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A case study of a lone humpback whale calf (*Megaptera novaeangliae*) inside Baía de Todos os Santos, Bahia State, north-eastern Brazil, with implications for rescue procedures

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We report the occurrence of a lone humpback whale (*Megaptera novaeangliae*) calf inside Baía de Todos os Santos, north-eastern Brazil, encountered swimming near the shore in a busy beach of the city of Salvador. The calf was monitored for over 6 hours during which time it was photographed performing an unusual behaviour, interpreted by the authors as a sign of stress and disorientation. One week later, a dead humpback whale calf was found 14 km north-east, on the island of Itaparica. Due to the similar size and the oceanographic currents of the area, we considered it to be the same animal. Finally, we discuss considerations to improve conditions for the rescue of cetaceans in the future.

Humpback whales (*Megaptera novaeangliae*) (Borowski, 1781) are cosmopolitan migratory animals that move yearly from feeding areas in high latitudes to tropical breeding areas, where they mate, give birth and nurse their calves (Clapham, 2002). The International Whaling Commission has established the existence of 7 stocks in the southern hemisphere (International Whaling Commission, 1998). One of the larger stocks comprises the population that comes to Brazil in winter for reproduction (Breeding Stock A–BSA), with the main concentration in the Abrolhos Bank (16°40'–19°30'S 38°00'–39°30'W) (Martins et al., 2001; Engel, 2003; Morete et al., 2003b; Andriolo et al., 2006).

First evidence suggests the feeding area of the BSA is near the South Georgia and South Sandwich Islands (53°58'–59°23'S 38°01'–32°34') (Engel, 2003; Stevick et al., 2006; Zerbini et al., 2006). According to recent population estimates (Kinas & Bethlem, 1998; Freitas et al., 2004; Andriolo et al., 2006) the size of the humpback whale population in Brazilian waters has been increasing since the prohibition of commercial whaling. Consequently, sightings of these animals are becoming more frequent along the north-eastern Brazilian coast, including coastal bays, such as Baía de Todos os Santos (13°00'S 38°35'W), Bahia State, where the whales were abundant prior to whaling activities (Tavares, 1916).

During the breeding season, humpback whale strandings are common on the north coast of Bahia (14°47'S/39°02'W) (11°40'S/37°02'W). From 2000 to 2005, 23 strandings were registered, of which 14 (61%) were calves (IBJ, unpublished data). These strandings may occur because the young cetaceans are completely dependent on their mothers, who feed and care for them, and may become stranded if separated from them (Carwardine et al., 1998; Boness et al., 2002).

Successful rescue of the calves of large cetaceans depends on a rapid and organized response, performed by trained professionals, a good infrastructure for eventual rehabilitation and the condition of the animal's health (Heyning & Heyning, 2001).

Case description

On Sunday, 6 August 2007, a lone calf, no more than 2 months old, was sighted by over one hundred people in the locality of 'Porto da Barra' (13°23'S 38°55'W), one of the busiest tourist places in Salvador, capital of Bahia State (Figure 1). The weather and sea conditions were good (Beaufort 2), with clear visibility at sea, wind speed of 2–4 m s^{-1} and temperature of 23 to 26°C.

Figure 1. Locality of 'Porto da Barra', one of the busiest tourist places in Salvador, capital of Bahia State, where the humpback whale (*Megaptera novaeangliae*) calf was sighted.

According to the public present at the site, the calf was observed alone, breaching near the beach at about 1000 h on the same morning. The animal approached the shore, reaching shallow waters very close to the beach (Praia do Porto da Barra) but did not become stranded. After some time, the life-guards could no longer contain the public and some people went into the water, even touching and climbing onto the whale calf. The Instituto Baleia Jubarte (IBJ) and Instituto Mamíferos Aquáticos (IMA), both members of the north-east stranding network (REMANE), were notified of the occurrence at 1400 h and immediately sent out researchers who began monitoring the calf with the assistance of a 6-m RIB (rigid inflatable boat) with a 50 hp outboard engine and an 8-m fiberglass boat with a 45 hp outboard engine, permitting underwater observations. However, due to poor underwater visibility the quality of the obtained photographs is poor.

