

**MONITORING THE PRESENCE AND OCCURRENCE OF BOTTLENOSE DOLPHINS
(*TURSIOPS TRUNCATUS*) IN COASTAL ABERDEENSHIRE WATERS, NORTH EAST
SCOTLAND**

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INTRODUCTION

The resident population of bottlenose dolphins (*Tursiops truncatus*) in the Moray Firth, Scotland is considered to be of international importance. Indeed, an area of the inner Moray Firth was recently designated as a candidate Marine Special Area of Conservation (mSAC) specifically for the conservation of this species. However, data collected during the present study suggests that the range of bottlenose dolphins from the Moray Firth population extends considerably beyond the boundaries of such protected waters.

The Sea Watch Foundation conducted land- and vessel-based cetacean surveys in the coastal waters of Aberdeenshire over a 3 year period (1999-2001) in order to collect data on the occurrence and abundance of bottlenose dolphins in North East Scotland. Although bottlenose dolphins were the primary focus of these surveys, several other cetacean species were additionally recorded during the survey work, in particular, the harbour porpoise, *Phocoena phocoena* and the white-beaked dolphin, *Lagenorhynchus albirostris* (Weir & Stockin, 2001)

This paper presents the first systematic study of bottlenose dolphins within the Aberdeenshire waters of North East Scotland.

METHODS

The study area was located along the coast of Aberdeenshire, North East Scotland (Fig. 1) in a shallow region of the North Sea. Data presented here were collected using a combination of land-based surveys carried out along the coastline throughout the year, and a series of vessel-based transects between March and October.

Both land- and vessel-based surveys utilised trained observers to conduct effort related sighting surveys. A continuous scanning methodology (Altmann, 1984) was implemented primarily with the naked eye, but supplemented with regular binocular scans (8-10x magnification) where appropriate. Relevant environmental data e.g. sea state and visibility were collected at 15 min intervals throughout the survey, and cetacean data including the species, number of animals and behaviour were recorded during each encounter.

During vessel-based surveys, a 15 m motor vessel at 3 m eye height was utilised to survey the region between Stonehaven and Aberdeen, a return journey of approximately 24 km. On two occasions, the vessel route ran southwards between Stonehaven and Inverbervie. A Global Positioning System (GPS) was used to record the vessel track and the position of cetaceans encountered.

During vessel-based surveys in 2001 (n = 17) photo-identification of individual animals was conducted using a Nikon F80 SLR camera fitted with Nikon-AF Nikkor 75-300 mm zoom lens. Photographic methodologies employed during this process were similar to those described by Wilson *et al.* (1997a).

RESULTS

Survey Effort. A total of 18,896 min survey effort was collected during timed sighting surveys at 15 land-based sites during the course of this study. Over 92% of land-based survey effort was collected from five key sites (Collieston, Girdle Ness, Souter Head, Aberdeen Harbour and Stonehaven Bay). Land-based survey effort was collected in all months of the year, but predominantly over the summer months between March and August.

Vessel-based surveys (n = 26) were completed in sea state 3 or less, resulting in 5,774 min of dedicated survey effort. These surveys occurred only between March and October due to winter weather constraints, with most coverage achieved during May and August.

Bottlenose dolphin occurrence. A total of 299 individual sightings of bottlenose dolphins were made during between 1999 and 2001. The majority of these encounters (n = 276) were land-based observations made during timed surveys (n = 86) and opportunistic sightings (n = 190). Bottlenose dolphins were recorded along the entire coast of the study area (Fig. 2a) suggesting a continuous distribution along the of Aberdeenshire coast. Aberdeen Harbour recorded the highest level of bottlenose dolphin encounters, with a rate of 1 sighting every 122 min of survey effort. Bottlenose dolphins were additionally sighted during most vessel-based surveys (n = 23) and were the most numerous cetacean species recorded with a total of 180 animals. Dolphins were most often encountered transiting along the coast presumably between feeding areas, and also while feeding off Girdleness and the harbour area. All sightings occurred within 1 km of the coastline, and most were within a few hundred metres from land. The location of vessel survey effort is shown in Fig. 2b.

