

**Bahamas Marine Mammal Research Organisation**  
**2010 PRELIMINARY FIELD REPORT to**  
**Bahamas Department of Fisheries**  
**Permit # 1**

**BACKGROUND**

The Bahamas Marine Mammal Research Organisation has been documenting marine mammal fauna around the islands of The Bahamas since 1991. To date, we have had almost 4900 sightings in The Bahamas, providing the only long-term marine mammal dataset in the region. This longitudinal dataset is becoming progressively more important as coastal development in the Bahamas is increasing at an unsustainable rate, raising concern about direct and indirect impacts to marine life (IDB Report 2006). Furthermore, the presence of two Navy underwater testing ranges and increased shipping traffic expected as a result of the expanding container port in Grand Bahama (Figure 1) has raised concerns about impacts of noise pollution on cetaceans in the region.

The overall objectives of the field studies are to document the distribution, abundance and population structure of marine mammals in the region, with a particular focus on bottlenose dolphins, beaked whales and sperm whales. 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 to build life history tables, and use these data to determine abundance estimates, occupancy patterns, and assess social organisation. This photographic sampling is complemented by the collection of tissue and faecal samples which are being used to investigate population structuring through molecular genetics and foraging ecology through analyses of chemical tracers. A new approach employed recently involves monitoring movement patterns of odontocetes using satellite telemetry.

**RESEARCH OBJECTIVES**

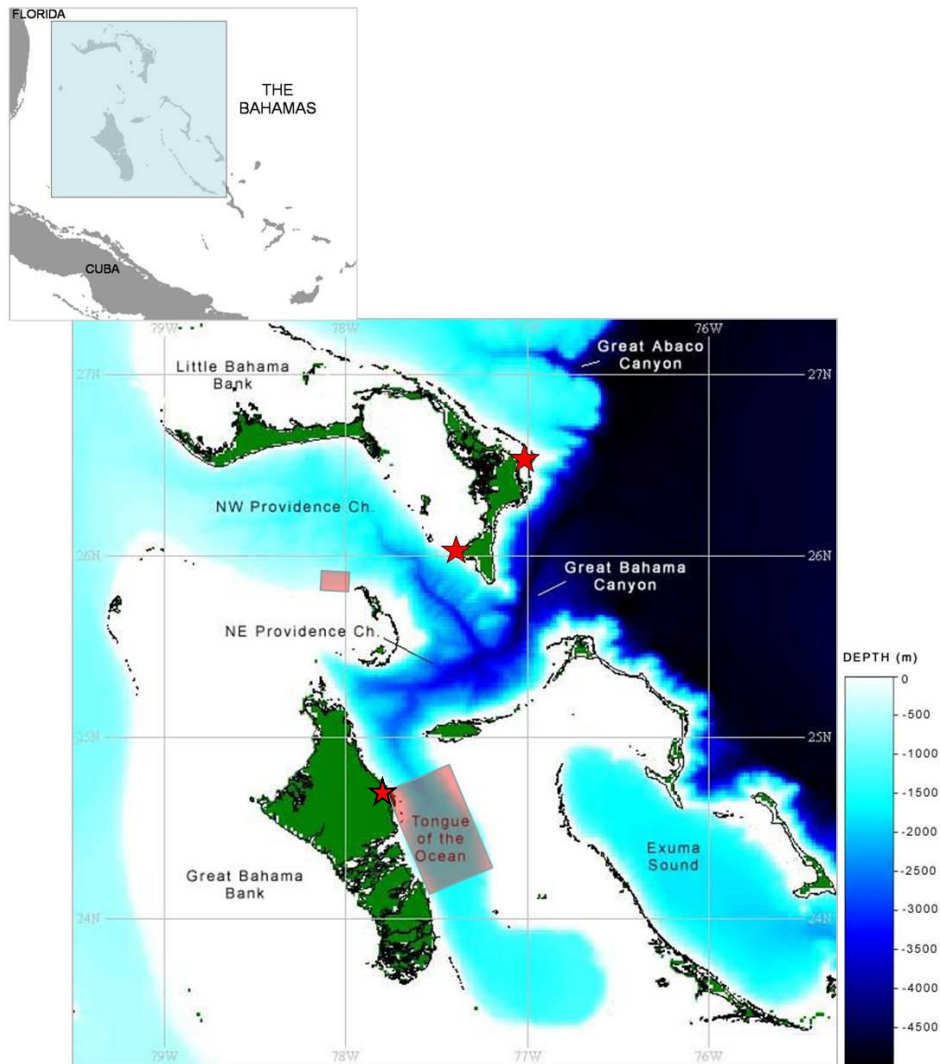
Long-term research objectives are:

- To investigate marine mammal species' distribution, abundance and population structuring 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 management of this population.
- To investigate the ecology of Blainville's 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 primarily in the northern Bahamas to assess species' distribution and habitat requirements.
- To photo-identify marine mammal species, with particular emphasis on bottlenose dolphins, beaked whales and sperm whales, to provide sufficient data for the statistical assessment of occupancy patterns, abundance and social organisation.

