

Dear Earthwatchers,

As 2008 now draws to a close, I would like to take this opportunity to thank you for joining us in Gardenstown this summer – for all your support and endless enthusiasm and energy towards our project *Whales and Dolphins of the Moray Firth*. Between May and October 2008, a total of nine Earthwatch teams (comprising 50 volunteers) joined the CRRU research team in Scotland for what turned out to be an absolutely fantastic summer. During this period, we clocked up an impressive 2,221 km of boat survey effort, which resulted in a total of 20 bottlenose dolphin encounters, 77 harbour porpoise and 43 minke whale encounters.

Every field season in the Moray Firth brings with it its fair share of rewards and experiences, but for me none are less memorable than sharing time and space with those of you who have left such a lasting impression on both myself, the team and the village this year. I now look back and reflect upon the summer with so much sentiment and pride – sentiment, for all the remarkable people that we have been so fortunate to meet and share such fabulous and humbling experiences with; and pride, for having been part of something very special again, that has managed to incorporate, educate and inspire so many of you and those others around us. Wonderful.

On behalf of the CRRU field team, Andreas, Dale, Marina, Pine and myself, I would like to thank you so very very much once again for joining us in 2008. We wish you a wonderful 2009, full of good health, prosperity, exciting new adventures (with EW again perhaps) and your dreams come true. We also very much look forward to welcoming you back to the project in the near future. With all things good and our very best wishes to you – and keep in touch!

Dr Kevin Robinson

Principal Investigator, Whales and dolphins of the Moray Firth

EARTHWATCH INSTITUTE ANNUAL FIELD REPORT

Date completed: 30 October 2008

Completed by: Dr. Kevin Robinson

Period covered by this report: May to Oct 2008

Reporting on research objectives

Objective 1: to record/document the occurrence and biodiversity of the cetacean species in NE Scottish waters

Annual systematic surveys along the outer southern Moray Firth study area continue to document the distribution and occurrence of the primary cetacean species (dolphins, whales, porpoises) frequenting this inshore coastal habitat, within the north western North Sea. The distribution data gathered thus far suggest that the spatial and temporal occurrence of these animals in this region is both variable and complex. Spatial data further indicate that some species restrict their movements and activities to particular areas and depths, whilst others are more widespread and responsive in their occurrence. Ongoing work aims to achieve additional coverage of the outer Moray Firth region, integrating broader scale survey data to further elucidate those oceanographic, biological and anthropogenic (human) determinants that underlie the distinctive patterns of distribution seen in this area.

Objective 2: to monitor the status and welfare of coastal cetacean populations in this area of the North Sea

Recent warming of these local coastal waters has been predicted to result in changes in the cetacean community, with probable additions and expected increases in existing warmer-water cetaceans and the disappearance or change in the relative and absolute abundances of others. In 2007, common dolphin (*Delphinus delphis*) – a typically warmer water species – were recorded for the very first time in these waters, an event which was identified as a result of continued monitoring studies in this region. Ongoing spatial and temporal studies of the priority coastal cetacean species identified in this area therefore continue to be particularly important for the present and future conservation work being carried out.

Objective 3: to identify prime areas/habitats used by key inshore species and evaluate (and propose solutions to) the underlying threats faced by the species using these key areas.

The identification of key habitats for coastal cetacean species is particularly relevant for the development of existing management policies for the Moray Firth. Areas of special significance and times of occurrence may be explicitly important for the life cycles of these animals (for calving or feeding, for example). The identification and subsequent mitigation of anthropogenic threats to these species remains crucial to the success of proposed

conservation measures for their protection. Ongoing research by the CRRU research team aims to quantify the nature of the threats to cetaceans in these waters, searching for solutions and supporting recommendations to remove or mitigate these problems.

Objective 4: to conduct detailed research into the biology, ecology and population dynamics of the principal coastal cetacean species found in this location.

