

SEASONAL OCCURRENCE OF THE WHITE-BEAKED DOLPHIN (*LAGENORHYNCHUS ALBIROSTRIS*) IN COASTAL ABERDEENSHIRE WATERS, NORTH-EAST SCOTLAND

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INTRODUCTION

The Sea Watch Foundation has carried out land- and vessel-based cetacean surveys in the coastal waters of Aberdeenshire since April 1999. A semi-resident population of bottlenose dolphins (*Tursiops truncatus*) has been the primary focus of these studies (Weir & Stockin, 2001), but several other cetacean species have been additionally recorded during the survey work. In particular, the white-beaked dolphin (*Lagenorhynchus albirostris*) has been regularly encountered within this relatively small and coastal study area.

Within UK waters both the bottlenose dolphin and the white-beaked dolphin are species that typically inhabit continental shelf waters of less than 200 m depth (Pollock *et al.*, 2000). However, the white-beaked dolphin has a much more pelagic nature than the bottlenose dolphin, and has received a relatively limited research focus. Although the white-beaked dolphin is generally considered to be the most numerous dolphin species in North Sea waters (Evans, 1992) details of its distribution, biology and ecology are little understood. The species is regularly reported during both dedicated sightings surveys (Hammond *et al.*, 1995; Northridge *et al.*, 1995), and during opportunistic observations (Weir, 2001; *pers. obs.*) in offshore North Sea waters, but its occurrence in coastal waters within the region has been poorly documented.

This paper reports on observations of white-beaked dolphins within a small study area along the coast of Aberdeenshire, 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 between 1999 and 2001, 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 carry out timed sea-watches. A continuous scanning methodology was implemented primarily with the naked eye, but supplemented with regular binocular scans (8-10x magnification), and occasionally with telescopes (20x). Relevant environmental data such as sea state and visibility were collected at 15 min periods throughout the survey, and cetacean data including the species, number of animals and behaviour were recorded whenever animals were observed.

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 (the vessel route twice ran southwards between Stonehaven and Inverbervie). A Global Positioning System (GPS) was used to record the vessel track and the position of any cetaceans encountered. A team of trained volunteers carried out vessel-based surveys, in addition to one or both of the authors.

Data were entered onto a computer database in a coded format, and were standardised as far as possible by the single person entering data to correct for variation in observer experience.

RESULTS

Survey coverage. A total of 18,896 min survey effort was collected during timed sea watches at 15 land-based sites between 1999 and 2001. 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.

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

White-beaked dolphin occurrence. A total of 104 sightings of white-beaked dolphins was made during the survey between 1999 and 2001, involving 634 animals. Of these, 84 sightings (547 animals) were land-based observations, of which 39 were recorded during effort related surveys and 45 were opportunistic sightings. White-beaked dolphin sightings occurred predominantly along the cliffs between Stonehaven and Aberdeen, and from Collieston in the north of the study area (Fig. 2a). Sightings were absent from the gently-sloping, shallow waters between Aberdeen and Collieston. A total of 20 white-beaked dolphin sightings (87 animals) was recorded during vessel-based surveys. The location of vessel survey effort and white-beaked dolphin sightings is shown in Fig. 2b.

The distribution of white-beaked dolphin sightings during both land- and vessel-based surveys was centred primarily along the coast between Aberdeen and Stonehaven (Fig. 2). This stretch of coastline is comprised mostly of cliffs and the 50 m isobath occurs within 3,500 m of the coast, compared with the shallow, sloping beaches to the north of Aberdeen where the 50 m isobath is over 7,700 m from shore. Table 1 shows the relationship between depth and dolphin sightings; white-beaked dolphins were sighted more often where deeper water occurred closer to shore.

The Sightings Rate Per Unit Effort (SPUE) for white-beaked dolphins was slightly higher overall during vessel-based surveys (0.346 sightings/100 min) than in land-based surveys (0.206 sightings/100 min). This factor may probably be explained by the tendency of white-beaked dolphins to approach vessels for bow-riding, thereby increasing their detection rate. However, both survey types reveal a strong seasonal trend in white-beaked dolphin sightings; sightings clearly occurred only during the summer months between June and August (Fig. 3). Despite adequate levels of survey coverage, no sightings occurred during dedicated watches outside of the June to August period, and only single opportunistic sightings were made during May and September respectively. These data clearly suggest a distinct seasonal movement of this species into Aberdeenshire coastal waters.

Of the total 104 white-beaked dolphin sightings recorded between 1999 and 2001, group size ranged from 1 to 32 animals (mean=6.2, median=4.5, modal=2.0). In some groups, the age of dolphins was approximated according to the estimated/comparative size of the animals. Over 52% of such aged groups contained immature (juveniles and/or calves) animals, and the mean group size of 3.52 animals in adult only pods increased to 8.03 when immature animals were present. Young calves were recorded in all three months that dolphins were observed, with a peak of 13 calves recorded during August.