Land-based sightings data revealed that group size ranged from 1 to 60 animals, with data being positively skewed towards smaller schools of 1 to 6 animals (mean = 8; median = 6.0). Further, group size increased to 10.9 animals in schools where juveniles and/or calves were present. When analysed over a temporal scale, this trend remained consistent, resulting in a higher mean group size for schools with immature animals present, as shown in Fig. 3. Calves and juveniles were observed throughout the year and were present in more than a third (35%) of total bottlenose sightings. This proportionally high presence of immature animals suggests that Aberdeenshire waters may be important for various age groups.

Despite adequate survey effort throughout the summer, bottlenose dolphins exhibited a marked seasonal occurrence within Aberdeenshire waters, with over 95% of vessel-based sightings occurring between March and June. A similar trend appears evident in land-based survey data, where both the number of sightings and the number of animals per unit effort sharply decreased throughout the late summer, as shown in Fig. 4. Interestingly, white-beaked dolphins were recorded close to the coast of Aberdeenshire during the summer months only (June to August), suggesting a distinct seasonal occurrence of animals in this coastal region to that of the bottlenose dolphin. However, unlike the white-beaked dolphin, bottlenose dolphins were observed to be strictly coastal in nature, only observed in shallow bays and travelling parallel along the coast.

Photo-identification. Approximately 1,200 photographic frames were taken during 17 vessel-based surveys in 2001, with a total of 17 animals being identified. Of these, 41.2 % (n = 7) were re-encountered during different vessel surveys throughout the 15-week photo-identification period. Over 70% of animals (n = 12) were distinguished by more than one type of identifiable feature. Permanent features e.g. nicks, certain types of pigmentation and dorsal fin shape accounted for 82.4 % of identifications (n = 14). The remainder (n = 3) were distinguished by semi-permanent features alone, e.g. skin lesions.

The number of marked individuals identified in each encounter ranged from 1 to 7 animals (mean = 2.8, median = 2.5). A third of individuals (29.5%) were identified using both left and right hand side photographs (n = 5), whilst 70.5% of animals were identified from either left hand side (n = 10) or right hand side (n = 2) images only, accounting for 58.6% and 11.9% of identified animals respectively.

During the present study, photo-identification was used to successfully confirm the presence of Moray Firth dolphins in Aberdeenshire waters. Although majority of the animals present in the study area are yet to be identified, the authors suggest that a continuous distribution of bottlenose dolphins exists along the Moray-Aberdeenshire coast and that majority of animals present in Aberdeenshire waters form part of the recognised Moray Firth population.

CONCLUSIONS

Despite strong evidence of seasonality, results of the present study reflect a year-round presence of bottlenose dolphins along the coast of Aberdeenshire. This may be an important issue given the numerous potential sources of disturbance within this region e.g. heavy shipping traffic, oil and gas development and dredging activities. An increased presence of bottlenose dolphins in Aberdeenshire waters may have important conservation implications for a population whose numbers are already reported to be in decline (Sanders-Reed, 1999). Wilson *et al.* (1997b) showed bottlenose dolphin sightings peak between June and August in the Moray Firth. In the present study, sightings of bottlenose dolphins in Aberdeenshire waters declined dramatically during this period. This in conjunction with the high frequency and regularity with which dolphins were observed during the present study, suggests that the Aberdeenshire coast is currently part of the normal range for at least a proportion of the Moray Firth bottlenose dolphin population. Conclusions about long-term trends in abundance of this population may also need revision in light of the present Aberdeenshire data, which undoubtedly indicate more than the 'occasional' extension to home range, as reported by Wilson *et al.* (1999).

