Pygmy right whale *Caperea marginata* records from Namibia

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All known records of pygmy right whales *Caperea marginata* in Namibia since 1978 are summarised for the first time, including 12 strandings (live and recently dead animals) and skeletal remains from at least eight more individ-uals. The majority of strandings and remains were located in the Walvis Bay region, where the coastal topography of the bay and lagoon may be a primary cause for the relatively high incidence of strandings in this area. Strandings appear to occur only during the austral summer, between November and March. All but two of the records for which age is available were juveniles, suggesting that the area offshore of Walvis Bay may function as a seasonal nursery ground and that the inexperience of younger animals may cause them to become 'entrapped' in the bay. These data contribute substantially to the limited information on pygmy right whale distribution worldwide and the cetacean fauna of Namibia.

Keywords: Benguela Current, strandings, Walvis Bay

Introduction

Few data exist on the pygmy right whale *Caperea marginata*. Found only in temperate waters of the Southern Hemisphere, most records of the species are from between 30° and 55° S. Sightings have been documented throughout the year in Tasmania and seasonally along the coasts of South Australia, New Zealand, South Africa, the Falkland Islands, and some areas of Antarctica (Kemper 2002, 2009), but its range is poorly described. The majority of sightings and strandings are recorded from the Pacific and Indian oceans, specifically off the coasts of Tasmania, southern Australia and New Zealand (Matsuoka et al. 1996, 2005, Kemper 2002, Gill et al. 2008), with far fewer reports from the Atlantic region. Because *C. marginata* are so rarely sighted at sea, most of what is known about this species comes from strandings (Gill et al. 2008), making the publication of the following Namibian records of considerable importance to the advancement of our knowledge of this species.

Apart from an unpublished study of coastal bottlenose dolphins *Tursiops truncatus* carried out in the Walvis Bay area in 1993–1994 (Best 2007), and annual aerial surveys for southern right whales *Eubalaena australis* (Roux et al. 2001), the cetacean fauna of the Namibian coast is poorly documented. However, dedicated research efforts have been underway in Walvis Bay and Lüderitz (Figure 1) since 2008, and a number of publications have arisen from these (Barendse et al. 2011, Elwen and Leeney 2011, Leeney et al. 2011). In addition to carrying out research on coastal cetaceans at several sites along the Namibian coast, researchers have also revived interest in a strandings network at Walvis Bay (Walvis Bay Strandings Network [WBSN]), and have trained interested members of the local community to document stranded cetaceans and, where possible and practical, to refloat live stranded animals.

Among the strandings from the Walvis Bay area, several have been *C. marginata*. This note documents these records and combines them with all the known records of this species from Namibia since 1978. A distinction has been made between documented 'strandings' (where an animal was known to strand live or a reasonable date of occurrence can be allocated to the record) and 'remains' (where only skeletal remnants have been discovered). The information has come from diverse sources, such as skeletal material collected by members of the public, live strandings, press cuttings (with photographs) relating to past stranding events, photographs, and remains in the possession of local people in Walvis Bay who remembered some details of the stranding event. Because of this, the same level of detail was not always available for each record of a stranding or remains.

For the purposes of this paper, strandings classified as recently dead were those that were still intact and with soft tissue still attached, even though decomposition might have been advanced. Whole specimens of *Caperea* were identified from the characteristic head profile, baleen shape and

