Bahamas Marine Mammal Survey
2005 FIELD REPORT to
Bahamas Department of Fisheries
Permit # MAF/FIS/12[A]

PRELIMINARY RESULTS

Background

The Bahamas Marine Mammal Survey (BMMS) is a long-term study that has been documenting the occurrence, distribution, and abundance of marine mammals around the islands of The Bahamas since 1991. With more than 1700 marine mammal encounters in The Bahamas, we are providing the only comprehensive documentation of the marine mammal fauna in this part of the world. Our research is based on the use of systematic boat-based surveys for describing the distribution and habitat use of different marine mammal species. We employ photo-identification techniques for the recognition of individual whales and dolphins, and we have developed new statistical approaches for using these data to determine abundance estimates and occupancy patterns. This photographic sampling is complemented by the collection of skin and faecal samples for molecular genetic analysis, which are being used to assess levels of genetic diversity and investigate the structuring of marine mammal populations. The use of Geographic Information Systems (GIS) mapping techniques allows us to describe species' distribution within the study area.

Key Research Objectives:

Long-term research objectives are:

- To investigate marine mammal species' occurrence, distribution and the abundance around the Bahamas to contribute towards management and conservation directives in the wider Caribbean region.
- To investigate the ecology of coastal Atlantic bottlenose dolphins on Little Bahama Bank, and monitor population trends to contribute towards future management of this population.
- To investigate the ecology of Blainville's beaked whales (dense-beaked whales) to aid in the conservation of beaked whale species in the Bahamas and elsewhere around the world.

The specific research objectives addressed this field season were:

- To conduct vessel surveys to search for marine mammals around Great Abaco Island, including random line transects, in order to assess species' distribution and habitat requirements.
- To photo-identify marine mammal species, with particular emphasis on bottlenose dolphins, Blainville's beaked whales and sperm whales, to provide sufficient data for the statistical assessment of occupancy patterns, abundance and social organization.

- To collect skin and faecal samples from marine mammal species, focussing on Blainville's beaked whales and sperm whales, to investigate population and social structuring using molecular genetic techniques, and to identify prey species.

Summary of 2005 Field Effort

During the 2005 field season, the BMMS team covered 2,750 nautical miles (over 5,000 km) during 77 vessel surveys in the waters off Great Abaco Island, in the northern Bahamas (see Figure 1). The majority of surveys were conducted in the South Abaco study site, but 3 surveys were run in East Abaco as well.