- To collect skin, blubber and faecal samples from marine mammal species, focussing on beaked whales and sperm whales, to investigate population and social structuring, identify prey species, and assess contaminant loads.
- To deploy satellite telemetry tags on deep-diving odontocete cetaceans to collect baseline information on movement patterns to determine population level effects of human activities, e.g. naval exercises at AUTEK.



**Figure 1.** Map of the northern Bahamas showing the Great Bahama Canyon which is comprised of two branches: NE and NW Providence Channel (an international shipping lane) and Tongue of the Ocean. The locations of the two US Navy testing ranges are shown by shaded boxes. Shore-based field work was undertaken from Sandy Point, Hope Town and AUTEK (red stars).

### SUMMARY OF 2010 FIELD EFFORT

During the 2010 field season, there were 236 marine mammal sightings including 15 different species and totalling 2404 animals (Table 1). BMMRO scientists collected the majority of these sightings data during surveys conducted off Andros and Abaco Islands, but some of the sightings data were gathered from reports from the public from throughout The Bahamas.

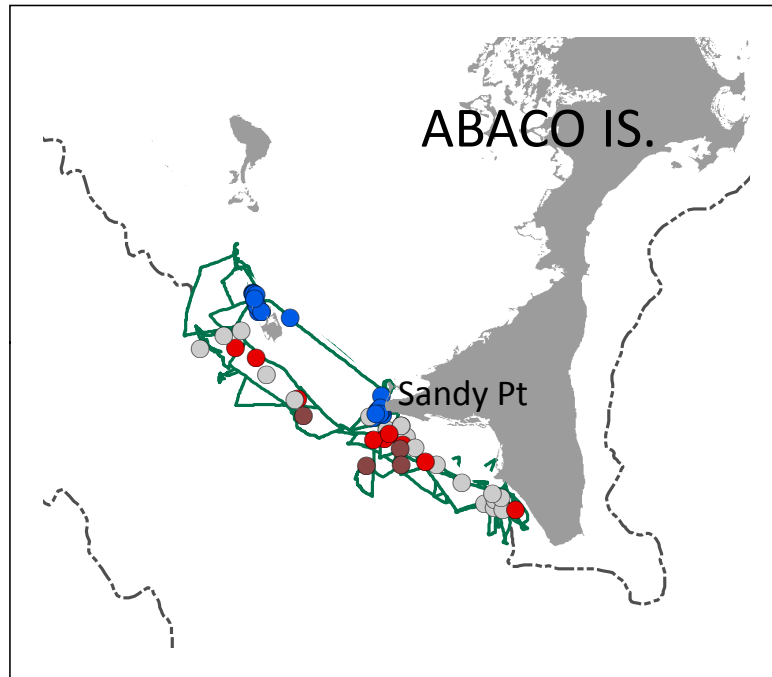
**Table 1.** Summary of data gathered during the 2010 field season. The numbers shown in parentheses are additional sightings information reported by the public.

<i>Common name</i>	<i>Scientific name</i>	<i>No. sightings</i>	<i>No. of animals seen</i>
Blainville's beaked whale	<i>Mesoplodon densirostris</i>	25 (3)	84 (6)
Gervais' beaked whale	<i>Mesoplodon europaeus</i>	6	18
Unknown <i>Mesoplodon</i> species	<i>Mesoplodon sp.</i>	1	2
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	15	39
Unknown Ziphiid		1	2
Sperm whale	<i>Physeter macrocephalus</i>	14 (1)	69 (1)
Dwarf sperm whale	<i>Kogia sima</i>	21	78
Pygmy sperm whale	<i>Kogia breviceps</i>	4	4
Unknown <i>Kogia</i> species	<i>Kogia sp.</i>	2	3
Killer whale	<i>Orcinus orca</i>	1 (1)	4 (2)
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	1 (1)	25 (12)
Melon-headed whale	<i>Peponocephala electra</i>	8	1160
Atlantic bottlenose dolphin – coastal ecotype	<i>Tursiops truncatus</i>	97 (14)	523 (36)
Atlantic spotted dolphin	<i>Stenella frontalis</i>	5 (1)	202 (26)
Pan-tropical spotted dolphin	<i>Stenella attenuata</i>	1	1
Fraser's dolphin	<i>Lagenodelphis hosei</i>	1	50
Humpback whale	<i>Megaptera novaeangliae</i>	(1)	(2)
Unknown cetacean		9	52
West Indian manatee – Florida subspecies	<i>Trichechus manatus latirostrus</i>	2	3
<b>Total</b>	<b>15 species</b>	<b>214 (22)</b>	<b>2319 (85)</b>