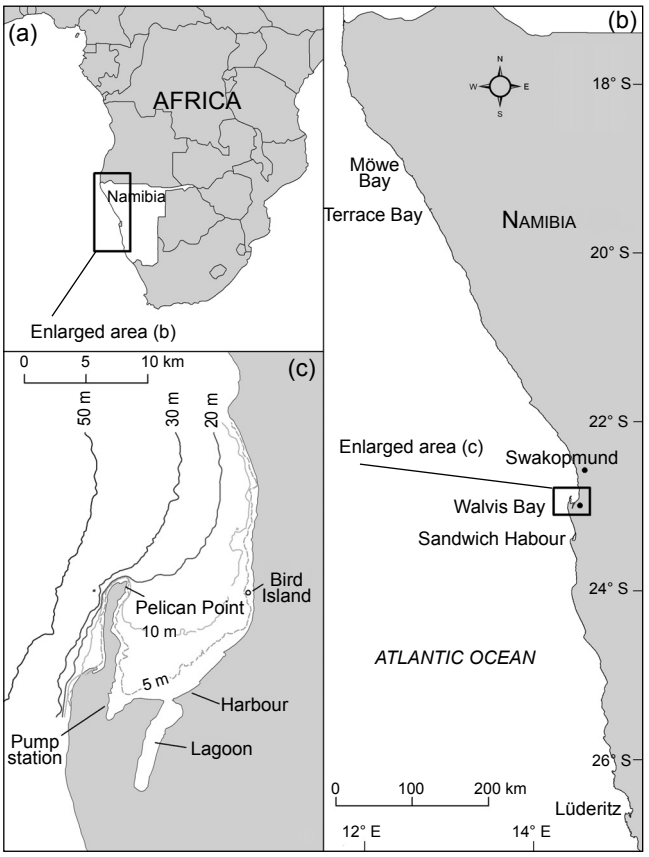

Figure 1: Map of the study area: (a) southern Africa, indicating the location of Namibia; (b) the Namibian coastline, indicating the location of Walvis Bay; and (c) a detailed map of Walvis Bay

colouration, and lack of ventral grooves. Skeletons were identified from the skull profile and shape, characteristic mandible, number and flattened shape of ribs, and rounded shape of lateral processes of vertebrae. Animals classified as juvenile were those immediately post-weaning, believed to occur at 3–3.5 m, and those as adults were animals >5.5 m in length; equivalent skull measurements were a supraoccipital length of <350 mm and >550 mm respectively (based on Kemper and Leppard 1999).

Strandings

Twelve strandings[1] of live (n = 7) or recently dead (n = 5) *C. marginata* have been documented; in reality, some of the other remains documented here may have originated from individuals that died close inshore or live stranded but were undetected at the time (Table 1).

On 24 November 1978, a whale was reported stranded south of Bird Island guano platform, Walvis Bay (Figure 1). Photographs taken later showed it to be an adult *C. marginata*, measuring at 6.1 m (20 feet). No material was collected. When examined a few days after discovery, the head was damaged and the baleen missing.

On 14 November 1980, a dead adult *C. marginata* was found floating next to a fisheries jetty in Walvis Bay port. It was towed out of the harbour, but washed up on the adjacent beach the following day. When examined (by PBB) on 17 November its epidermis had sloughed off, the baleen was missing and on dissection the body proved highly decomposed. The skeletal remains were collected and now reside at the Iziko South African Museum in Cape Town.

On 17 February 1989, a juvenile *C. marginata* was found dead but fresh in the Walvis Bay lagoon near the salt works pump station (at the south-west corner of Walvis Bay, Figure 1), having probably come ashore overnight. It was frozen whole and shipped to the Iziko South African Museum in Cape Town.

Three days later (20 February 1989), a specimen of *C. marginata* was found stranded live in the same locality. It was estimated at 0.5 m longer than the earlier specimen and paced off at 3.7 m in length. Seven black and white and six colour images are available that confirm identity and relative size. It was refloated later the same day, but had become badly sunburnt and during refloating the skin from the whole right side of the animal floated off. No samples were taken. The coastline was watched for the ensuing week, but up to two weeks later there was no report of a re-stranding.

During the night of 29–30 March 1991, a juvenile *C. marginata* was found stranded live in the Walvis Bay lagoon near the salt works. It was refloated, but was found dead on 2 April, having come ashore the previous night. It was described on dissection as emaciated (Mammal Research Institute Whale Unit records) and its skeleton is now in the Iziko South African Museum in Cape Town (Table 1).

On 19 January 1994, a juvenile *C. marginata* was found dead and already decomposing in the Walvis Bay lagoon near the salt works pump station — almost 90% of the epidermis had already been lost. A section of baleen was collected and is now lodged at the Iziko South African Museum.