While there was still some daylight, superficial scarifications were observed on the calf's fluke and dorsal fin. Breath intervals were in accordance with its age (1 breath every 1 min 20 s to 1 min 40 s) (Petta et al., 2004).

No barnacles (Cirripedia), whale lice (Amphipoda) or sharksuckers (Echeneidae) were observed on the calf's body, although they are well documented in the literature (Winn & Reichley, 1985). Sharksuckers, *Echeneis naucrates* Linnaeus, 1758 are mostly found in coastal areas, being registered on both adults and calves of *M. novaeangliae* on the coast of Bahia (Sampaio, personal observation; Wedekin et al., 2004).

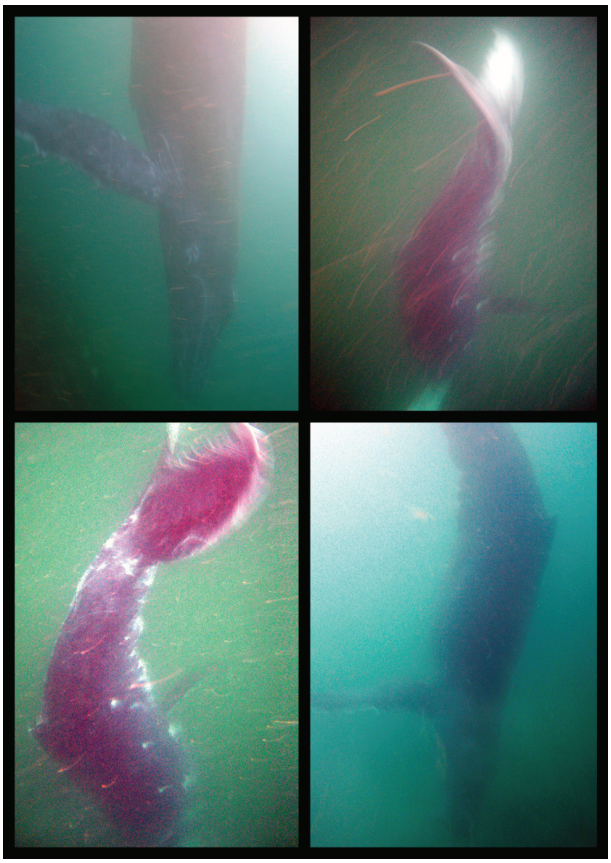

Figure 2. The humpback whale (*Megaptera novaeangliae*) calf, diving to the bottom with the rostrum towards the sand and swimming against the sea floor. Photographs: Cláudio L.S. Sampaio.

Behaviour

The humpback whale is one of the most acrobatic whales, exhibiting a large variety of conspicuous surface and underwater behaviours (Winn & Reichley, 1985; Clapham, 2002), for example, the tail up, frequently observed in the Abrolhos Bank, located about 200 nautical miles south of Salvador (Morete et al., 2003a).

In the case described here, a very peculiar behaviour was observed underwater. The humpback whale calf was seen diving to the bottom (5–7 m depth) with its rostrum towards the sand, swimming against the bottom repeatedly (Figure 2). There were no alterations in the respiratory interval. This behaviour was observed for around 30 min, while just one boat was on site, trying to drive the whale towards deeper waters, keeping the engine on and in high rotation. On one occasion, a local diver tried to push the calf away from the sea floor in an attempt to change this behaviour, without success.

Studies on whale behaviour report mainly on reaction to biopsy sampling and to vessel approach through land station observations (Weinrich et al., 1992; Gauthier & Sears, 1999; Morete et al., 2000; Morete, 2003). Although a number of underwater behavioural studies have been conducted on odontoceti (Hofmann et al., 2004; Silva Jr, 2005), very few have been reported for misticeti (Green et al., 2001).