The coastal cetacean species frequenting the currently unprotected waters of the outer Moray Firth are all considered to be a conservation priority. As such, a better knowledge of the behavior and biology of these animals and their pivotal role in the marine environment is not only essential for their ultimate conservation, but also of considerable scientific interest. Current studies are focused on the 3 main coastal species frequenting the Moray Firth study area – namely, the bottlenose dolphin (*Tursiops truncatus*), the minke whale (*Balaenoptera acutorostrata*) and the harbour porpoise (*Phocoena phocoena*). All are listed as being of local, national and international conservation interest and concern. Ongoing focal studies of populations of these species therefore remain crucial in this respect, and are even considered fundamental for local management directives for the protection of this and other UK coastal cetacean populations and their marine communities.

Project development

In 2009, the CRRU research team will continue to develop current work utilising time-depth recording tags in order to better understand the diving ecology of coastal minke whales in the Moray Firth. This objective continues to present a considerable challenge, as the research team are yet to successfully deploy a tag on one of these whales. However, the data gained through this accomplishment still remains crucial in addressing the issues of minke whale population over-estimates, from which current erroneous whaling quotas are presently derived. In addition to addressing this management-based issue, these studies will also be used to increase our understanding of the basic biology of the species, such as the diurnal (active in daytime) / nocturnal (active at night) behaviour patterns and ontogeny (development) of diving.

Non-technical summary of results

Data Collection and Results

The CRRU project facilitated 9 Earthwatch teams between May and October 2008, each team lasting 11 days. During this period, a total of 50 Earthwatch volunteers joined the CRRU scientists and researchers in Gardenstown in Scotland.

With the support of these teams, 98 part surveys were undertaken on 49 survey days between May and October, covering a total survey distance of 2,221 km (Table 1). This resulted in 140 encounters being recorded with 3 different species of cetacean: 77 harbour porpoise (*Phocoena phocoena*) encounters, 43 minke whale (*Balaenoptera acutorostrata*) encounters and 20 bottlenose dolphin (*Tursiops truncatus*) encounters (Table 2). The respective spatial distribution of these animals is illustrated in Figure 1.

Bottlenose dolphins were primarily sighted towards the west of the study area in 2008, with group size ranging from 2 to an incredible 65+ animals (mean = 23.3 ±15.8) across the period. The 65+ animals were recorded in September 2008, and represented the largest school that CRRU has ever recorded in the Moray Firth since 1997. This proved to be a huge headache when trying to sort out all the mother-calf associations and individuals present, but

we got there eventually. The total number of bottlenose dolphins seen in 2008 amounted to 383 animals and this was represented by 95 known individuals (compared to just 64 individuals in 2007). However, only 2 newborn calves were recorded in 2008 which was

Table 1: Summary of survey effort from dedicated cetacean surveys with EW volunteers between May and October 2008 inclusive.

2008	No. of survey days	Total no. of part surveys	Total effort (km)
May	2	2	34.7
Jun	8	17	267.9
Jul	16	28	623.4
Aug	11	26	631.6
Sep	9	22	604.4
Oct	3	3	58.6
Total	49	98	2,220.6

Table 2: Number of encounters (cumulative count of animals in brackets) and the respective number of hours spent with each of the study species during the 2008 research season.

	Total no. of harbour porpoise encounters	Porpoise encounter hours	Total no. of Bottlenose dolphin encounters	Bottlenose encounter hours	Total no. of minke whale encounters	Minke encounter hours	Total no. of encounters with other cetacean species
2008	77 (247)	5.15	20 (383)	23.42	43 (48)	31.27	0

