

PRELIMINARY ANALYSIS OF LARGE WHALE STRANDINGS IN SRI LANKA 1889-2004

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ABSTRACT

Records of large whale strandings in Sri Lanka since 1889 are scattered throughout the available literature but have never been subject to any analyses. Stranding records of the Cetacean families Balaenopteridae and Physeteridae, occurring between 1889 and 2004 are compiled here into a single comprehensive list and examined in terms of species composition, area of coastline from where strandings have been recorded and month. Records are compiled through a literature survey of published historical data and supplemented with recent unpublished data collected by the author. According to the present data six species of large whales including *Balaenoptera musculus*, *Balaenoptera physalus*, *Balaenoptera acutorostrata*, *Balaenoptera edeni*, *Megaptera novaeangliae* of the family Balaenopteridae and *Physeter macrocephalus* of the family Physeteridae have stranded along Sri Lanka's coastline. Strandings have occurred all round the island with the majority being on the west coast. Overall, the largest number of stranding events has occurred in the months of August and November but there are species-wise differences in the stranding data.

Key words Sri Lanka, Cetacean, large whales, stranding, 1889-2004.

INTRODUCTION

Sri Lanka is an island located centrally in the northern Indian Ocean between latitudes 5° - 10° N and longitudes 79° - 82° E (Fig. 1). The island is surrounded by a narrow continental shelf with an average width of only 11 nm (Wijeyananda, 1997), which broadens out only in the waters off the northern sector where it becomes contiguous with the continental shelf of India. Other than in the north where the island is in close proximity to the Indian sub-continent Sri Lanka has no continental land mass near it in the west, south or east. This unique location makes the waters around Sri Lanka rich in marine mammal fauna.

The first documented large whale stranding in Sri Lanka is that of a sperm whale (*Physeter macrocephalus*) that stranded on the northern coast in September 1889 (Deraniyagala, 1960). Since

then sporadic strandings of both large and small marine mammals of the order Cetacea have been documented in the available literature (Deraniyagala, 1948, 1963, 1965a, 1965b; Leatherwood & Reeves, 1989). While these records remained scattered in numerous documents for over a hundred years, they were compiled into a single list only as recently as the year 2002 (Ilangakoon, 2002). This list containing 78 stranding events appeared as an appendix in a general book on whales and dolphins in Sri Lanka and no analysis of this data has been undertaken to date.

The present paper concentrates on large whale strandings of species belonging to the two families Balaenopteridae and Physeteridae under the order Cetacea. It aims at consolidating all available large whale stranding records from around Sri Lanka that occurred between 1889 and 2004 into a single comprehensive list. It also gives the results of a