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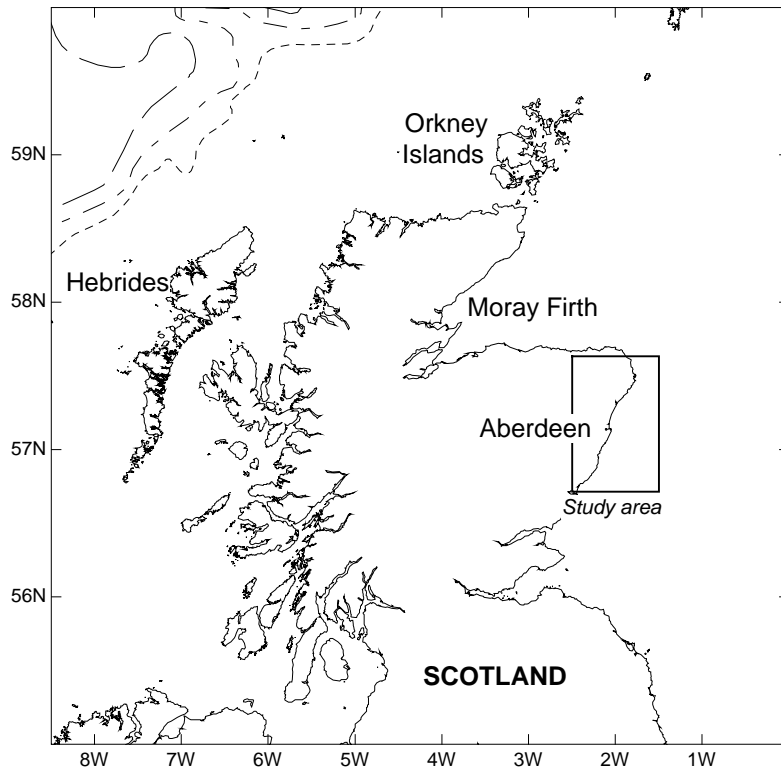


Fig. 1 Location of the study area
Bathymetry: dot (200m isobath); dotdash (500m isobath); dash (1000m isobath)

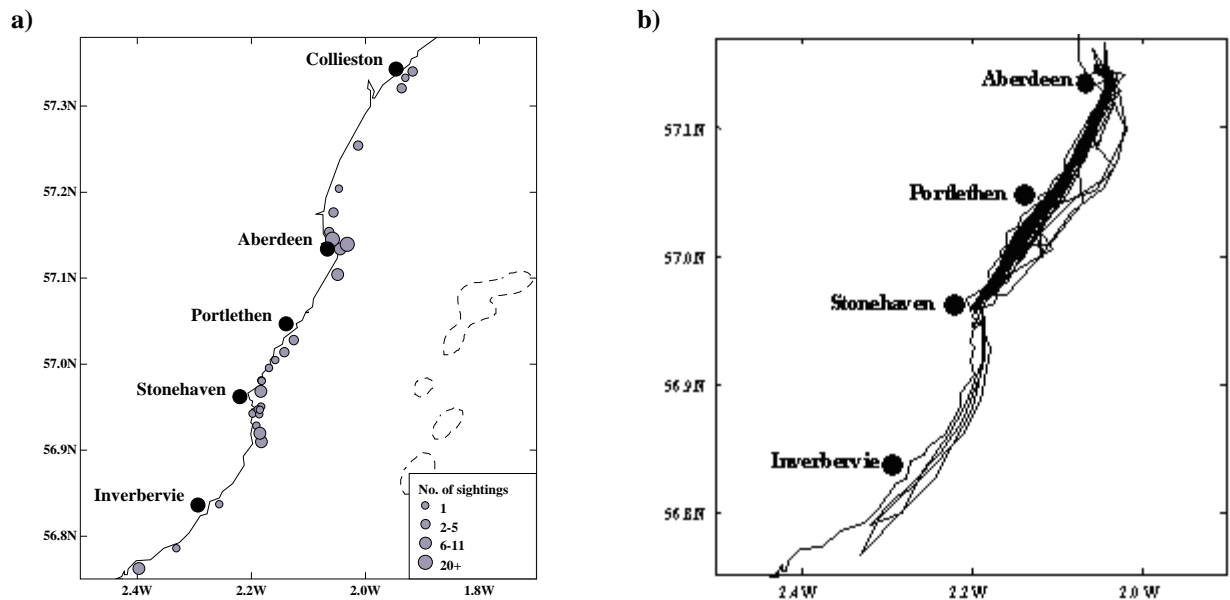


Fig. 2 (a) Distribution of land-based bottlenose dolphin sightings (b) Route plot of vessel-based surveys (1999-2001)

