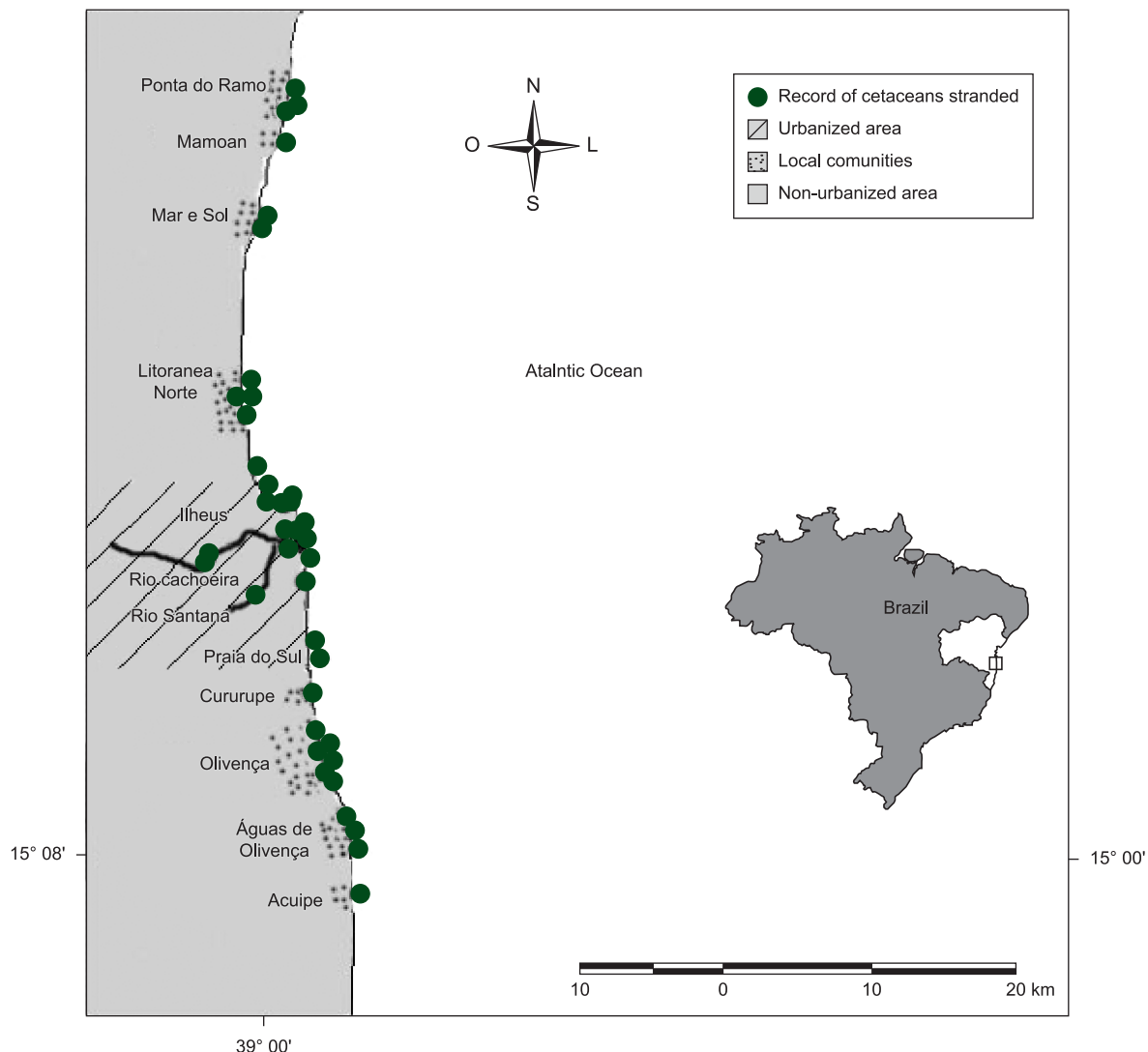
On the coast of Espírito Santo, it was observed that 62% of dolphins found ashore had some indication of interaction with fishing (Barbosa & Barros 2006). In the state of São Paulo, this is the second most frequently captured species among 15 confirmed cetaceans that interact with the local fisheries (Souza et al. 2006). An earlier review of strandings and fishery interaction of small cetaceans along the coast of Brazil (Siciliano 1994) indicated that *S. guianensis*, together with the *Pontoporia blainvillei*, were the most frequently captured in fishing operations. This probably indicates that fishing pressure occurs on the species throughout all the range in Brazil and suggests that an assessment of its conservation status is required.