Frohoff (2004) observed behavioural responses to stress in odontoceti and described changes in respiratory, surfacing and dive patterns; cohesion of groups; orientation and speed of swimming; communicative displays; postures; defaecation and vocalizations. Based on such descriptions, and in spite of poor underwater visibility, we could interpret the lone calf's behaviour as a stress response to either excessive noise produced by the boat's engine or even to the absence of the mother.

Futhermore, despite control from environmental agencies, fishing with explosives (dynamite) is still a common practice utilized by some fishermen inside Baía de Todos os Santos (Herold et al., 2007). People encountered on the site of the incident reported on explosion noises they heard in the morning of 5 August near the stranding site. Explosions are suggested as a possible cause of disorientation in cetaceans (Richardson, 1995; Simmonds et al., 2003); as such, we cannot discard this possibility as a plausible causal factor in the case above described.

The animal was resighted early in the evening (1830 h) and was monitored for over one hour. The animal showed clear evidence of stress and disorientation: (a) about 3 breaths per minute; (b) it approached the boats used by the researchers; and (c) it scratched its body against the hull of the boat and the coastal rocks. By 2000 h, the monitoring activity ended.

The next morning, a land search was conducted, comprising all the metropolitan area of Baía de Todos os Santos and Itaparica Island, but the animal was not found, raising the question of whether it would be able to leave the bay or not.

Figure 3. The humpback whale (*Megaptera novaeangliae*) calf stranded in Itaparica Island, presenting lacerations (A, B, C) on the peduncle and part of the fluke, probably caused by propellers; (D) a cookie-cutter shark (*Isistius* sp.) bite in the ventral region of the dead whale.