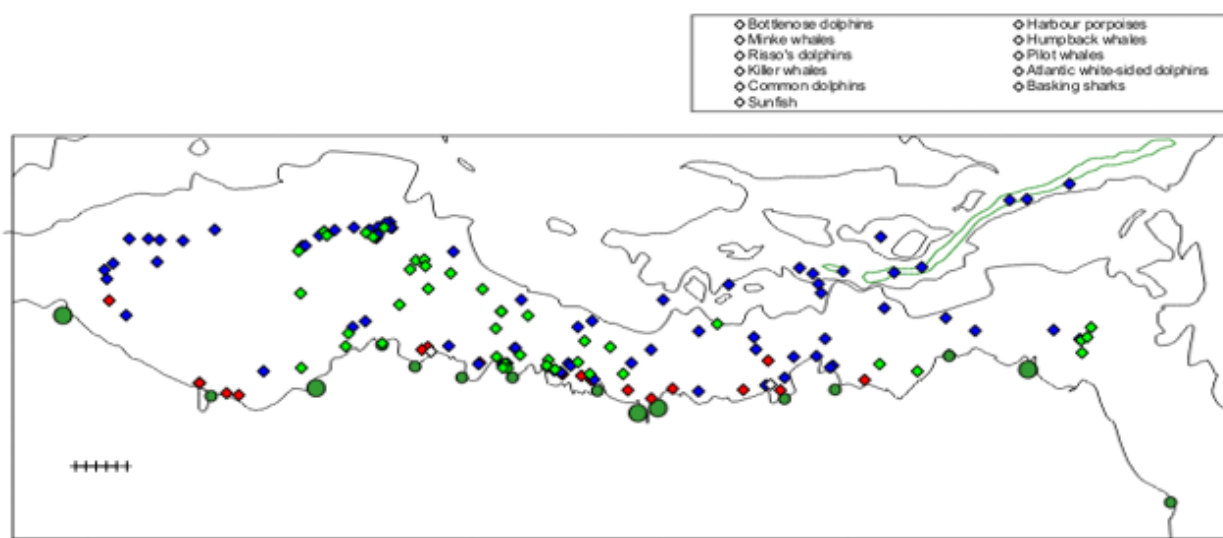


Figure 1: Sightings map of the outer southern Moray Firth showing the distribution of cetaceans encountered with Earthwatch volunteers during dedicated boat surveys during the 2008 field season (n=140).

considerably lower than in previous years. That saying, all of the calves born in 2007 were seen to survive into their second year, as each was recaptured again (on film) across the summer months.

The minke whales put in a very early appearance again in 2008, being recorded from as early as May, and encountered in erratic numbers throughout the following months. After observing lots of inshore feeding during the earlier months, however, from August the whales appeared to move further offshore and to the west of the study area, and the changeable weather conditions during this period restricted our ability to uniformly survey these areas. This resulted in lowered sightings and very few chances to attempt any dedicated tagging efforts. Encouragingly, we actually made contact with a whale in late August with a tag, but the device fell away almost immediately. This was all starting to look very good, but a bad spell of weather followed and this severely restricted further offshore surveys, resulting in few, if any, minke whale encounters for our last two EW teams in September.

The harbour porpoises continued to save the day throughout the summer, however. One afternoon in August saw over 100 porpoises feeding voraciously on sandeels all around the research boat – something we have never witnessed to such an extent before, with so many individuals. Typically porpoise encounters consist of 1 to 4 animals, but on many occasions this year we enjoyed considerably larger group sizes which allowed us to observe a little more than the usual tell-tale surface or two and obtain some good quality behavioural data.

Conservation impacts:

Despite being hampered by intermittent bouts of unpredictable weather in 2008, we still managed to log an impressive 2,221 km of boat survey effort across the year. This resulted in some exceptionally high-quality sightings of each of our main study species providing some excellent data. These data were often extremely complementary to earlier records, and also facilitated a number of high quality postgraduate studies. The scientific output arising from earlier work has included a number of central peer-reviewed scientific papers published by the research team in 2008, in addition to 6 conference presentations at the 22nd Annual European Cetacean Society meeting in Egmond aan Zee in Holland back in March (see: www.crru.org.uk/research/publications.htm).

Local significance of results (in the area of the research site):

- Results are disseminated locally via newsletters, the local press/media, through public talks and local exhibitions/demonstrations. Boat owners and members of the public are also encouraged to report their sightings.
- The CRRU is active within the Moray Firth Partnership, NE Scotland Biodiversity Partnership and Local Biodiversity Action Group.
- The local involvement of supporters and training of medics for marine mammal rescue activities also forms a vital area of our local remit.