Field work undertaken by BMMRO in 2010 was part of four directed research efforts:

### **1. South Abaco Marine Mammal Monitoring Programme**

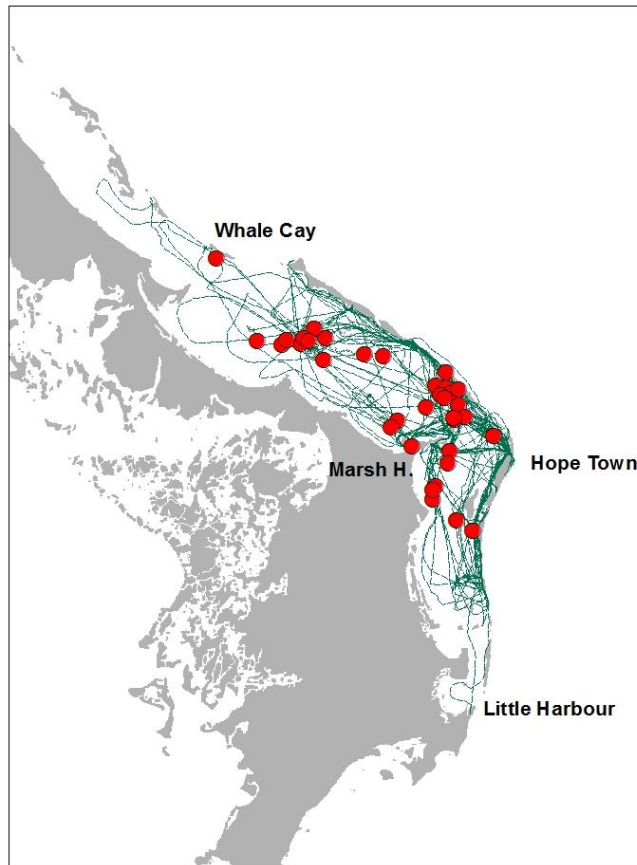
During 2010, survey effort off SW Great Abaco Island was based from shore at Sandy Point and resulted in 59 sightings of marine mammals, including eight different species. Atlantic bottlenose dolphin, the most frequently sighted species, were primarily found at Rocky Point, and north of Gorda Cay (Disney Cruise Line's Castaway Cay). Locations of sightings are shown below in Figure 2.



**Figure 2.** Map showing survey effort (green track lines) marine mammal sighting locations off SW Abaco during the 2010 field season. Atlantic bottlenose dolphins (shown in blue circles) were concentrated at Rocky Point and north of Gorda Cay (Castaway Cay) while beaked whales (red) and sperm whales (brown) were primarily found near the 1000 m isobaths (dashed line). Sighting locations for other species are shown by light gray circles.