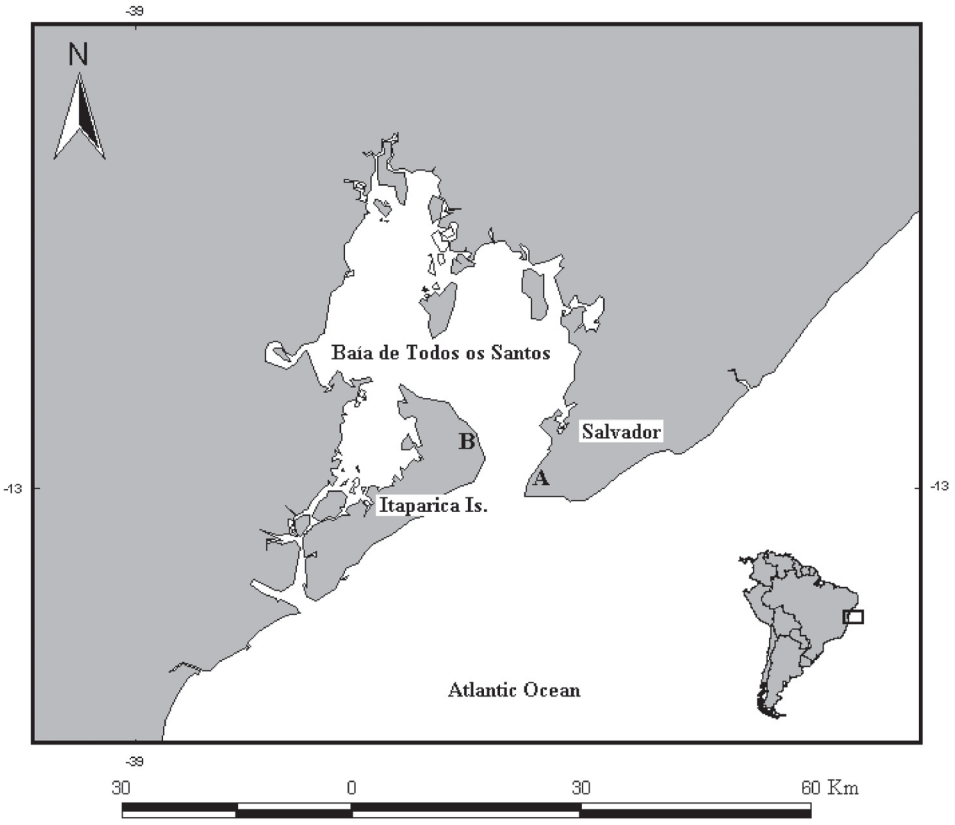

Figure 4. Baia de Todos os Santos showing the sites where the lost humpback whale (*Megaptera novaeangliae*) calf was recorded in (A) Porto da Barra beach, Salvador and (B) where the calf was stranded in Itaparica Island, about 14 km from A.

Stranding

One week later (12 August 2007), the IBJ was called to attend a humpback calf stranded at Itaparica Island (12°15'S 38°10'W). The animal was at an advanced decomposition state, 'code 4' (Geraci & Lounsbury, 2005), total length of 4.70 m, presenting two deep parallel wounds on the peduncle and partial mutilation of the fluke, possibly caused by watercraft propellers (Figure 3A,B,C). The location of the lesions and the absence of signs of recent cicatrization suggest the collision probably occurred after the animal's death. Some cookie-cutter shark (*Isistius* sp.) bite marks were identified in the ventral region (Figure 3D) (Souto et al., 2007). Due to the calf's advanced decomposition state it was impossible to determine the cause of death. The location where the carcass was found suggests that this animal was possibly the lost calf described above (Figure 4).

This area possesses a strong tidal influence and intense shipping traffic, since it is the main entrance channel to Baia de Todos os Santos, and its harbours (Lessa et al., 2001). In 2005, a collision incident involving an adult humpback whale struck by a catamaran was recorded (IBJ, unpublished data).

It is of utmost importance that institutions working with cetacean strandings receive more funding to invest in the training of staff and acquisition of equipment, such as adequate vessels, transportation stretchers, cables and medications. A rehabilitation centre with pools and trained personnel, plus financial support for the rescue of large cetacean calves, may have allowed the calf to be cared for until weaning, improving its chances of survival and the possibility of a successful reintroduction (Stewart, 2001).

Governments, together with NGOs, should also allocate financial resources to the development of new technologies for rescuing cetaceans, since it is a matter that concerns both conservation and public health issues.

Opportunities, such as in the case described here, to closely monitor and observe a young calf, are both rare and extremely valuable. Had there been better structures in place, or even a rehabilitation centre, for the accompaniment of this calf throughout the night and subsequent hours, a wealth of new information could have been gathered about this animal to increase our understanding of the causes and consequences of separation between whale mothers and calves in the wild. Better resources and more knowledge might also improve our chances to successfully intervene in similar cases in the future.

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REFERENCES

Andriolo, A., Kinas, P.G., Engel, M.H. & Martins, C.C.A., 2006. Monitoring the humpback whale (*Megaptera novaeangliae*) population in the Brazilian breeding ground, 2002 to 2005. International Whaling Commission, Saint Kitts. Paper presented to the International Whaling Commission Scientific Committee: SC/58/SH15.

Boness, D.B., Clapham, P.J. & Mesnick, S.L., 2002. Life history and reproductive strategies. In *Marine mammal biology* (ed. A.R. Hoelzel), pp. 278–324. Oxford: Blackwell publishing.

Carwardine, M., Hoyt, E., Fordyce, R.E. & Gill, P., 1998. Social life and behavior. In *Whales & dolphins* (ed. M. Carwardine et al.), pp. 80–101. Harper Collins Publishers.

Clapham, P.J., 2002. Humpback whale (*Megaptera novaeangliae*). In *Encyclopedia of marine mammals* (ed. W.F. Perrin et al.), pp. 589–591. San Diego: Academic Press.