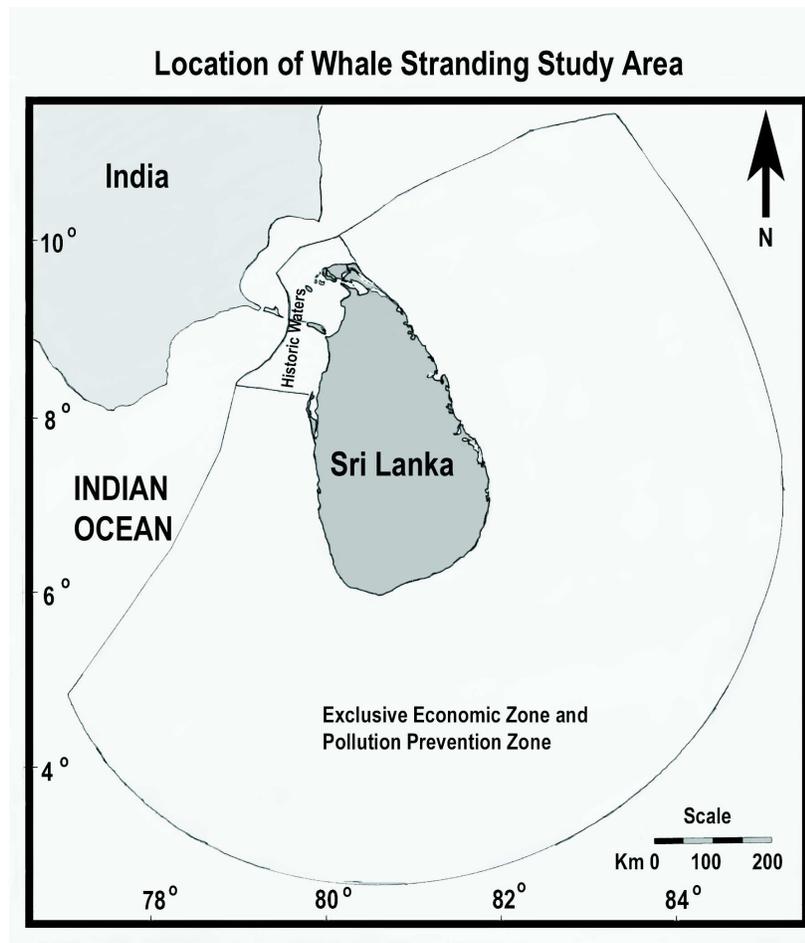


Fig. 1. Map of Sri Lanka with the study area for reference.

preliminary analysis of these records in terms of species richness, area of coastline where they occurred and time of year when strandings occurred.

MATERIAL AND METHODS

Data on large whale strandings between 1889 and 1985 have been extracted through a literature survey of available documentation and examination of corresponding museum specimens where available. Data from 1985 to the present have been compiled from strandings personally examined by the author or reported to the author with authenticated evidence such as good quality

photographs, measurements and specimens. News reports appearing in electronic and print media were also used to locate strandings in far off places. If such a stranding could not be personally examined by the author it has only been used when other supporting evidence like good photographs were available to verify that it was in fact a large whale stranding, occurring on a particular date, at a particular place but news reports alone have not been used for species identification. The preliminary list of strandings compiled by the author and published as an appendix to a book on marine mammals in 2002 also contained records on small cetaceans. Therefore, for the purpose of the present paper a new list was compiled only with the

revised and updated data on large whales being used. New large whale stranding records since 2001 have also been added to the data used in this paper.

The data thus compiled has been examined here for the first time in terms of species of large whales stranding on Sri Lanka's coastline. The data was then divided into different areas of coastline as north, west, south and east to look for any prevalent patterns and the time of year when the stranding events have taken place was also examined. In some older records only the year of the stranding is reported and the exact date and month of stranding were not mentioned. Thus only 58 records were analyzed for seasonal variation in stranding data.

These three factors were subsequently compared in order to determine if there exists any correlation between them and if so how this can be explained. For the comparison between month of stranding and species only the data on the four species *Balaenoptera musculus*, *Balaenoptera physalus*, *Balaenoptera acutorostrata* and *P. macrocephalus* were used as these were the only species that represented more than 10% each of the total recorded strandings. *Balaenoptera edeni* and *Megaptera novaeangliae* each had less than 10% of the total documented strandings and were not

considered due to the data being inadequate for any meaningful comparison in terms of seasonality.

RESULTS

A total of 66 large whale stranding records were compiled from the available literature and recent data collected by the author (Table 1). Some of the records were found to have incomplete information in terms of exact dates and species identification but all records used for this paper can be authenticated.

Species Richness

Of the 66 documented large whale strandings species identification was not available for eight records comprising 12.1% of the total. The 58 remaining stranding records are of the six species *B. musculus*, *B. physalus*, *B. acutorostrata*, *B. edeni*, *M. novaeangliae* and *P. macrocephalus* (Table 1). The species with the largest number of recorded strandings (21) comprising 31.8% of the total is *P. macrocephalus*. This is followed by *B. musculus* (15) with 22.7% of the total, *B. physalus* (9) 13.6%, *B. acutorostrata* (8) 12.1%, *B. edeni* (3) 4.6% and *M. novaeangliae* (2) 3.0% (Table 1).