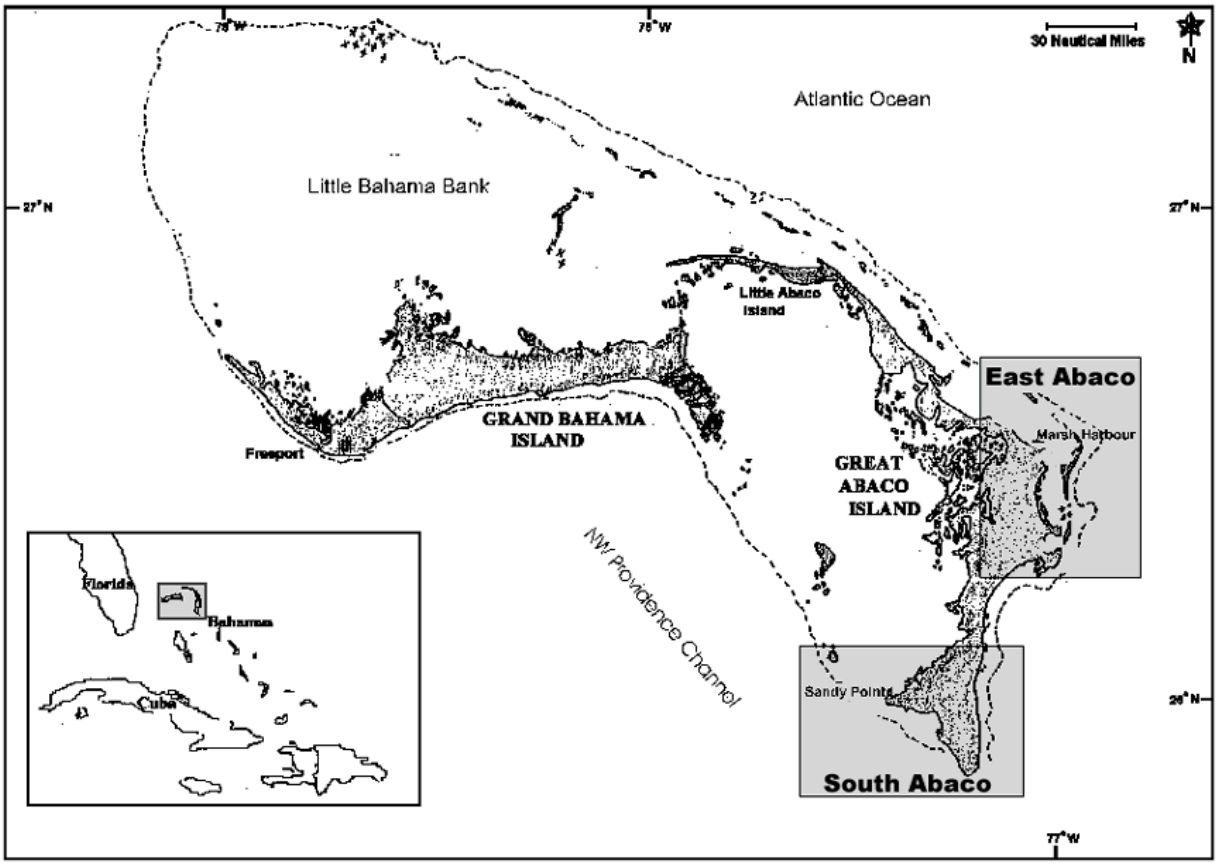

Figure 1. Map of the northern Bahamas showing the South Abaco and East Abaco study areas covered by the Dolphins and Whales of Abaco Island project during 2005 field season. The broken line shows the boundary between the shallow waters of Little Bahama Bank and the surrounding deep oceanic waters.

The majority of surveys were opportunistic vessel surveys allowing us to maximise our encounter rate and photo-identification. In order to gather non-biased data on species' distribution, we also completed 13 random-line transects in South Abaco during 2005, allowing

us to build on our distribution dataset for cetaceans found in Northwest Providence Channel, with 6 different pelagic species found in 16 encounters on transect. Marine mammals were found during 52 of the all vessel surveys, or during 67% of the surveys run. Three hundred and fifty-two hours was spent searching for marine mammals during vessel surveys, while 97 hours of observation and habitat use data was gathered during encounters.

Marine Mammal Encounters

During the 2005 field season, there were 113 sightings of marine mammals, including nine different species and totaling 1020 animals. All of the sightings consisted of toothed whale species in the Order Cetacea, Suborder Odontocete, including one endangered species, the sperm whale. There were also 14 sightings reported from the public which included another endangered species, the humpback whale (*Megaptera novaeangliae,* suborder Mysticete).

The majority of sightings (50%) were of the coastal or inshore ecotype of Atlantic bottlenose dolphins found on the shallow carbonate banks. However, there was one sighting of the oceanic ecotype of bottlenose dolphin in a mixed coastal and oceanic group.

Other frequently encountered species included dwarf sperm whales (13% of sightings), Blainville's beaked whales (12%), and sperm whales (6%). Eight faecal samples were collected opportunistically during encounters with Atlantic spotted dolphins and Blainville's beaked whales, in addition to four sloughed skin samples collected from Blainville's beaked whales and sperm whales. Additionally, seven tissue samples were collected from a dwarf sperm whale that was killed by a group of foraging killer whales. Table 1 lists the species sighted and the number of encounters and samples collected from each species.

Table 1. Marine mammal species encountered in the waters around Great Abaco Island, northern Bahamas, during the 2005 field season.

Common name	**Scientific name**	**No. Sightings**	**No. enc. during transects**	**No. faecal or sloughed skin samples**
Atlantic bottlenose dolphin – coastal ecotype	*Tursiops truncatus*	56	4	0
Atlantic bottlenose dolphin – oceanic ecotype	*Tursiops truncatus*	1	1	0
Atlantic spotted dolphin	*Stenella frontalis*	5	0	6
Pan-tropical spotted dolphin	*Stenella attenuata*	1	0	0
Killer whale	*Orcinus orca*	1	1	0

Dwarf sperm whale	*Kogia sima*	15	4	7
Pygmy sperm whale	*Kogia breviceps*	2	1	0
Sperm whale	*Physeter macrocephalus*	7	1	3
Blainville's beaked whale	*Mesoplodon densirostris*	14	2	3
Cuvier's beaked whale	*Ziphius cavirostris*	3	0	0
Unknown cetacean Species		8	4	0

The most exciting encounter of the field season was on July 27th when a group of four killer whales where sighted during a line transect in South Abaco. The group comprised of an adult female, an immature " sprouting" male and two other immature animals. Three of these animals had been photo-identified during a previous encounter in 2001, two of which had also been photographed in 1995. The encounter lasted just over seven hours during which time the group foraged for and killed at least two dwarf sperm whales. During one of the fatal attacks, the immature male lunged out of the water with the dwarf sperm whale in its mouth! This moment was captured on film by both the staff photographers and on video by an Earthwatch volunteer (Figure 3).

Figure 3. Immature "sprouting" male killer whale surfacing with an adult dwarf sperm whale in its mouth. Photograph taken by Meagan Dunphy-Daly (© BMMS 2005).