## **2. Sea of Abaco Bottlenose Dolphin Assessment**

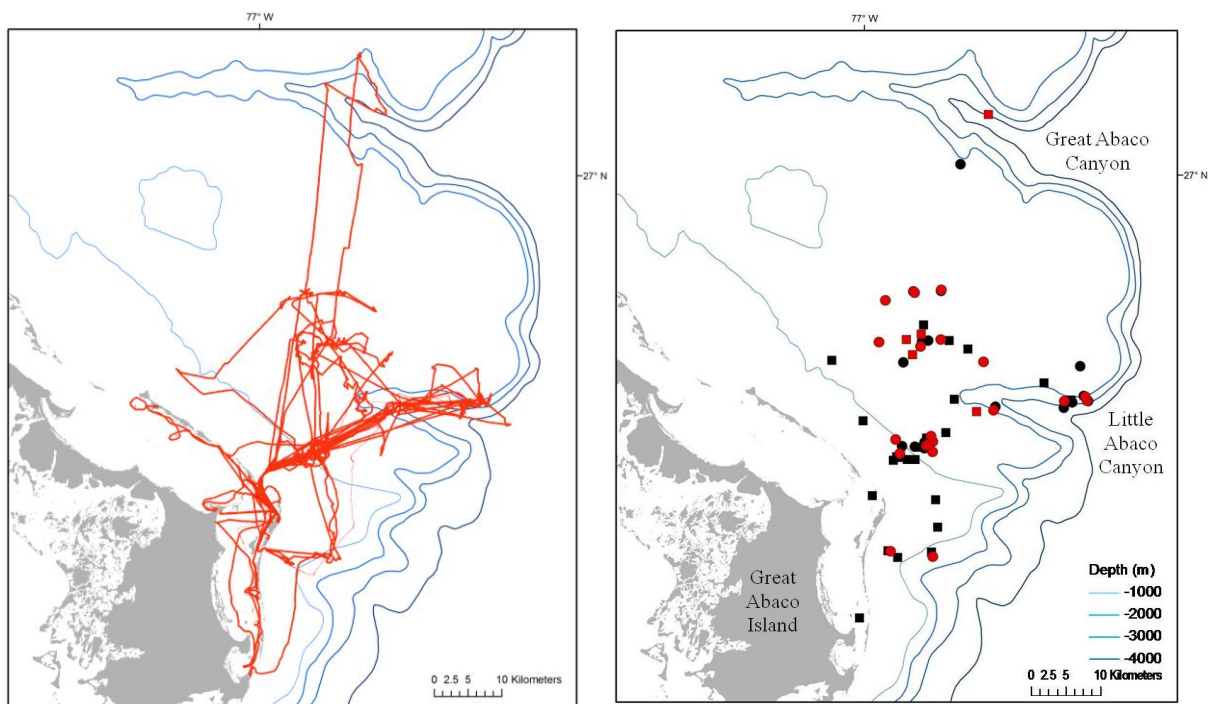
BMMRO research associates, Dr. John Durban (U.S. National Marine Fisheries Service) and doctoral student Holly Fearnbach (University of Aberdeen, U.K.) completed the fourth consecutive year of October surveys to monitor bottlenose dolphins in the Sea of Abaco. Almost 1200 miles of survey effort were conducted in the waters between Little Harbour in the South and Green Turtle Cay in the North (Figure 3), between Great Abaco Island and the barrier islands or reefs. Thirty-seven (37) dolphin groups were encountered on 24 survey days, providing information on key areas of distribution and habitat. No dolphins were seen south of Lubbers Quarters, with a notable absence from the traditional “hot-spot” around the Tilloo Bank area. This was similar to the 2009 survey, and may reflect a response increasing boat traffic in this part of the dolphins’ range, and certainly represents a change compared to the 1990s.



**Figure 3.** Map showing survey effort (vessel tracks) and locations of bottlenose dolphin sightings in the Sea of Abaco, east Abaco Island.

### **3. Bahamas Beaked whale Ecology Study (BBES)**

In 2006 BMMRO began the Bahamas Beaked Whale Ecology Study (BBES), a multi-year study of beaked whales in the Great Bahama Canyon to address knowledge gaps in the baseline population ecology of beaked whales. During June 2010 we conducted a shore-based survey for beaked whales in Little and Great Abaco Canyons on the Atlantic side (east side) of Abaco Island (Figure 4). This work completed the final dedicated field effort for this project. The primary objective was to collect skin and blubber samples from beaked whales *outside* the Great Bahama Canyon to assess the population structure in the region. This survey covered 1323 nautical miles (2500 km) of visual search resulting in 35 sightings of beaked whales, comprising 3 species: Blainville's beaked whale (n=12), Gervais' beaked whale (n=6) and Cuvier's beaked whale (n=16). The sightings of Gervais' beaked whale are noteworthy as this species has not been sighted off the SW side of Abaco Island. There were 42 biopsy samples collected from beaked whales during this field effort.



**Figure 4.** Survey effort (vessel track lines in orange on left) and locations of cetacean sightings (on right) off the east side of Great Abaco Island in the northern Bahamas. Beaked whale groups are denoted by circles and all other cetacean species by squares. Sightings during which biopsy samples were taken are shown in red and others in black.