Table 1. Large whale strandings in Sri Lanka by species and coastline

| Species | North Coast | | West Coast | | South Coast | | East Coast | | Total | |
|--------------------------|-------------|-------------|------------|-------------|-------------|-------------|------------|------------|-----------|--------------|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| <i>B. musculus</i> | 0 | - | 7 | 46.6 | 4 | 26.7 | 4 | 26.7 | 15 | 22.7 |
| <i>B. physalus</i> | 1 | 11.1 | 7 | 77.8 | 1 | 11.1 | 0 | - | 9 | 13.6 |
| <i>B. acutorostrata</i> | 7 | 87.5 | 1 | 12.5 | 0 | - | 0 | - | 8 | 12.1 |
| <i>B. edeni</i> | 0 | - | 1 | 33.3 | 1 | 33.3 | 1 | 33.3 | 3 | 4.5 |
| <i>M. novaeangliae</i> | 0 | - | 2 | 100.0 | 0 | - | 0 | - | 2 | 3.0 |
| <i>P. macrocephalus</i> | 1 | 4.8 | 15 | 71.4 | 5 | 23.8 | 0 | - | 21 | 31.8 |
| <i>Unidentified spp.</i> | 0 | - | 6 | 75.0 | 1 | 12.5 | 1 | 12.5 | 8 | 12.1 |
| Total | 9 | 13.6 | 39 | 59.1 | 12 | 18.2 | 6 | 9.1 | 66 | 100.0 |

Area of Coastline

The majority (39) of recorded large whale strandings, accounting for 59.1% of the total have taken place along the western coastline of the island (Table 1). This is followed by the south coast (12) with 18.2%, north coast (9) with 13.6% and the east coast (6) with 9.1% of the total recorded strandings (Table 1).

Month of Stranding

When the 58 stranding records with a date including the month of stranding were examined for the number of strandings that had occurred in each month of the year, twin peaks were observed in the months of August and November with each month comprising 17.2% of the total (Fig.2). This was followed by the months of January and April with 10.3% each of the documented strandings. July had a further 8.6% of strandings while February, May and June had 6.9% each. March, September and October had only 5.2% each of the recorded

strandings while the month of December had no records at all.

Comparison of Species, Area of Coastline and Month of Stranding

The stranding data on all 66 records was examined in relation to species and the area of coastline where the strandings occurred. The majority of strandings in all species except *B. acutorostrata* and *B. edeni* have occurred on the west coast. Accordingly, *B. musculus* had 46.6%, *B. physalus* had 77.8%, *M. novaeangliae* had 100% and *P. macrocephalus* had 71.4% of strandings on the west coast (Table 1). *B. acutorostrata* had 87.5% of strandings occurring on the northern coast and *B. edeni* had only three recorded stranding with one each on the west, south and east coasts. Meanwhile 75.0% of the strandings where the species has not been identified have also been on the west coast.

When the stranding records were examined to determine if there is any connection between