On 4 March 2003, a live *C. marginata* stranded near the salt works pump station. The animal had no apparent external injuries and the strongly arched jaw, narrow rostrum and white baleen gum characteristic of this species were apparent (Kemper 2009, Figure 2a, b). The individual was measured, photographed and successfully refloated. The length of the individual (Figure 2b) suggests the animal was a juvenile (Kemper and Leppard 1999).

In 2004, a very decomposed carcass of a *C. marginata* was discovered, also near the salt works (Figure 3). No details, other than several photographs held by the WBSN, were collected for this stranding.

During February 2005, a juvenile *C. marginata* live stranded near the pump station of the salt works at Walvis Bay and was refloated by the WBSN (Figure 4a). This animal had circular scars on its flanks (Figure 4b), most likely the result of attempted cookie-cutter shark bites (Best 2007). The animal was not sighted again after refloatation. No other data on this incident were recorded.

On 6 January 2010, a juvenile *C. marginata* stranded near the pump station. The individual was approximately 3.5 m in length (Figure 5). The animal was refloated within several hours of the initial report, whereupon it immediately attempted to return to the beach — four times

[1] Recent stranding information added while the article was in press

Table 1: Summary of all records of *Caperea marginata* strandings and skeletal remains found in Namibia. Sources — Mammal Research Institute Whale Unit (MRI); Rotterdam Museum of Natural History (RM); collected by Namibian Dolphin project from local press/records (NDP); data collected by Walvis Bay Strandings Network (WBSN), or another source (source/author initials indicated)

Date	Length (m)	Sex	Locality	Material held	catalogue no.	Remarks	Source
24 Nov 1978	6.1	Unknown	South of Bird Island, Walvis Bay	None (photos)	–	Found dead and decomposing	MRI
20 Jun 1978	2 juveniles	Unknown	Pelican Point	Skulls	ZM 39216 and ZM 39217	Skeletal remains only	MRI
14 Nov 1980	6.08	M	Walvis Bay	Skeleton	ZM 39768	Found floating dead	MRI
17 Feb 1989	3.32	F	Walvis Bay, salt works	Skeleton	ZM 40708	Found stranded dead	MRI
20 Feb 1989	~3.7	F	Walvis Bay, salt works	None (photos)	–	Stranded live; refloated	MRI
29 Mar 1991	3.23	M	Walvis Bay	Skull	ZM 41126	Stranded live, refloated, re-stranded dead	MRI
19 Jan 1994	3.4	M	Walvis Bay	Baleen section	ZM 41265	Found dead and already decomposing	MRI
19 Jul 1996	Juvenile	Unknown	19 28° S, 13 02° E (Skeleton Coast)	Vertebra	–	Skeletal remains found at the side of the road	MRI
1999	Juvenile	Unknown	Sandwich Harbour	Skull and six bones	RM 9990–00001449	Skeletal remains	RM
18 Jan 2002	3 juveniles	Unknown	Walvis Bay inner lagoon	Three crania	–	Skeletal remains found in mud	RM
4 Mar 2003	~3	Unknown	Walvis Bay lagoon	None	–	Stranded live; refloated	RM/*Namib Times*
Dec 2004	Unknown	Unknown	Walvis Bay lagoon	None	–	Decomposing carcass	WBSN
Feb 2005	Juvenile	Unknown	Walvis Bay lagoon	None	–	Stranded live, refloated	WBSN
6 Jan 2010	3.5	Unknown	Salt pans, Walvis Bay	None	–	Stranded live; refloated multiple times	WBSN
25 Mar 2012	Juvenile	Unknown	Walvis Bay lagoon	Right squamosal, periotic and bulla	–	Skull only	WBSN/ RHL
25 Mar 2012	Juvenile	Unknown	Pump station, Walvis Bay lagoon	Skeleton	–	Buried following live stranding at least four years prior to 2012	WBSN/ RHL
14 Feb 2013	3.57 (alive) 3.65 (dead)	F	Pump station, Walvis Bay lagoon	Vertebrae, ribs, skull	–	Stranded live, refloated. Found dead in Walvis Bay lagoon four days later	WBSN

— before finally swimming out into the bay. However, by the evening of the same day, it had re-stranded at the same location. On the following morning (7 January), the WBSN used a small motorised vessel to transport the whale out of the bay into open water beyond Pelican Point. The animal was released and no further sightings were reported.