National / International significance of results:

- National / international collaborations and partnerships with other non-profit organisations, animal welfare bodies, universities and colleges, and public and governmental bodies.

- Developing conservation strategies for coastal cetacean communities that have implications for their management and conservation in other areas of the UK and Europe as well.

Communication of results

Peer reviewed scientific publications:

Culloch, R.M. & Robinson, K.P., 2008. Bottlenose dolphins using coastal regions adjacent to a Special Area of Conservation (SAC) in north-east Scotland. *Journal of the Marine Biological Association of the UK* **88(6)**: 1237-1243.

Robinson, K.P., Tetley, M.J. & Mitchelson-Jacob, E.G., 2008. The distribution and habitat preference of coastally-occurring minke whales (*Balaenoptera acutorostrata*) in north-east Scotland. *Journal of Coastal Conservation: Planning and Management* (EW acknowledged) (in press).

Tetley, M.J., Mitchelson-Jacob, E.G. & Robinson, K.P., 2008. The summer distribution of coastal minke whales (*Balaenoptera acutorostrata*) in the southern Moray Firth, northeast Scotland, in relation to co-occurring mesoscale oceanographic features. *Remote Sensing of Environment. Special Issue on Earth Observation for Biodiversity and Ecology* **112(6)**: 3449-3545.

Robinson, K.P. & MacLeod, C.D., 2008. First stranding record of a Cuvier's beaked whale (*Ziphius cavirostris*) in the Moray Firth in northeast Scotland. *JMBA Biodiversity Records* 3 pp., (published online).

Dolman, S.J., Reid, R.J., Barley, J.P., Deaville, R., O'Connell, M., Berrow, S., Penrose, R.S., Jepson, P.D., Pinn, E., Stevick, P.T., Calderan, S., Robinson, K.P., Doyle, T.K., Browning, R.L. & Simmonds, M.P., 2008. A preliminary note on the unprecedented strandings of 45 deep-diving odontocetes along the UK and Irish coast between January and April 2008. *Paper presented to the International Whaling Commission Scientific Committee, SC/60/E5*.

Conference proceedings:

Baumgartner, N., Robinson, K.P. MacLeod, C.D. & Pierce, G.J. 2008. Variations in coastal minke whale occurrence with respect to food availability in northeast Scottish waters. *European Research on Cetaceans* **22** (distributed on CD-ROM).

Eisfeld, S.M. & Robinson, K.P., 2008. Management options for coastal harbour porpoises in the Moray Firth, NE Scotland. *European Research on Cetaceans* **22** (distributed on CD-ROM).

Hall, K., MacLeod, C.D. & Robinson, K.P., 2008. Variations in cetacean community composition and structure within the northern North Sea, UK. *European Research on Cetaceans* **22** (distributed on CD-ROM).

Mitcheson, H., Weare, J.S., Haskins, G.N. & Robinson, K.P., 2008. The influence of tidal cycle on the fine-scale behaviour and group size of bottlenose dolphins using the outer southern Moray Firth coastline. *European Research on Cetaceans* **22** (distributed on CD-ROM).

Weir, C.R., Calderan, S., Unwin, M., Pitman, R.L., Booth, C., Photopoulos, T. & Robinson, K.P., 2008. White-beaked dolphin (*Lagenorhynchus albirostris*) occurrence in the Minch (Scotland, UK) during August 2007. *European Research on Cetaceans* **22** (distributed on CD-ROM).

Wylie, L.G., Eisfeld, S.M. & Robinson, K.P., 2008. Calf survivability and female reproductive success in a North Sea coastal bottlenose community. *European Research on Cetaceans* **22** (distributed on CD-ROM).

Theses:

Baumgartner, N., 2008. The diving ecology and foraging behaviour of inshore, coastal minke whales (*Balaenoptera acutorostrata* Lacépède) in the outer Moray Firth, NE Scotland. MPhil thesis, University of Aberdeen.