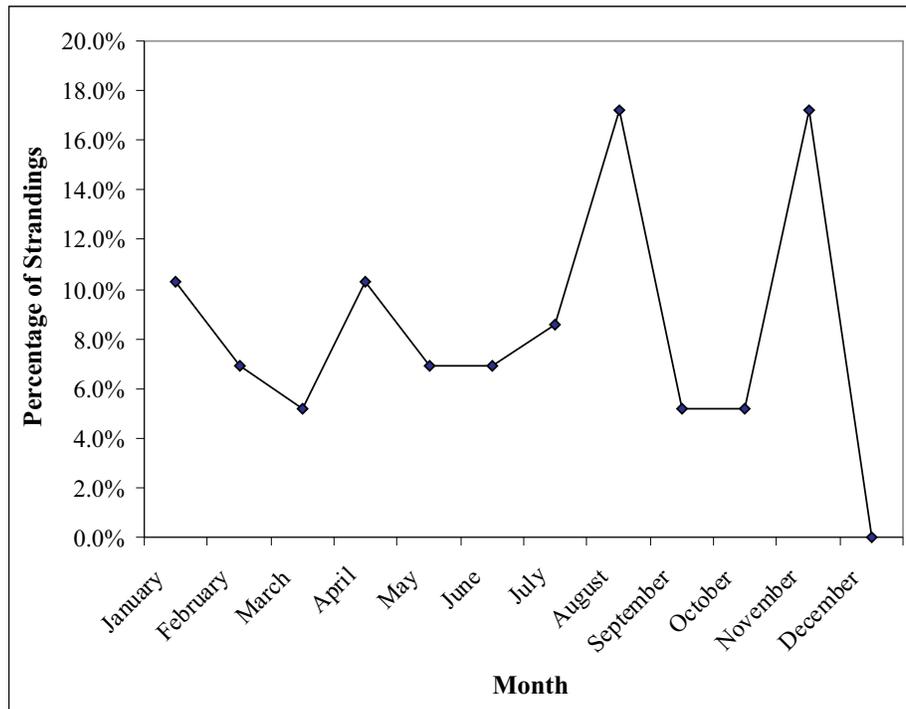


Fig. 2. Monthly variation in large whale strandings in Sri Lanka 1889-2004.

Table 2. Large Whale Strandings in Sri Lanka by species and months

| Month | <i>B.musc</i> | | <i>B.phys</i> | | <i>B.acut</i> | | <i>B.eden</i> | | <i>M.nova</i> | | <i>P.macr</i> | | <i>Unid.spp.</i> | | Total | |
|-----------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|------------------|------|-------|------|
| | No. | % | No. | % | No. | % |
| January | 1 | 7.7 | 0 | 0.0 | 2 | 25.0 | 0 | 0.0 | 1 | 50.0 | 1 | 5.6 | 1 | 20.0 | 6 | 10.3 |
| February | 1 | 7.7 | 2 | 22.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 5.6 | 0 | 0.0 | 4 | 6.9 |
| March | 1 | 7.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 11.1 | 0 | 0.0 | 3 | 5.2 |
| April | 4 | 30.8 | 1 | 11.1 | 0 | 0.0 | 0 | 0.0 | 1 | 50.0 | 0 | 0.0 | 0 | 0.0 | 6 | 10.3 |
| May | 2 | 15.4 | 0 | 0.0 | 1 | 12.5 | 0 | 0.0 | 0 | 0.0 | 1 | 5.6 | 0 | 0.0 | 4 | 6.9 |
| June | 0 | 0.0 | 3 | 33.3 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 20.0 | 4 | 6.9 |
| July | 2 | 15.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 11.1 | 1 | 20.0 | 5 | 8.6 |
| August | 0 | 0.0 | 3 | 33.3 | 0 | 0.0 | 2 | 66.7 | 0 | 0.0 | 4 | 22.2 | 1 | 20.0 | 10 | 17.2 |
| September | 1 | 7.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 11.1 | 0 | 0.0 | 3 | 5.2 |
| October | 1 | 7.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 5.6 | 1 | 20.0 | 3 | 5.2 |
| November | 0 | 0.0 | 0 | 0.0 | 5 | 62.5 | 1 | 33.3 | 0 | 0.0 | 4 | 22.2 | 0 | 0.0 | 10 | 17.2 |
| December | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Total | 13 | 22.4 | 9 | 15.5 | 8 | 13.8 | 3 | 5.2 | 2 | 3.4 | 18 | 31.0 | 5 | 8.6 | 58 | 99.9 |