On 25 March 2012, a full skeleton of a *C. marginata* was unearthed from the site where it had been buried by members of the WBSN 'at least four years ago' (N Dreyer, former WBSN lead member, pers. comm.; Figure 6). The animal stranded alive, close to the pump station, but subsequently died. The skeleton was soft and fragile after a considerable period of time in waterlogged conditions. The skull, several vertebrae and flipper bones have been retained by the Namibian Dolphin Project.

On 14 February 2013, a juvenile pygmy right whale stranded approximately 200 m south of the pump station. This individual was 3.57 m in length. The whale was refloated on the flooding tide, approximately five hours after the initial report, whereupon it swam directly out towards the mouth of the bay. Vocalisations were heard on three

occasions from this whale while it was on the beach — short, thump-like pulses that were not only heard but also felt as vibrations through the soles of the feet of those in the vicinity of the whale (RHL and SHE pers. obs.). This is consistent with observations by Dawbin and Cato (1992) of intense pulses in pairs and trios, produced by a juvenile pygmy right whale in Australia. On 18 February, a dead juvenile pygmy right whale, likely the same animal, was found stranded on a sand bar in the Walvis Bay lagoon, approximately 4 km south east of the pump station. The skull, vertebrae and ribs were collected and will be lodged at the National Museum in Windhoek, Namibia.

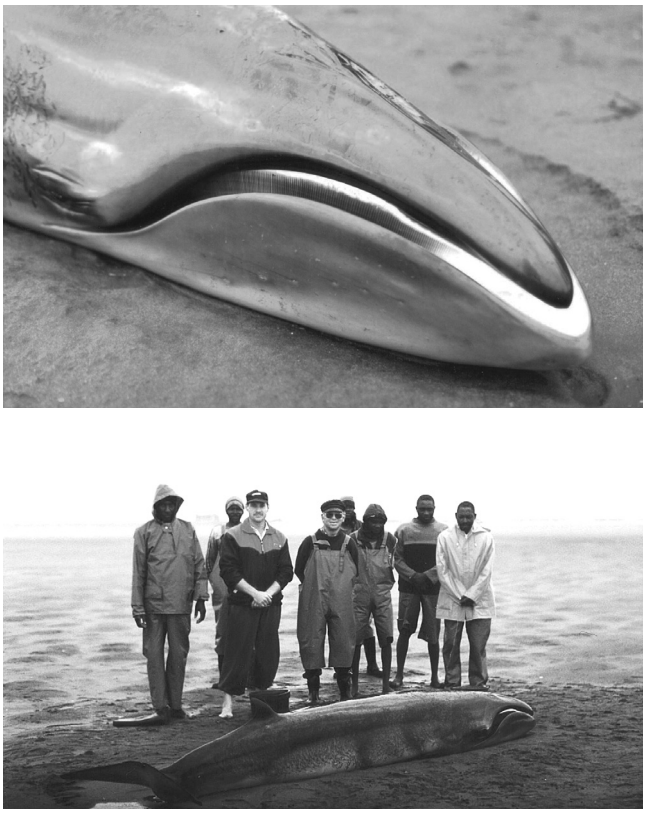

Figure 2: A juvenile *Caperea marginata* stranded in March 2003 displays the characteristic curved jaw line, narrow rostrum and creamy-white baleen plates with black edges