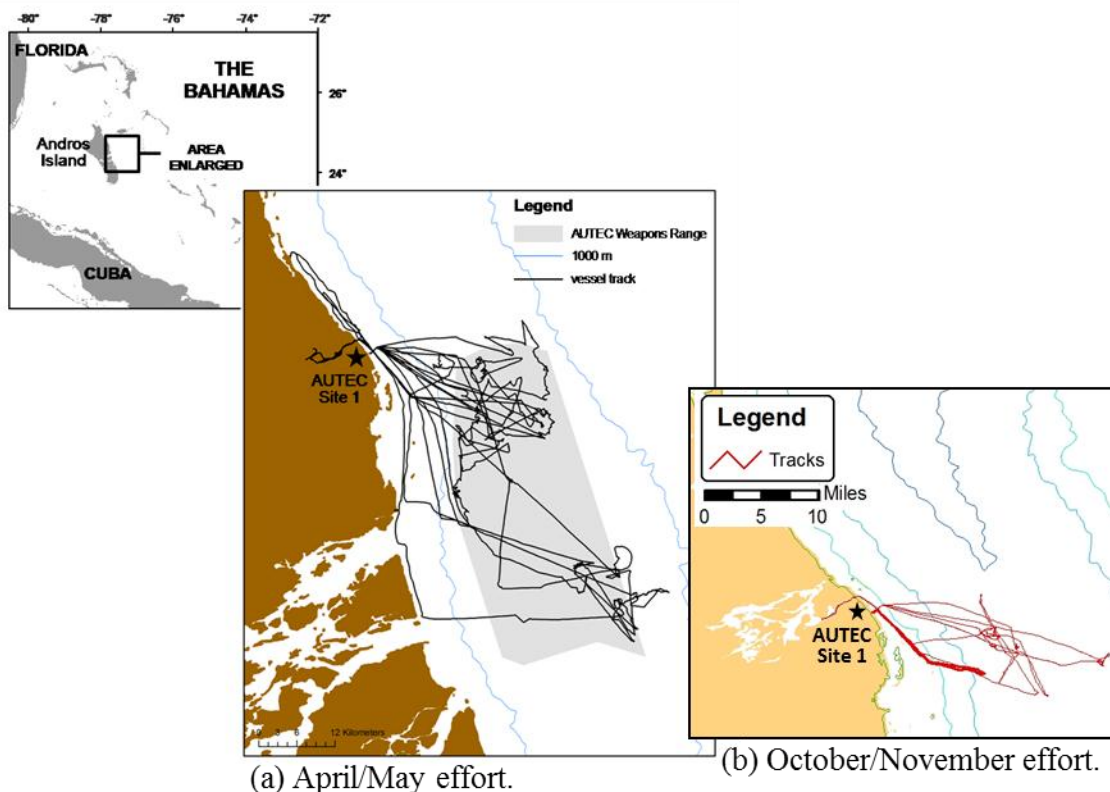
#### **4. Monitoring Movements of Odontocetes during Submarine Commanders Courses**

The Submarine Commanders Course (SCC) is a multi-ship exercise that takes place twice a year at the Atlantic Undersea Test and Evaluation Center (AUTEK), off Andros Island and involves the use of multiple mid-frequency active sonars over a 2-week period with the peak in activity occurring during a 4-day mini-war. As part of a collaborative study between BMMRO, NOAA’s Southwest Fisheries Science Center and the Naval Undersea Warfare Center, the movement of individual whales before, during and after SCCs is being monitored by deploying “dart-tags” comprising a satellite transmitter (SPOT5 model, Wildlife Computers, Redmond, WA). Secondary objectives include obtaining photo-identification data and biopsy samples. There were two field efforts at AUTEK, the first in April and May and then later in October and November prior to each of the SCCs during 2010.

April/May Field Work: Weather permitted vessel operations during 12 days covering 701 nautical miles (1,297 km), with 9 days of calm enough weather to allow work on the AUTEK range. During this time, the field team worked in co-ordination with NUWC’s Marine Mammal Monitoring on Navy Ranges (M3R) team based at Site 1, AUTEK and the vessel was vectored to acoustic detections of cetaceans made by M3R. The poor-weather days were spent searching for bottlenose dolphins in the sheltered creeks of Andros. Vessel tracks are shown in Figure 5 below.

October/November Field Work: Due to a last minute schedule change at AUTEK, the tagging team were not permitted to begin working on the AUTEK range until November 1<sup>st</sup> so vessel operations were conducted from BMMRO’s shore station on Abaco Island from October 23 – 28. Weather permitted vessel operations during 10 days covering 397 nautical miles (734 km) of

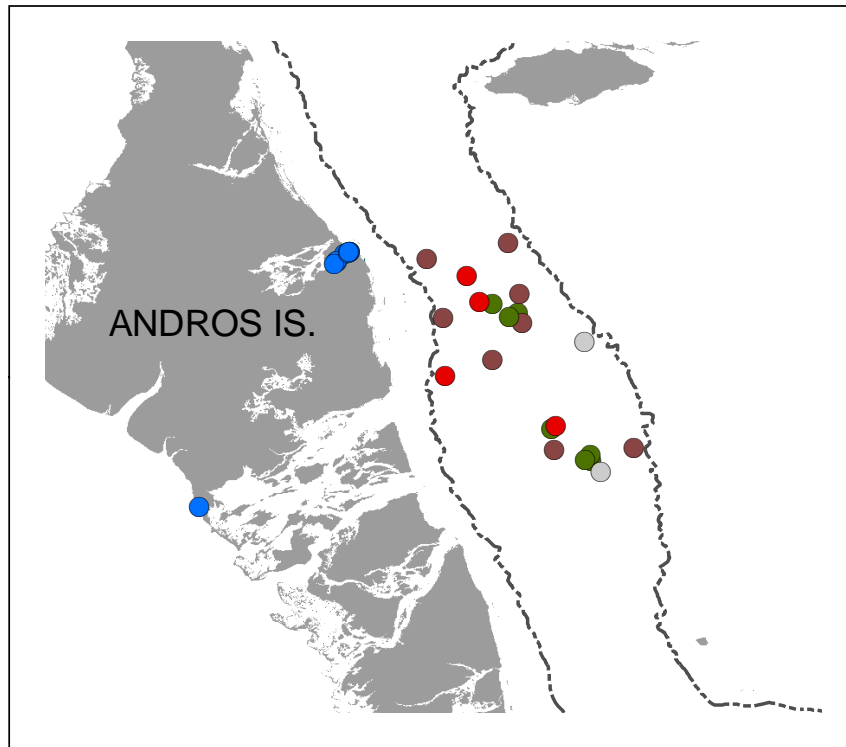
trackline, and including 42.9 hours of operation. However the majority of effort was in poor conditions (Beaufort sea state > 4) which made visual searches very difficult. The vessel tracks are shown in Figure 2 at Abaco and Figure 5 at AUTEK.