CONCLUSIONS

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. Within the coastal water study area, white-beaked dolphins were sighted more often along areas of coastline where relatively deep water occurred near to shore. Both these trends suggest that white-beaked dolphins occupy a different niche/habitat from the more commonly observed bottlenose dolphins in the region. Bottlenose dolphins are generally absent from the area during June to August at the same time that white-beaked dolphins are observed, and the bottlenose dolphins are strictly coastal in nature being recorded in shallow bays and travelling parallel along the coast.

The movement of potential prey species most likely explains the seasonal occurrence of white-beaked dolphins in coastal waters off Aberdeenshire, since dolphins were engaged in feeding behaviour during many sightings. Mackerel (*Scomber scombrus*) also show an inshore movement along the coast of

Aberdeenshire during the summer months (Coull *et al.* 1998), and the distribution of this prey species may explain the seasonal appearance of white-beaked dolphins.

The movement of white-beaked dolphins in relation to increased prey sources is especially relevant during the breeding season when dolphins may have higher energetic demands during calving and lactation. Immature white-beaked dolphins were recorded in over 52% of aged groups, suggesting that the species may utilise Aberdeenshire waters over their calving period.

Other possible reasons for the shift in distribution to inshore waters includes the reduced risk of predation to calves/juveniles in the shallower, coastal waters (from e.g. killer whales, *Orcinus orca*). However this is considered unlikely in this particular population of white-beaked dolphins, since killer whales and other large predators are rarely observed in the central North Sea.

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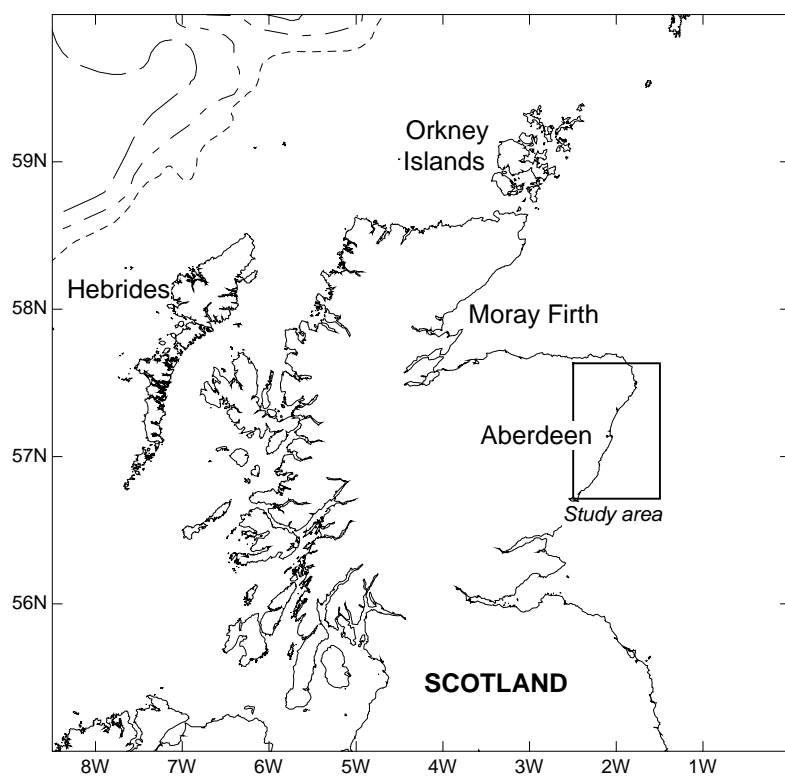


Fig. 1 Location of the study area
Bathymetry: dot (200m isobath); dotdash (500m isobath); dash (1000m isobath)