species and the time of year when strandings occurred, the most commonly stranded species, *P. macrocephalus* showed clear peaks in the months of August and November with 22.2% in each month (Table 2). The other 77.8% of strandings of this species were evenly distributed in small numbers throughout the year except in the months of April, June and December when no strandings were documented. *B. musculus* with the second highest number of strandings showed a peak of 30.8% of the total in the month of April, followed by 15.4% each in the months of May and July (Table 2). Small numbers of strandings of this species have also been recorded in the months of January, February, March, September and October while none are recorded for the months of June, August, November

and December. *B. physalus* had 33.3% each of the total recorded strandings in the months of June and August (Table 2). Small numbers of strandings of this species have also been recorded in February and April while none are reported for all other months of the year. *B. acutorostrata* has a clear peak (62.5%) in strandings in the month of November with the rest of the strandings recorded in January and May and none in any other month of the year (Table 2).

DISCUSSION

The stranding data indicates high species richness in relation to large cetaceans in the northern Indian Ocean waters around Sri Lanka. While the most

commonly stranded species is *P. macrocephalus* of the sub-order Odontoceti, five species of Balaenopterids have also stranded periodically on Sri Lanka's coastline since the first record in 1889 (Deraniyagala, 1960). It is interesting however, that *Balaenoptera borealis* (sei whale) has never been found stranded anywhere along Sri Lanka's coastline because 10 strandings of this species have been recorded from the Indian coast, with several of these being stranded in southern India along the Palk Bay and Gulf of Mannar coast (Venkataraman *et al.*, 1973; Mohomad Kasim & Balasubramanian, 1989; Kumaran, 2002; Sathasivam, 2003). This is especially noteworthy because the Palk Bay/Gulf of Mannar is the closest part of the Indian coastline to Sri Lanka with the two countries being separated by a distance of only 22 nm across the narrow Palk Strait. Deraniyagala (1948) however has noted that descriptions of some stranded animals in Sri Lanka that were destroyed before proper examination could fit *B. borealis*. Therefore, it is possible that some of the stranding records from the period before 1985 considered here as unidentified whales, could have been *B. borealis* although there is no conclusive evidence.

The majority of strandings have occurred on the west and south coasts according to the present data although there are species-wise differences. While this is difficult to explain it should be taken into consideration that data for the most recent two decades may be slightly biased in this respect as more strandings would have been reported from the west and south coasts while some strandings from the north and east may have gone unreported due to security limitations making these areas less accessible to researchers. However, this bias does not apply to the earlier data and therefore its overall impact on the findings would be considerably small.

The data presented here indicate that the two species *B. musculus* and *B. edeni* have stranded in all areas other than the northern coast of Sri Lanka. This could be a result of the narrow continental shelf around these parts of the country in comparison to the north where the shelf is broader. Both species are generally considered as open ocean animals (Jefferson *et al.*, 1994) but may come close to land to feed. In Sri Lanka *B. musculus* has been observed feeding just off the continental

shelf (Alling *et al.*, 1991) and even within the shelf (Ilangakoon, 2006), while *B. edeni* has been observed both by the shelf edge and in shallower waters within the shelf (Ilangakoon, 2002). *B. acutorostrata* is a species known to occur in shallow coastal waters in most parts of its worldwide range (Jefferson *et al.*, 1994). This could explain the majority of strandings of this species occurring around Sri Lanka being in the north where the continental shelf is broader. Some of these strandings have been on coastal islets such as Delft, Kayts, Analaitivu and Velanai (Deraniyagala, 1963) that lie off the northern coastline. The reason for the majority of *B. physalus* strandings in Sri Lanka occurring on the west coast is unclear especially as only a few live sightings of this species are recorded from the east coast (Deraniyagala, 1960) with none from the west coast (Ilangakoon, 2002). As there are only two *M. novaeangliae* strandings recorded no explanation is attempted in terms of area of occurrence for this species.