Engel, M.H., 2003. *Caracterização da variabilidade genética e avaliação das prováveis áreas de alimentação baseada no DNA mitocondrial da população de baleias jubarte,* Megaptera novaeangliae*, no Banco dos Abrolhos, Bahia, Brasil*. MSc. Thesis, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brasil.

Freitas, A.C., Kinas, P.G., Martins, C.C.A. & Engel, M.H., 2004. Abundance of humpback whales on the Abrolhos Bank wintering ground, Brazil. *Journal of Cetacean Research and Management,* **6**, 225–230.

Frohoff, T.G., 2004. Stress in dolphins. In *Encyclopedia of animal behavior* (ed. M. Bekoff), pp.1158–1164, Connecticut: Greenwood press.

Gauthier, J. & Sears, R., 1999. Behavior response of four species of balaenopterid whales to biopsy sampling. *Marine Mammal Science*, **15**, 85–101.

Geraci, J.R. & Lounsbury, V.J., 1993. *Marine mammals ashore: a field guide for strandings*, 2nd edn. Baltimore: National Aquarium in Baltimore.

Green M.L., Zoidis A.M. & Pantukhoff, J., 2001. Singing humpback whales associate with mothers and calves. In *14th Biennial Marine Mammal Conference, Vancouver, Canada*, 28 November–3 December.

Herold, E., Machado, R.A.S. & Nazar, M.L., 2007. Zoneamento do uso e ocupação territorial como ferramenta de planificação para o desenvolvimento social, econômico e ambiental em municípios de vocação extrativista—O caso de Salinas da Margarida-Ba. In *XIII Simpósio Brasileiro de Sensoriamento Remoto, Florianópolis, Brazil*, 21–26 April, pp. 3975–3982.

Heyning, J.E. & Heyning, C.A., 2001. Rescue of an orphaned California gray whale calf. *Aquatic Mammals*, **27**, 212–214.

Hofmann B., Scheer M. & Behr I.P., 2004. Underwater behaviors of short-finned pilot whales (*Globicephala macrorhynchus*) off Tenerife. *Mammalia*, **68**, 221–224.

International Whaling Commission., 1998. *Report of the scientific committee International Whaling Commission*, **48**, 447–450.

Kinas, P.G. & Bethlem, C.B.P., 1998. Empirical Bayes abundance estimation of a closed population using mark recapture data, with application to humpback whales, *Megaptera novaeangliae*, in Abrolhos, Brazil. *Report of the Scientific Committee International Whaling Commission*, **48**, 447–450.

Lessa, G.C., Dominguez, J.M.L., Bittencourt, A.C.S.P. & Brichta, A., 2001. The tides and tidal circulation of Todos os Santos Bay, Northeast Brazil: a general characterization. *Anais Academia Brasileira Ciências*, **73**, 245–261.

Martins, C.C.A., Morete, M.E., Engel, M.H., Freitas, A.C., Secchi, E.R. & Kinas, P.G., 2001. Aspects of habitat use patterns of humpback whales in the Abrolhos Bank, Brazil, breeding ground. *Memoirs of the Queensland Museum*, **47**, 563–570.

Morete, M.E., Freitas, A.C., Engel, M.H. & Glock, L., 2000. Tourism characterization and preliminary analyses of whale watching on humpback whales (*Megaptera novaeangliae*) around Abrolhos archipelago, southeastern Bahia, Brazil. Paper presented to the International Whaling Commission Scientific Committee: SC/52/WW6.

Morete, M.E., Freitas, A., Engel, M.H., Pace III, R.M. & Clapham, P.J., 2003a. A novel behavior observed in humpback whales on wintering grounds at Abrolhos Bank (Brazil). *Marine Mammal Science*, **19**, 694–707.

Morete, M.E.; Pace III, R.M.; Martins, C.C.A.; Freitas, A.C. & Engel, M.H., 2003b. Indexing seasonal abundance of humpback whales around Arquipélago dos Abrolhos, Bahia, Brazil. *Latin American Journal of Aquatic Mammals*, **2**, 21–28.