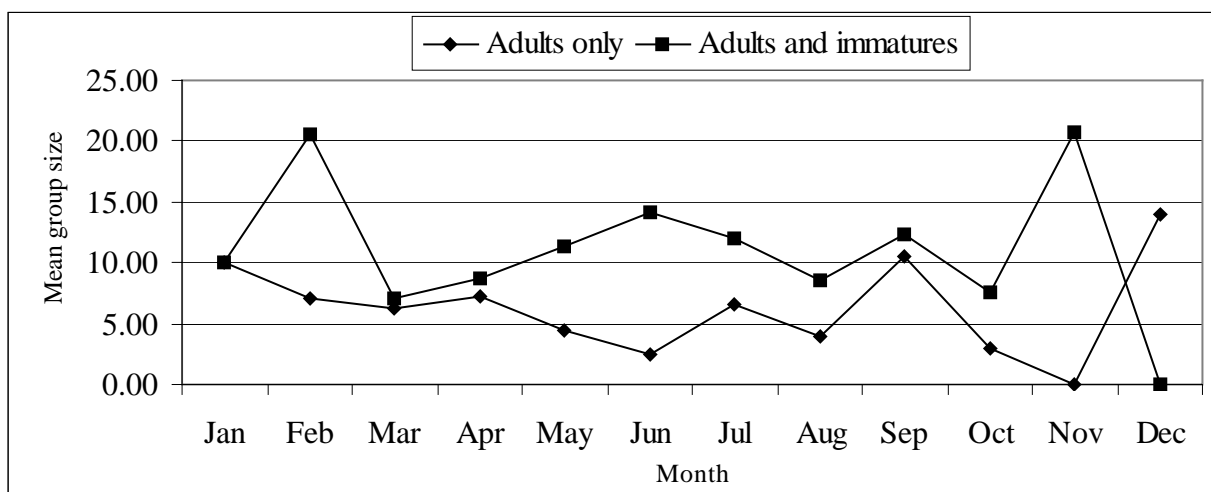


Fig 3. Monthly mean group sizes for bottlenose dolphin groups containing adults only and groups including immatures

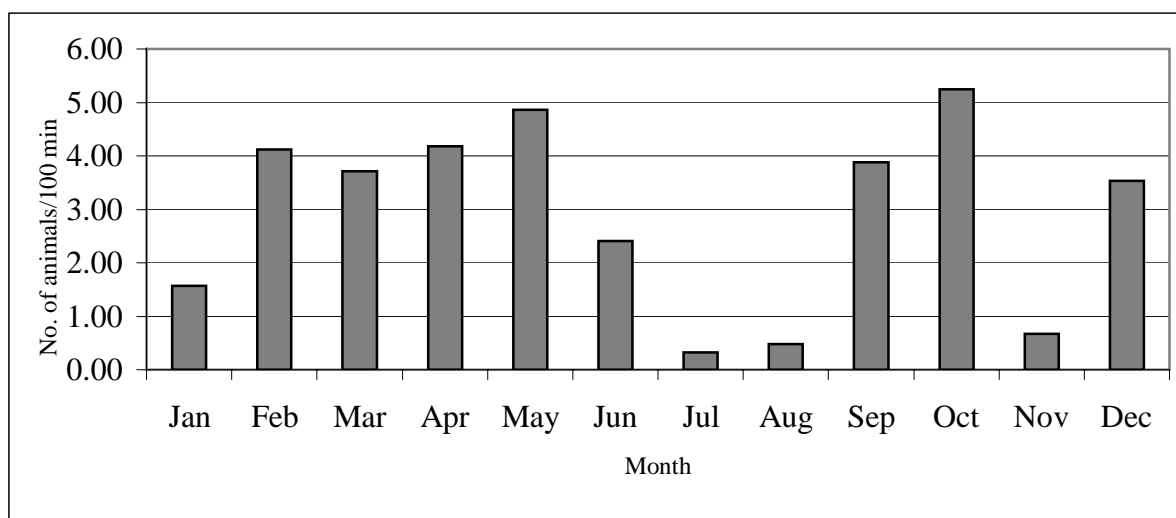


Fig 4. Monthly number of bottlenose dolphins per 100 min. survey effort