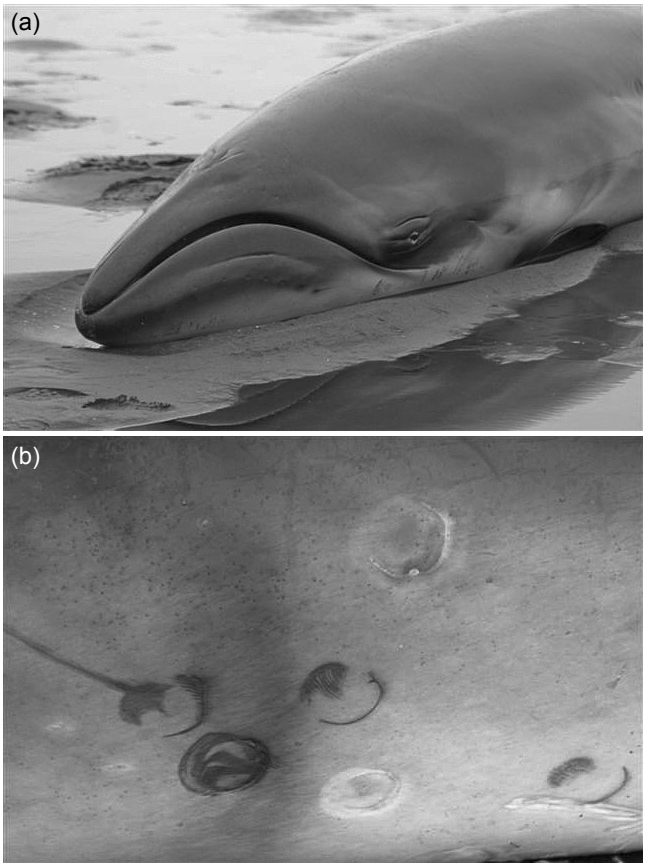

Figure 4: A stranded *Caperea marginata* from 2005, showing (a) dorsal chevron above and anterior to the flippers as mentioned in Gill et al. (2008); and (b) circular scars on the flank (likely attempted attachments by cookie cutter sharks)

Figure 3: A decomposed carcass of *Caperea marginata* found in February 2004

Figure 5: An ~3.5 m juvenile *Caperea marginata* stranded in January 2010

Remains

Skeletal remains of at least eight individuals have been recovered on the Namibian coast since 1978; all have been juveniles (Table 1). Where only partial remains of an individual were found, remains from very different localities have been assumed to belong to different individuals.

On 20 June 1978, a search of the beach at Pelican Point, Walvis Bay, revealed two crania of juvenile *Caperea*, together with crania from two *Mesoplodon layardii* and three *Kogia breviceps*, mandibles from one *K. breviceps* and a rostral portion from a small balaenopterid. All were completely free of flesh and had obviously been there for some time (likely over a year, although no information exists on estimating the age of a stranding in desert conditions). The crania of *C. marginata* are now housed in the Iziko South African Museum.

On 19 July 1996, a tourist picked up a single beach-worn *Caperea* dorsal vertebra half hidden in loose sand at the side of the coastal road west of Goas (in the vicinity of Möwe Bay, Figure 1): there were no other obvious skeletal remains at the site. The specimen was eventually forwarded to the Naturhistorisches Museum, Wien, Austria, where it was compared with the 16th dorsal vertebra from a near-complete juvenile *C. marginata* skeleton from New Zealand, and the identification confirmed. The sizes of the two vertebrae were also similar, and as the New Zealand specimen had a maximum skull width of 370 mm, equivalent to a predicted body length of about 2.9 m (Kemper and Leppard 1999), this confirmed that the vertebra came from a juvenile. The bone has been retained by the finder as a souvenir (K Bauer, Naturhistorisches Museum, Wien, pers. comm.).

In 1999, a cranium and partial skeleton of a *C. marginata* were found on the beach at the Sandwich Harbour lagoon (~50 km south of Walvis Bay). The remains were judged to be of a fairly recent stranding (probably several months old) due to the smell and high fat content of the bones. The cranium and some post crania were moved to Walvis Bay and were later transferred to the Rotterdam Museum of Natural History (see Table 1). The measurements of this cranium (Figure 7, Table 2), indicate that the individual was a juvenile with a total body length of 3.3–3.4 m (Kemper and Leppard 1999).