Morete, M.E., 2003. Observação de ponto-fixo para estudo comportamental das baleias jubarte e a interação com embarcações ao redor do Arquipélago de Abrolhos, Bahia. In *XXI Encontro Anual de Etologia e III Simpósio de Ecologia Comportamental e de Interações, Uberlândia, MG. Brazil*, 30 October to 02 November 2003.

Petta, C.B., Andriolo, A., Morete, M.E. & Martins, C.C.A., 2006. Comportamento respiratório das baleias jubarte (Megaptera novaeangliae) em seu sítio reprodutivo no Banco dos Abrolhos, Bahia, Brazil. In *I Iva Reunión de trabajo de especialistas en mamíferos acuáticos de América Del Sur—5to Congreso de la sociedad Latinoamericana de especialistas en mamíferos acuáticos*. p 155.

Richardson, W.J., 1995. Documented disturbance reactions. In *Marine mammals and noise* (ed. W.J. Richardson et al.), pp. 241–324. San Diego: Academic Press.

Silva Jr, J.M., Silva, F.J.L. & Sazima, I., 2005. Rest, nurture, sex, release, and play: diurnal underwater behaviour of the spinner dolphin at Fernando de Noronha Archipelago, SW Atlantic. *Aqua, Journal of Ichthyology and Aquatic Biology*, **9**, 161–176.

Simmonds, M., Dolman S. & Weilgart, L., 2003. Oceans of noise. *Whale and Dolphin Conservation Society Science Report*, Chippenham, UK. 164pp.

Souto, L.R.A., Oliveira, J.G.A., Nunes, J.A.C.C., Maia-Nogueira, R. & Sampaio, C. L. S., 2007. Análise das mordidas de tubarões-charuto, *Isistius* spp. (Squaliformes: Dalatiidae) em cetáceos (Mammalia: Cetacea) no litoral da Bahia, Nordeste do Brasil. *Biotemas*, **20**, 19–25.

Stevick P.T., Godoy L.P., Mcosker, M., Engel M.H. & Allen, J., 2006. A note on the movement of a humpback whale from Abrolhos Bank, Brazil to South Georgia. *Journal of Cetacean Research and Management*, **8**, 297–300.

Stewart, B.S. 2001. Introduction and background to the collected papers on the rescue, rehabilitation, and scientific studies of JJ, an orphaned California gray whale calf. *Aquatic Mammals*, **27**, 203–208.

Tavares, J.S., 1916. A pesca da Baleia no Brazil. *Broteria*, **14**, 69–80.

Wedekin, L.L., Freitas, A., Engel, M.H. & Sazima, I., 2004. Rough-toothed dolphins (*Steno bredanensis*) catching diskfishes while interacting with humpback whales (*Megaptera novaeangliae*) off Abrolhos bank breeding ground, Brazil. *Aquatic Mammals*, **30**, 327–329.

Weinrich, M.T., Lambertson, R.H., Belt, C.R., Schilling, M.R., Iken, H.J. & Syrjala, S.E., 1992. Behavior reactions of humpback whales *Megaptera novaeangliae* to biopsy procedures. *Fishery Bulletin*, **90**, 588–598.

Winn, W.E. & Reichley, N.E. 1985. Humpback whale, *Megaptera novaeangliae* (Borowski, 1781). In *Handbook of marine mammals*, Vol. 3. New York: Academic Press. Inc.

Zerbini, A.N., Andriolo A., Heide-Jørgensen, M.P., Pizzorno, J.L., Maia, Y.G., VanBlaricom, G.R., DeMaster, D.P., Simões-Lopes, P.C., Moreira, S. & Bethlem, C., 2006. Satellite-monitored movements of humpback whales *Megaptera novaeangliae* in the Southwest Atlantic Ocean. *Marine Ecology Progress Series*, **313**, 295–304.

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