



# The summer distribution and occurrence of cetaceans in the coastal waters of the outer southern Moray Firth, NE Scotland

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Our current knowledge of the distribution and occurrence of cetacean species in the outer Moray Firth (57°41' N, 3°15' W, Fig. 1a) remains fairly rudimentary to date, with few detailed studies having been carried out in this area on species other than the bottlenose dolphin (*Tursiops truncatus*) (Eisfeld, 2003; Culloch, 2004), harbour porpoise (*Phocoena phocoena*) (Whaley & Robinson, 2004) and the minke whale (*Balaenoptera acutorostrata*) (Tetley *et al.*, *in prep.*). Since 1997, however, systematic boat surveys by the CRRU and opportunistic sightings in the outer southern Moray Firth have revealed a number of additional species frequenting these northeast UK waters. Several of these appear to have been poorly documented in this area, and others may be of considerable conservation priority. Undoubtedly, a better knowledge of the biodiversity and occurrence of cetaceans in this geographical location, and their role in the marine ecosystem, may also be of significant scientific interest.

## Methods

Data used in the present paper were collected between the months of May and October 2001 to 2004 inclusive. Systematic line transect surveys were carried out along an 82-km stretch of coastline of the southern outer Moray Firth between the coastal ports of Lossiemouth and Fraserburgh, covering a total area of approx 860 square kilometres (see Fig. 1b).

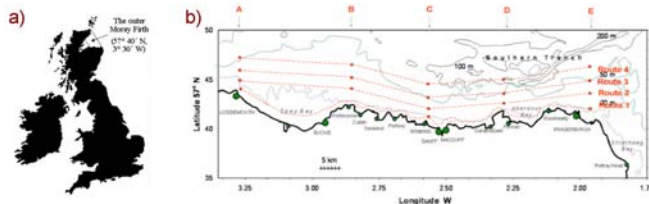


Figure 1. Showing (a) the general location of the Moray Firth, and (b) the southern coastline of the outer firth and the survey routes used by the CRRU during systematic boat surveys between the ports of Fraserburgh and Lossiemouth. The transects are divided into 3 longitudinal outer routes (routes 2 to 4 respectively), each approximately 45 minutes apart in latitude, and an inner coastal route used during dedicated bottlenose dolphin surveys.

All surveys were made using a 5.4 metre rigid inflatable boat with a 90 hp 4-stroke outboard. The surveys were typically conducted at speeds of 8 to 15 km hr<sup>-1</sup> in sea states of Beaufort 3 or less, and during good light conditions with a crew of 4 to 7 trained observers.

## Results

Between May and Oct 2001 to 2004, a total of 193 survey trips were carried out on 164 survey days, giving an overall survey effort of 847 hours (see table 1 below).

Table 1. The survey effort for dedicated cetacean surveys conducted between May and October 2001 to 2004 inclusive.

Year	No. of survey days	Survey effort (hrs)	Total survey trips	Total no. of encounters
2001	39	178.2	40	61
2002	50	224.5	58	226
2003	43	262.8	53	210
2004	32	181.7	42	64
Total	164	847.2	193	561

**Discussion** - The productive, coastal waters of the outer southern Moray Firth support an interesting diversity of cetacean species. In addition to the seasonal occurrence of bottlenose dolphins, minke whales, and an impressive abundance of harbour porpoises – all of which show a seasonal peak in numbers from one year to the next – inshore movements of several pelagic species can also be observed. Killer whales, pilot whales and humpback whales were typically seen during the months of Jul and Aug in the present study, and a single encounter with Risso's dolphins was made in Sep 2001. However, at least 6 additional species which are known to occur in the study area from previous shore/boat sightings and/or local strandings, including the Atlantic whitesided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*), striped dolphin (*Stenella coeruleoalba*), sperm whale (*Physeter macrocephalus*), northern bottlenose whale (*Hyperoodon ampullatus*) and sei whale (*Balaenoptera borealis*), were not encountered during this investigation. As such, incidental strandings records for the area could be used to complement the live survey data collated, to provide a better determination of the species composition and frequency of occurrence at this location.

The distribution of animals observed in the present study can be analysed, both spatially and temporally, to predict areas and times of concentration for "priority" species. This will allow us to focus conservation measures in relation to human activities, such as by-catch reduction measures or disturbance by shipping and tourism, for example, but further to identify times and areas of special significance for various stages in the life cycle, such as calving or mating intervals. In this respect, ongoing studies of the key coastal species highlighted in this presentation may be of particularly interest; the conservation of ecologically important sites for species that exclusively use specific habitats making the monitoring of small, inshore populations a necessity.



>561 encounters were recorded across the 4-year survey period (table 1), comprising 5 species of toothed whale (4 delphinids and 1 phocoenid) and 2 species of baleen whale. In descending order of sightings frequency, these were: (i) the harbour porpoise (*Phocoena phocoena*) (n=378), minke whale (*Balaenoptera acutorostrata*) (n=109), bottlenose dolphin (*Tursiops truncatus*) (n=62), killer whale (*Orcinus orca*) (n=6), long-finned pilot whale (*Globicephala melas*) (n=3), humpback whale (*Megaptera novaengliae*) (n=2), and the Risso's dolphin (*Grampus griseus*) (n=1) (table 2).

Table 2. The encounter rates, cumulative frequencies and group sizes of cetacean species recorded in the study area from 2001 to 2004.

Species	No. of Encounters	Cumulative no. of animals encountered	Group Size		
			Mean ± SD	Max	Min
1) <i>Phocoena phocoena</i>	378	1149	3.02 ± 3.13	40	1
2) <i>Balaenoptera acutorostrata</i>	109	118	1.04 ± 0.31	4	1
3) <i>Tursiops truncatus</i>	62	884	14.49 ± 8.61	44	2
4) <i>Orcinus orca</i>	6	19	3.17 ± 2.48	6	1
5) <i>Globicephala melas</i>	3	35	11.67 ± 6.03	18	6
6) <i>Megaptera novaengliae</i>	2	2	1.00 ± 0.00	1	1
7) <i>Grampus griseus</i>	1	7	7.00 ± 0.00	7	7

>The distribution of sightings of the above species (illustrated in photo plate at footer, ranked by highest sightings frequency, left to right) can be seen in figure 2 below.

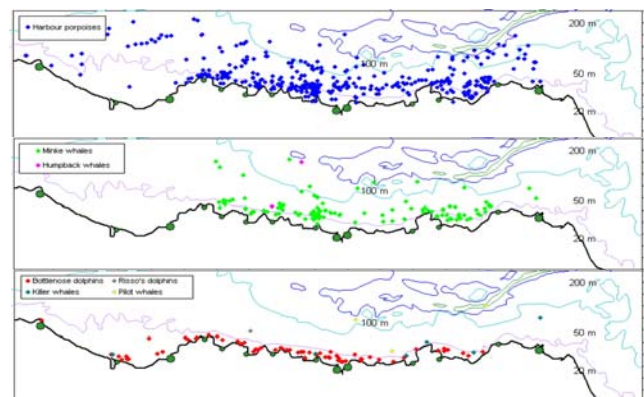


Figure 2. Sightings maps of the southern outer Moray Firth showing the distribution of animals encountered across the 4-year study period.

## References

Culloch, R.M. (2004). Mark recapture abundance estimates and distribution of bottlenose dolphins (*Tursiops truncatus*) using the southern coastline of the outer Moray Firth, NE Scotland. M.Sc. thesis. University of Wales, Bangor, pp. 85.  
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