**Figure 5.** Vessel tracklines showing more extensive survey effort at AUTEK during April and May (a) than in October and November (b) 2010 due to lack of range access and poorer weather conditions.

April/May Sightings: Sightings were made of 4 species: Blainville’s beaked whale (n=4), sperm whale (n=7), melon-headed whale (n=7), and bottlenose dolphin (n=9). There were additional brief sightings of possible dwarf or pygmy sperm whale (n=1) and Cuvier’s beaked whale (n=1). Photo-identifications were obtained for the majority of individuals in groups encountered and 10 biopsy samples were collected. There were 5 satellite tag deployments, 2 on sperm whales and 3 on melon-headed whales. Analysis if these data are currently underway. Sighting locations for the Abaco work are shown in Figure 2 and at AUTEK in Figure 6.

October/November Sightings: Sightings were made of 4 species: Blainville’s beaked whale (*Mesoplodon densirostris*, n=1), sperm whale (*Physeter macrocephalus*, n=1), dwarf sperm whale (*Kogia sima*, n=2), and common bottlenose dolphin (*Tursiops truncatus*, n=2). A satellite tag was deployed on a male Blainville’s beaked whale off the southwest coast of Abaco Island on October 27<sup>th</sup>. Photo-identifications were obtained for the majority of individuals in groups encountered but no biopsy samples were collected. Sighting locations at AUTEK are shown below in Figure 6.



**Figure 6.** Map showing marine mammal sighting locations off Andros Island during the 2010 field season. Atlantic bottlenose dolphins (shown in blue circles) were found in Fresh Creek and outside Loggerhead Creek on the west side. Beaked whales (red), sperm whales (brown), and melon-headed whales were found in Tongue of the Ocean in depths greater than 1000 m (dashed line). Sighting locations for other species are shown by gray circles.

## 2010 STRANDINGS

The following is a summary of 2010 stranding events as recorded through the Bahamas Marine Mammal Stranding Network:

### 11<sup>th</sup> April 2010 - 5 Pilot whales (*Globicephala macrorhynchus*), Grand Bahama

On 11<sup>th</sup> April 2010, 5 pilot whales were found dead and stranded in Grand Bahama at 26°35'N 78°52'W. The animals are thought to have stranded on the evening before. Four of the animals were definitely males, ranging in size from 12-15 feet, with the 5<sup>th</sup> animal being about 4 feet smaller than the others and of unknown sex. The animals were found along a rocky shoreline, all next to each other except the largest animal which was 2 miles away. It is assumed the animals stranded alive, but the carcasses were already blotted and at an intermediate level of decomposition when found.

Skin and blubber samples were taken from each of the whales, and are being stored at Atlantis in their -80 degree freezer for preservation. A subsample of each of these samples has been taken by BMMRO to contribute towards a study of population structure and diet, and will be shipped to Northwest and Southwest Fisheries (NOAA) for the molecular genetics and fatty acids/stable isotope analyses, pending CITES approval.

Veronica Cuccurullo from the Bahamas Marine Mammal Stranding Network attended the stranding, took the samples and provided a report.

**17<sup>th</sup> April 2010 - Sperm whale (*Physeter macrocephalus*), Savannah Sound, Eleuthera**

A 30 foot sperm whale was reported dead and stranded in Eleuthera. The reason for the beaching is unknown because the individuals who discovered the dead whale did not call the Bahamas Marine Mammal Stranding Network hotline (242 544-5409). They removed the lower jaw to extract the teeth, a violation of the Bahamas Marine Mammal Protection Act.

Transporting sperm whale teeth out of the Bahamas is a further violation of the Convention on the International Trade of Endangered Species (CITES).

Lionel Fernander from the Bahamas Marine Mammal Stranding Network attended the stranding and was asked to collect a skin sample, however it is unknown whether this ever took place.