In January 2002, an intensive vehicle-based search of the coast was carried out over three days, spanning the area from Walvis Bay north to Terrace Bay (20° S), involving all publicly accessible beaches (approximately 70% of the coastline; Figure 1). The vehicle drove along

Figure 6: Skull and parts of the skeleton of *Caperea marginata* unearthed in March 2012, from a stranding in the lagoon, at least four years earlier

Figure 7: Skull of *Caperea marginata* held at Rotterdam Museum of Natural History

Table 2: Measurements of the *Caperea marginata* crania from Sandwich Harbour (1999) and Walvis Bay lagoon (2012), with associated body length estimates for each using Kemper and Leppard (1999)

Measurement	Sandwich Harbour skull (1999; mm)	Estimate of total body length (m)	Walvis Bay skull (2012; mm)	Estimate of total body length (m)
Supraoccipital length	335	3.3–3.4	314	3.1–3.2
Greatest skull width (GW)	452	3.43 (3.05–3.82)[a]	422	3.05–3.43[b]
Vertex height	210–220	3.04–3.35[c]	216	3.04–3.35[c]

[a] Predicted mean length (and lower and upper 95% limits) for GW of 450 mm
[b] Predicted mean length for individuals with GW of 400 and 450 mm
[c] Predicted mean length values for vertex heights of 200 mm and 225 mm

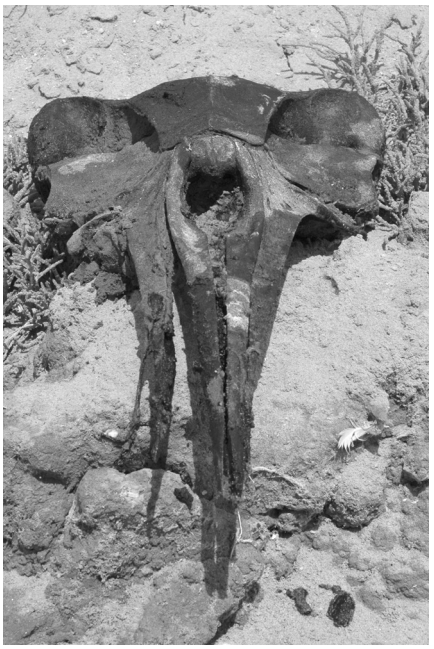

Figure 8: Skull of *Caperea marginata* found in March 2012

the high tide line and any visible carcasses were investigated further on foot. The Walvis Bay inner lagoon was also searched at low tide. While no remains of *C. marginata* were located on the beaches, skeletal remains of the species, including three damaged crania with bullae and periotics, as well as several individual bullae, periotics and parts of non-synostosed crania and post-crania, were collected from the mudflats of the Walvis Bay lagoon, near the pump station on 18 January 2002 (Figure 1). The first skull consisted of a mostly complete neurocranium with left frontal, left periotic and bulla. The second skull consisted of the neurocranium with left bulla and periotic (no frontals), and the third comprised parts of a basicranium, both squamosals and both petrotympanic complexes (see Kemper and Leppard 1999 for details of the *C. marginata* skeleton). Based on Kemper and Leppard (1999) and Ross et al. (1975), two crania were estimated to represent juvenile *C. marginata* of seven months old and the other, a juvenile of eight months old. These specimens were offered to the Namibian National Museum in Windhoek, but currently reside with the WBSN.

In March 2003, Sandwich Harbour lagoon (Figure 1) and the beach area between Sandwich Harbour and Walvis Bay were searched. A single *Kogia* skull was found, but no remains of *C. marginata* were found, and the partial skeleton left on the Sandwich Harbour beach in 1999 could not be located.

On 25 March 2012, a skull was found on the mudflats along the road to the pump station in Walvis Bay lagoon (Figure 8). The skull was in good condition and was measured for comparison with the Sandwich Harbour skull, to confirm the identity of the species (Table 2). It was slightly smaller in dimensions than the skull from Sandwich Harbour, and was estimated to come from an animal of 3.1–3.2 m in length. The skull has been retained by the WBSN.

Given the limited time spent searching the mud of Walvis Bay lagoon and the relative freshness of the bones uncovered there, it is likely that the remains of several other *C. marginata* or other species are still uncovered at this site.