In the most frequently stranded species *P. macrocephalus* it is puzzling that most of the strandings have occurred on the west coast while none have been recorded on the east coast. This is particularly interesting because it is well documented that large numbers of sperm whales have been frequently sighted in the deep waters of the Trincomalee canyon off the east coast of Sri Lanka (Alling *et al.*, 1986; Leatherwood *et al.*, 1984; Gordon, 1991; Ilangakoon, 2002). However, sightings have also been reported off the west and south coasts (Ilangakoon, 2002, 2006; Ocean Alliance, 2003). A possible explanation for the strandings being mainly on the west coast is that animals of this species usually favour deep oceanic waters and are more likely to strand in areas where the continental shelf is narrow. With the generally narrow continental shelf around Sri Lanka the shelf break is not too far from land off the west coast of the island and could therefore account for the large number of *P. macrocephalus* strandings. This is also substantiated by Gordon (1991) who states that sperm whales were most often heard near the edge of the continental shelf on the Sri Lankan side of the Gulf of Mannar (north-west coast). It is therefore possible that *P. macrocephalus* accidentally strays into coastal waters more often where the continental shelf is narrow on the west coast and are

susceptible to stranding there, while the deep water canyon close to land, frequented by them on the east coast prevents straying into the shallows and as a result there are less strandings in the east.

While stranding events have generally occurred in Sri Lanka almost throughout the year the significance of August and November being peak months is not yet apparent. When the stranding data were looked at in relation to species and time of year when strandings occurred it was interesting to note that *B. musculus* strandings were distributed throughout the year except November and December. This is a species known to undertake regular annual migrations between high latitude summer feeding grounds and warmer, low latitude wintering grounds (Leatherwood & Reeves, 1983). However, strandings around Sri Lanka have occurred even in the southern summer months of January and February indicating that not all animals of this species found in Sri Lanka's waters undertake regular migrations but may remain in these low latitude waters throughout the year. The possibility of a resident population off the northeast coast of Sri Lanka has previously been mentioned by Leatherwood & Reeves (1989). Meanwhile, Alling (1991) indicated that Sri Lankan waters appear to be an important feeding area for *B. musculus*, while Ilangakoon (2002) reports that sightings of this species have been recorded around Sri Lanka in all months of the year indicating that at least some animals may be resident year-round. The present data substantiates these earlier references indicating that at least part of the *B. musculus* population in the waters around Sri Lanka is present throughout the year. Alternatively the blue whales in Sri Lanka's waters could be of the sub-species *Balaenoptera musculus brevicauda* whose migratory patterns are not well understood and may have different movement patterns which explain the year-round presence of some animals in Sri Lanka's waters.

B. Physalus is also a species that undertakes annual migrations and Leatherwood and Reeves (1983) suggest that most southern ocean animals that winter in the Indian Ocean are found in waters between 20° S and 40° S. However, the present data suggests that at least a few stragglers of this species wander much further north to the tropical waters around Sri Lanka in the southern winter. All

strandings of this species around Sri Lanka have occurred between autumn and early spring indicating that this species unlike *B. musculus* definitely undertakes regular seasonal migrations. *B. acutorostrata* on the other hand is a species that may or may not undertake regular seasonal migrations (Leatherwood & Reeves, 1983; Jefferson *et al.*, 1994) and is known to stay year round in many parts of its range. The present data show that strandings have occurred in both summer and winter months in Sri Lanka indicating that the population in the waters around the island is probably non-migratory. *P. macrocephalus* strandings in Sri Lanka are distributed throughout the year and this is not unusual in that the females and calves of this species are known to stay in tropical waters throughout the year (Leatherwood & Reeves, 1983). Gordon (1991) stated that during the two spring field seasons when sperm whale surveys were conducted off Sri Lanka the majority of sightings of this species were of females and immature males. However, it should be noted that according to the present data larger numbers of strandings of this species have occurred in autumn and early winter but it is not possible to offer any explanation for this at present.

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