**4<sup>th</sup> August 2010 – Beaked whale (unknown Ziphiid species), Fresh Creek, Andros**

The carcass of is believed to be a dead beaked whale floated into the AUTECH harbour with its fin and much of the exterior missing having been extensively attacked by sharks. The carcass was buried on shore. A skin sample was taken and is in BMMRO's archive.

Marc Ciminello and Alyson Canestrani, both of the Bahamas Marine Mammal Stranding Network, attended the stranding and obtained a skin sample.

**11<sup>th</sup> August 2010 - 4 Pilot whales (*Globicephala macrorhynchus*), Norman's Cay, Exuma**  
Stranding report provided by Andrew Kriz, Exuma Land & Seas Park:

On August 11, the Exuma Cays Land and Sea Park (ECLSP) was made aware of the stranding and provided photos by email. "Hi Nigel here from Powerboat Adventures, found four minke whales (I think) 2 adults around 12' to 14'. And two smaller 8', they been dead for a day or two stranded at highwater mark." Upon inspection of his photographs, the whales were identified as pilot whales. Staff from ECLSP, Deputy Warden Christopher Dunkley and Park Administrator Andrew Kriz, and the Royal Bahamas Defence Force, Petty Officer Fred Smith and Leading Seaman McPhee, arrived at Norman's Cay at 11:00 am on August 12, just after high tide. Three of the stranded individuals were located approximately one half mile north of Norman's Cay Beach Club on the west side of the island. Coordinates are 24.37.020 N and 76.49.122. The fourth individual was not located. [BMMRO later learned that American fishermen off a sport-fishing boat towed one of the carcasses offshore to use as a shark attractant so they could catch them, in violation of the Bahamas Marine Mammal Protection Act.]

Using the contents of the marine mammal stranding kit provided by the Bahamas Marine Mammal Stranding Network, external examination of the individuals were performed. The individuals were named #1, #2, and #3 as they lay south to north. #1 was male and 370cm total length, #2 male and 470cm, and #3 female 310cm. #3 was in the most advanced stage of decomposition, bloating having ruptured its abdomen. All three were bleeding into the water from decomposition, yet no sharks or evidence of scavenging was noted. None of the individuals had injuries inflicted by man or boat and there were no obvious signs of parasites or disease. The whales did not appear emaciated and had no external wounds, other than those from being awash on the rocks. The water was littered with small pieces of black skin, which was peeling off.

The 21 measurements (morphometrics) were taken on individuals #1 and #2 and recorded on the summary form. Extensive measurements of #3 were not taken due to its bloated and ruptured condition. The counting of teeth was performed on #1 only, and that count is questionable, as the whale's tongue was bloated and the underside was difficult to access. Blubber thickness was measured by cutting out chunks and skin tissue collection was made. DMSO vials containing the skin samples for genetic testing were sealed, labelled, and frozen upon returning to the park. Following additional instructions relayed from the park, 2cm by 2cm chunks were cut out, labelled, and preserved in aluminium foil inside ziplock bags and frozen upon returning.

We received communication from park headquarters to leave one whale on the beach for further analysis, and secured #2 to a buttonwood tree with a rope. #1 and #3 were towed out to Exuma Sound and secured to dive site mooring on the edge of deep water in front of Wax Cay. One small approx. 100cm reef shark arrived quickly, which was the intention, to allow scavengers to take care of the carcasses.

Necropsy report provided by Dr. Charles Manire, DVM, Dolphin Cay, Atlantis:

On August 13, 2010, Jim Horton and I flew to Normans Cay, Bahamas to examine one remaining pilot whale (#2 from Andrew Kriz's report the day before – 470 cm total length male) from a mass stranding earlier in the week. We were assisted by staff from Exuma Park. We found the whale in shallow water tied to a tree on shore. There was external evidence of decomposition, but no evidence of human interaction. A tooth count revealed 12 upper and 12 lower teeth. Several teeth were preserved for ageing of the animal. At that point, an incision was made to examine the right ear of the whale. We found extreme decomposition in the head and neck area. The head was so hot that it would burn your palm if you leaned against it. The decomposition was extensive enough to make it impossible to assess the periodic tissues. The right ear was removed mostly intact and was preserved in formalin. Next, the skin, blubber, and muscle were removed from the right side of the chest and abdomen. There was extensive gas present in the abdominal cavity and in the GI tract. There was gross evidence of decomposition (autolysis) in all organs. Samples were collected from the major organs and were fixed in formalin. Additional samples of heart, lung, liver, and kidney were preserved for later freezing. Grossly, there was no evidence of pathology on the organs, but the decomposition may well have hidden some. Size of testes showed it to be a mature male. Once all of the internal tissues were collected, the whale was rolled over onto its right side so that the left ear could be collected. The left ear was removed intact and placed in formalin for fixation. Later in the afternoon, the tissues were transported to Atlantis, Paradise Island where they are being stored, either in -70C freezer or at room temperature for the formalin fixed tissues.