Mitcheson H., 2008. Inter-birth interval estimation for a population of bottlenose dolphins (*Tursiops truncatus*): accounting for the effects of individual variation and changes over time. MRes thesis, University of St Andrews, 66 pp.

Digital:

- CRRU and Earthwatch websites; CRRU email newsgroup; photo libraries and digital news items in 2008.
- “Cetaceans of the Scottish Coast” – DVD produced with the Earthwatch Institute (Europe) with UK Secondary School teachers as a teaching resource for the UK national curriculum.

Meetings and conferences:

- Guest lectures given at the Universities of Aberdeen and Wales, Bangor.
- Attended and presented 6 papers at the 22nd Annual Conference of the European Cetacean Society in Egmond aan Zee, Holland, March 2007.
- Monthly public talks in Gardenstown on the work of the CRRU – summer 2008.
- Presentations to local and regional groups and schools throughout the year.

Educational Opportunities

The CRRU project directly/indirectly involves the following groups in its research:

- Local communities
- Students

- Early career scientists
- Other groups

This project is believed to constitute an integral part of the community in the village of Gardenstown and the boroughs of Banffshire and Aberdeenshire beyond – the extensive work of the charity being fully integrated into the area’s economic and social structure and development. Educating primary and secondary school children about their role in the natural environment, so that they can grow up to be environmentally-aware adults, remains an important directive for school visits and educational activities. When students work with the charity, whether as volunteers, during placements, or on short courses, they experience this integration within the community first-hand, learning the direct importance of marine conservation and educational work within this small coastal community.

An important first step towards developing effective conservation strategies has been to assess the level of public knowledge and awareness of the environmental issues at hand in the local marine environment. This has been determined using interview and survey methods, incorporating residents, tourists, stakeholders and policy makers to assess public attitudes and perceptions to marine conservation. Highlighting the economic benefits of marine conservation through sustainable ecotourism is also an important means of generating support for conservation projects such as those carried out by the CRRU. Investigating the socio-economic benefits of marine conservation therefore remains a vital area in ensuring public acceptance and support for the CRRU’s marine conservation work.

The project further accommodates a diversity of university projects for students across the summer months. In 2008, Dr Robinson co-supervised 2 Masters Projects and a PhD Project in cooperation with the Universities of Aberdeen, St Andrews and Bangor respectively.

Other

List of partnerships/collaborations maintained or developed with other organisations over the past season:

- Ongoing collaboration on SEERAD (Scottish Executive Environment and Rural Affairs Department) project reviewing the distribution of bottlenose dolphins around the Scottish Coast in association with the Universities of Aberdeen and St. Andrews
- An examination of the shifting patterns of cetaceans in Scottish waters with Dr. Colin MacLeod (Dept of Zoology, University of Aberdeen)
- Collaboration with the Veterinary Division of the Scottish Agricultural College on studies incorporating incidental strandings records, biopsies from dead cetaceans for dietary analysis and clinical findings supporting visual observations at sea (including the publication by Robinson & Macleod (2008))
- MPhil, MRes and PhD studentships currently co-supervised in collaboration with the Universities of Aberdeen, St Andrews and Bangor
- Active members of the UK Marine Animal Rescue Coalition (MARC), providing specialist training and advice for other marine mammal rescue organisations in the UK and elsewhere in the world
- Collaboration in radio-tracking studies with the Whale Museum of Madeira (Portugal) and the Cascadia Research Collective (USA).

List of collaborators in 2008:

- Universities: Aberdeen, Bangor and St. Andrews
- UK NGO's: Care for the Wild International, Whale and Dolphin Conservation Society, Hebridean Whale & Dolphin Trust, Scottish Natural Heritage and Marine Conservation Society
- International NGO's: Whale Museum of Madeira, Cascadia Research Collective (USA), Tethys (Italy), ORES Foundation for Marine Environment Research (Canada), Project Rugvin (Holland) and Wildlife Rescue Centre (Thailand)
- Others: Scottish Agricultural College (SAC) Inverness, HM Coastguard, British Divers Marine Life Rescue and Scottish SPCA.

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