2005 Strandings

There were 5 stranding events in the Bahamas which we were able to respond to. The first of these was a mother and a calf Blainville's beaked whale pair found in North Andros on January 25th, 50-70 yards north of the breakwater at AUTEC base. The female arrived on the beach freshly dead but the 213 cm calf was alive and was pushed back to the sea. It was found dead two days later (January 27th), one mile north of original stranding site. The predominant cause of the stranding and death would be being a dependent calf. Standard measurments were taken and tissue from the adult female was taken for genetic analysis. Both carcasses were towed.

On February 15th there was a single stranding of an adult male Blainville's beaked whale in the Atlantic site of South Eleuthera, opposite to Bannerman Town. It was reported to the BMMS next day, on the 17th February. The remains of the stranded animal were left at site.

On March 9th we collected the skeletal remains, a single weathered bone, found on rocks in Rocky Point, South Abaco. The stranded single animal was identified as an unknown small cetacean .

On April 23rd we attended a single stranding of a 407 cm Gervais'beaked whale female, in Andros. The animal was in state of decomposition but was identified as a Gervais' beaked whale female, with the characteristic lack of teeth. Fluke and flipper mesures were taken and tissue and skin samples were collected for genetics analysis. The skull and one lower mandibule was collected and held in the BMMS, as well as a fish bone found lodged in the oesophagus. The rest of the remains of the stranded animal were left at site.

The last stranding we attended was on July 15th, of a single Atlantic bottlenose dolphin in Crown Haven, Little Abaco, in North Abaco. Most of the skeleton, almost the complete axial skeleton, was collected and held at home of collectors in Crown Haven.

Acknowledgements

The Bahamas Marine Mammal Survey acknowledges Earthwatch Institute for providing an annual research grant in order to cover field expenses for this study since 1992. This study would not be possible without the enthusiastic help of our volunteer research staff, student interns and Earthwatch Institute volunteers over the years. This field season, the research assistants included Meagan Dunphy-Daly, Dr. Scott Wallace, Charlotte Dunn, Lisa Wozniak, Barbara Cheney, Olivia Patterson, Thomas Brown; student interns, Chad Thompson and Lisa Kemp; and nine great teams of Earthwatch volunteers. BMMS is a research project of the Center for Whale Research, WA and acknowledges their continued support

Publications & Presentations

Scientific papers:

Parsons, K.M., J.W. Durban, D.E. Claridge, D.L. Herzing, K.C. Balcomb and L.R. Noble. (In press). Population genetic structure of coastal bottlenose dolphins (Tursiops truncatus) in the northern Bahamas". Accepted July 2005, Marine Mammal Science.

Hickmott, L.S. Diving behaviour and foraging ecology of Blainville's and Cuvier's beaked whales in the northern Bahamas. Thesis submitted for Master of Reseasrch in Environmental Biology, August 2005, University of St. Andrew's, Scotland, UK. 102 pp.

Claridge, D.E. Fine-scale distribution and habitat selection of beaked whales. Thesis submitted for Master of Science in Zoology, November 2004, University of Aberdeen, Scotland, UK. 136 pp.

Management plans and reports:
Annual Field Report to the Bahamas Department of Fisheries, Nassau, Bahamas.
Contributed marine mammal and sea turtle sightings data towards the US Navy's Marine Resources Assessment.

Presentations:
"Becoming a marine mammal scientist in the Bahamas", presented by Diane Claridge, February 2005, Bahamas Ministry of Education's Science Careers Expo 2005, Nassau, Bahamas.

"Sperm whales in the Great Bahama Canyon" presented by Meagan Dunphy-Daly, June 26th, 2005. 11th Symposium on the Natural History of the Bahamas, Gerace Field Station, San Salvador, Bahamas.

"The Bahamas Marine Mammal Survey – a Review of our Achievements" presented by Diane Claridge, August 9th, 2005 for the Abaco Rotary Club, Marsh Harbour, Abaco.

"Distribution of Blainville's beaked whale (*Mesoplodon densirostris*) reveals age class segregation" to be presented by Diane Claridge at the 16th Biennial Conference on the Biology of Marine Mammals, December 12-17th, 2005, San Diego, CA.

"Association patterns of sperm whales in the Great Bahama Canyon, northern Bahamas" to be presented by Meagan Dunphy-Daly at the 16th Biennial Conference on the Biology of Marine Mammals, December 12-17th, 2005, San Diego, CA.

Popular articles and films:
Guide to the most common whales and dolphins of Abaco, *in* "Cruising Guide to the Abacos", White Sound Press, New Smyrna Beach, FL., reprinted 2005.
"Wild Caribbean", BBC television series, to be aired in 2006 will feature bottlenose dolphins cooperatively feeding on schooling jacks at Rocky Point.