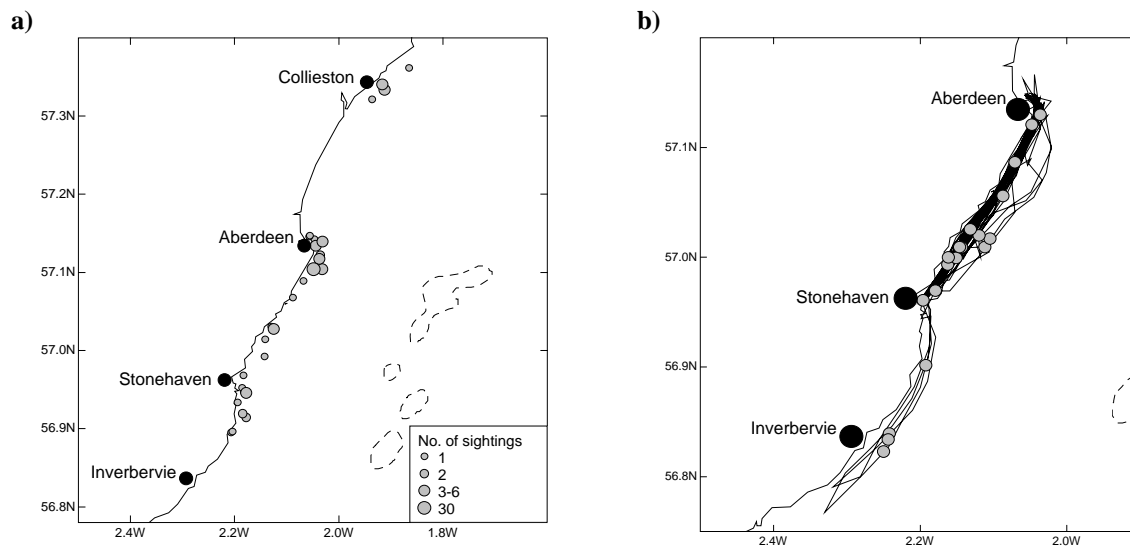
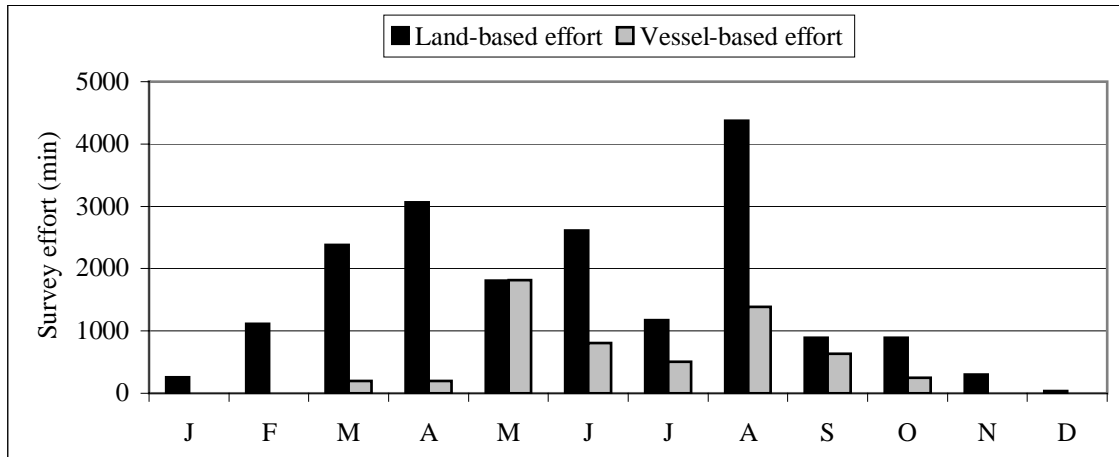


Fig. 2 Location of white-beaked dolphin sightings in a) land-based surveys and b) vessel-based surveys (showing vessel routes)

Table 1 White-beaked dolphin sightings in relation to depth isobath

Distance of isobath from shore (m)	Total min survey effort (n=no. of sites)	Sightings per unit survey effort (SPUE)	No. of casual sightings
10 m Isobath			
<500	6569 (n=5)	6.15	13
500–1000	2570 (n=5)	1.51	7
>1000	9757 (n=5)	0.00	3
30 m Isobath			
<2000	6479 (n=4)	5.04	13
2000-3000	8122 (n=4)	2.51	5
>3000	4295 (n=7)	0.12	5
50 m Isobath			
<4000	6569 (n=5)	6.15	13
4000-5500	8297 (n=4)	1.40	6
>5500	4030 (n=6)	0.12	4

a)



b)

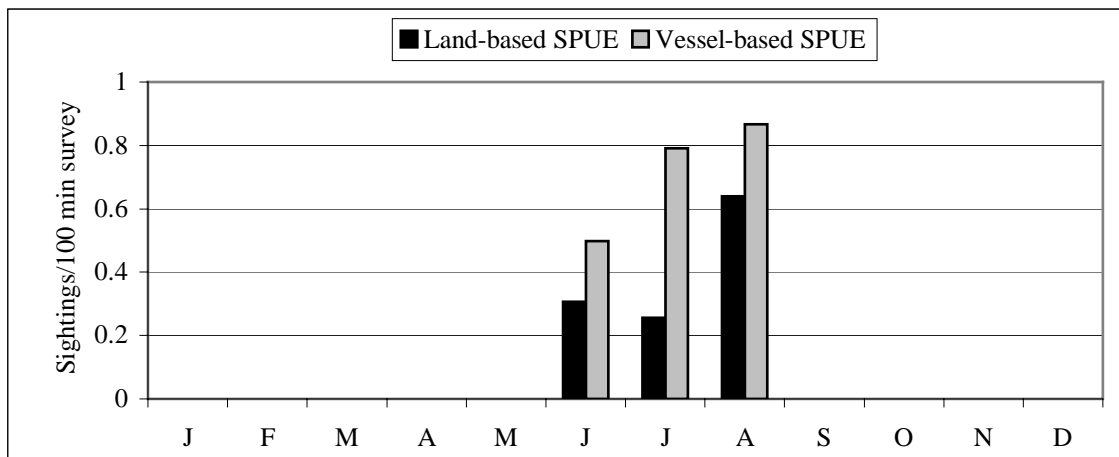


Fig. 3 Seasonal occurrence of a) survey effort and b) white-beaked dolphin sightings per unit effort