The spatial distribution of all stranding events near Ilhéus wasn't homogeneous (Figure 2). The highest number of records was seen within 10 km from the downtown area (Figure 3), probably because they are areas with more housing, thus increasing the number of reports for the institutions and the easy access of local researchers. The frequency of strandings was lower in distances further away from the center of Ilhéus, possibly as a consequence of the lower observation effort in these regions.

In this region, cetacean carcasses were found in all five stages of decomposition (Codes 1 to 5, Figure 3) as defined by Geraci & Lounsbury (1993). Our expectation was to find animals in more fresh conditions in the proximities of the center of the city, because of the shortest distance and time needed for the research team to arrive at the stranding site. However, there was no relationship between the decomposition code and the distance from the center ( $p < 0.05$ ), probably because some animals remain adrift after the death came in an advanced state of decomposition to the beach.

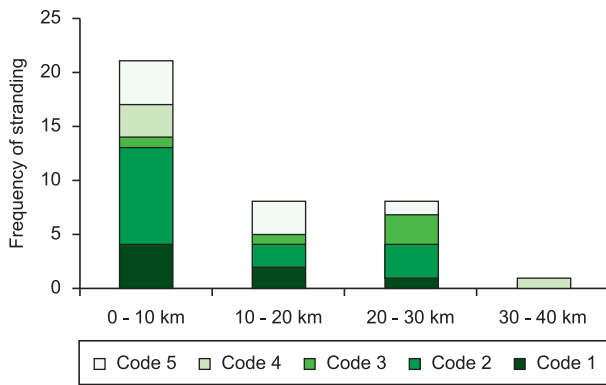
The present article reports on the first record of a live stranded *O. orca* and of a stranding of *F. attenuata* along the coast of Bahia further confirming the occurrence of these species along the northeast coast of Brazil. In addition, it is noteworthy that the majority of the species found ashore have a preference for deep pelagic waters. This may be a consequence of the relatively narrow continental shelf observed in the region (~7.5 km), which may suggest that oceanic species occur closer to the coast and have a greater chance of washing ashore.

This study also demonstrates the importance of educational campaigns because it facilitates the recovery of stranded dead animals,



**Figure 2.** Spatial distribution of the records of stranded cetaceans on the coast of Ilhéus (Bahia), northeastern of Brazil

**Figura 2.** Distribuição espacial dos registros de encalhe de cetáceos na costa de Ilhéus, nordeste, Brasil



**Figure 3.** Frequency of the records of stranded cetaceans on the coast of Ilhéus (Bahia), northeastern of Brazil according to the distance from the center of the city and proportion of state of decomposition in which carcasses were found.

**Figura 3.** Frequência dos registros de encalhe de cetáceos na costa de Ilhéus, nordeste, Brazil, de acordo com a distância do centro da cidade e estado de decomposição em que as carcaças foram encontradas.

help streamline the care of live animals. Reports were received immediately, but a much greater proportion was observed between three and seven years after the onset of our campaigns. The decrease in stranding records after 2003 likely indicate that campaigns must be conducted on a regular basis to keep the population engaged in reporting efforts. That should include presentation of previous results to demonstrate the value of the campaigns and the importance of the participation of the community.

Our results also demonstrate that the local inhabitants can assist with the collection of important biological information if made aware (e.g. through the distribution of instructional poster and folders) about cetaceans. This has been reported for other regions; for example in Oregon and Washington (USA) 79% of the strandings recorded was obtained through volunteer work. In addition, these campaigns can also be important to stimulate interest in these animals within the general public (Norman et al. 2004) and to bring information to the population (e.g. fishing villages) in regards to cetacean conservation issues.

The distribution of posters is useful and relatively inexpensive. It must be done in the areas where there are residents to make recovery of stranded animals more efficient. This allows us to quickly obtain information about the circumstances in which the stranding occurred. Obviously this kind of campaigns would not be as efficient in more isolated areas with little or no urbanization since the observation effort would be minimal. In such areas, it is necessary to increase monitoring efforts by scientists (e.g. by surveying the beach on a regular basis) to improve collection of important biological material.

## Acknowledgements

This article is dedicated to Professor Binael Soares Santos<sup>†</sup> for his active participation on preservation issues over the years. We are grateful to Professors Julio Baumgarten, Jorge Argolo and Luiz Alberto Matos for their collaboration, to all the trainees of the MAMA's project of Instituto Mamíferos Aquáticos, Universidade Estadual de Santa Cruz (UESC) and the researchers Salvatore Siciliano, Paulo Cesar Simões Lopes and Alexandre Zerbini for helping in the confirmation of some species.

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Received 18/01/2010

Revised 03/10/2011

Accepted 04/10/2011