Discussion

The majority of strandings of *C. marginata* reported here occurred within or near Walvis Bay. A considerable number of strandings of various species of cetaceans including humpback whales *Megaptera novaeangliae*, minke whales *Balaenoptera acutorostrata*/*bonaerensis* and dusky dolphins *Lagenorhynchus obscurus* (WBSN records, held by NDP) have occurred in Walvis Bay, usually in the south-west corner of the bay, near the pump station (Figure 1). Walvis Bay is a wide shallow bay with a very shallow seafloor gradient (maximum depth approximately 30 m in a bay ~10 km × 10 km in size), formed by a roughly 10 km long sand spit on the western side of the bay ending at the northern tip of Pelican Point (Figure 1). Coastal topography has been shown to influence the occurrence of strandings (Brabyn and McLean 1992). For cetaceans travelling southwards along Namibia's almost entirely straight coast, the northward facing Walvis Bay may act as a trap. As individuals move southwards into progressively shallower waters within the bay, they are likely to attempt to veer westwards into deeper waters, whereupon they would find themselves constrained by Pelican Point and would have to backtrack over 10 km northwards to exit the bay and continue southwards. The combination of shallow slope and the apparent dead-end reached by animals moving southwards in Walvis Bay may thus conspire to increase the likelihood of strandings. Although Walvis Bay is one of the more highly populated areas along the Namibian coastline and strandings are thus more likely to be reported in this area, the high incidence of strandings is nonetheless believed to be a reflection of the topography of the bay.

Of the 12 live or recently dead strandings of *C. marginata* reported here, seven were of live animals, all of which were juveniles. Six of these live strandings were refloated. At least three of these are known to have re-stranded and subsequently died; the fate of the other four individuals is unknown. Of the five documented dead strandings, two were juveniles, two were adults and the length of one individual was not recorded. Nonetheless, the high proportion of live stranded animals (all juveniles) suggests that *C. marginata* appearing on the Namibian coast may be stranding due to some extrinsic environmental factor such as the topography of the bay, rather than because of ill health, although no pathology studies have been done to confirm this theory.

Ross et al. (1975) suggested that there may be an inshore movement of juvenile *C. marginata* in spring and summer off southern Africa, which may constitute part of a post-weaning dispersal phase. Sekiguchi et al. (1992) proposed that this movement may coincide with an increased abundance nearshore of *C. marginata*'s prey during the summer upwelling period. Numerous strandings of this species, all 3–3.5 m long, have also been reported from Australia (Kemper and Ling 1991), suggesting that the stranding of juveniles may be a species trait. The data available from Namibia provide some support for this suggestion. Seven

of the nine *C. marginata* reported here, for which lengths were available, were juveniles <4 m in total length, and all eight skeletal remains were from juveniles. All 11 stranded animals for which date of discovery provides an estimate of stranding date (i.e. animals that were found live or had recently died) were recorded during the austral summer, between November and March (with adults only occurring in November). The high proportion of juveniles occurring in the stranding record suggests that the area may function as some sort of nursery ground and that the inexperience of younger animals may cause them to become 'entrapped' in Walvis Bay. Sergeant (1982) noted that minke whales in the Northern Hemisphere often strand when newly weaned, due to inexperience. In the same way, newly weaned *C. marginata* that become entrapped in Walvis Bay are less likely than adults to be able to navigate out into deeper waters.

Namibian waters appear to be used with some frequency by juvenile (and possibly also adult) *C. marginata*. Although much of the coast in northern Namibia is sparsely populated and rarely patrolled, apart from a single vertebra found on the Skeleton Coast, Walvis Bay at ~23° S represents the northernmost record of this species globally. The occurrence of *C. marginata* in the region is most likely associated with the cold, highly productive waters of the Benguela ecosystem, which may act as a feeding ground for the species (Best 2007). Given the increasing human threats in this ecosystem, especially prospecting and mining for hydrocarbons and marine phosphates (e.g. Namibian Marine Phosphate [Pty] Ltd and EnviroDynamics 2012), knowledge of the abundance and distribution of this species is essential if the impacts of such activities are to be fully understood (Elwen et al. 2011). This information would most feasibly be collected as part of an overall survey programme for cetaceans in coastal and offshore waters of Namibia, in conjunction with concurrent studies worldwide on population structure of *C. marginata* through genetic sampling of stranded material. These studies will provide a useful guide to the conservation of the species.

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