**1<sup>st</sup> September 2010 - Adult male Gervais beaked whale (*Mesoplodon europaeus*), Man O' War, Abaco**

Stranding report provided by Olivia Patterson, Bahamas Marine Mammal Stranding Network:

The stranding was reported to Friends of the Environment on September 1<sup>st</sup> by Fred Sweeting of Man-O-War at approximately 4pm. Photos were taken by Nancy Albury at 6pm that afternoon and the photos were sent to BMMRO who identified carcass as that of an adult male *Mesoplodon europaeus*. Nancy Albury (Bahamas National Museum), Olivia Patterson (Friends of the Environment, BMMRO), David Rees (BMMRO), and Kristin Williams (FRIENDS) went to the stranding site on September 2<sup>nd</sup> at approximately 3:00pm to secure the carcass and take

measurements and initial samples (skin and blubber). The team confirmed the species identification. The carcass was in a state of moderate decomposition, and most of the skin was missing (it appeared that the carcass may have been at sea for a time). It had several shark bites, but no further evidence of scavenger damage. No exterior evidence of human interaction or trauma aside from shark bites. Teeth were clean of barnacles and in good shape.

On September 3<sup>rd</sup>, a second trip was made to Man-O-War to perform necropsy with Dr. Derek Bailey, also along David Rees, Nancy Albury, (and myself). Decomposition now advanced; body bloated, tissues hot etc. No further scavenger damage. Overnight a Man-O-War resident extracted the teeth, and in the process broke the lower jaw. One tooth was broken. The intact tooth was delivered to Nancy Albury for us, and has been kept as a sample by BMMRO. The broken piece of jaw was not to be found when we visited the site that morning. The person who extracted it is still holding the broken tooth, but we can ask them for it if still useful.

Both pectoral fins were collected for studies by Nick Higgs (these were later frozen and stored at BMMRO). Skin, blubber and muscle were reflected from the left side chest and abdomen. Subcutaneous hemorrhage observed on left flank from thorax to tail, worst bruising in the mid-thorax region. The last four ribs were broken cleanly. Left lung appeared to be collapsed and the diaphragm was intact. Stomach and intestines were empty, but for some small “balls” in the stomach which were presumed to be sargassum. Lung tissue appeared normal; a sample was stored in formalin and an additional piece frozen. Dr. Bailey said that decomposition was so advanced that visual interpretation of death mechanism was not possible. A hole, approximately 12 inches wide was discovered on the right side of the animal. Most of the muscle was missing from this area. Ribs also broken and I think some pieces were missing. The animal was discovered on its right side, so this hole was not very obvious until we were part way through the necropsy. The head was removed and buried at the top of the beach (26°36.575’N, 77°01.029’W) for later collection. Two (tiger?) sharks were observed offshore and were there at least as long as we were. Ocean conditions too rough (post Hurricane Earl) to consider towing offshore. Beach not quite deep enough to bury whole carcass without possibility of it being exposed. Some locals assisted in pushing the carcass into the surf in the hopes that it would wash away from shore with the tide. Decomposition advanced greatly and tissues basically falling apart. The carcass returned to shore. Still too rough to tow out. Locals decided they would burn the carcass, but it has been raining, so as far as I know, the carcass is still on the rocks. There are no full-time residents in that area, so it is possible that they may not burn it and leave the carcass to the elements.

### **23<sup>rd</sup> September 2010 – Kogia species, Compass Cay, Exuma**

Stranding report provided by Andrew Kriz, Exuma Land & Seas Park:

Coordinates are 24.15.86 N and 76.30.66 W. Overall length was 113cm and maximum girth 62cm at the midsection. Other measurements were taken and recorded on the stranding form. No umbilical cord was present. Two samples were taken: the DMSO skin sample and a 2" x 2" tissue sample with blubber, preserved in formalin and the carcass was buried three feet deep in the sand where it washed up.

Jamaal Rolle of Compass Cay reported seeing two adult whales off the same beach this morning. Conditions today were stormy, with wind 15-20 knots onshore (E-NE) and high seas.

## **20 October 2010 - Unknown delphinid, Royal Island, Eleuthera**

Reported by Nick Higgs:

The stranding of a dead dolphin carcass was brought to the attention of Nick Higgs by Howard Albury (local boat master employed by Royal Island developers). The stranding site was on the north side of Royal Island, Eleuthera (25 30'59.67"N, 76 50'49.78"W). At the first chance N. Higgs investigated (20/10/10) and found the skeletal remains widely scattered with a part of leatherised skin that had been chewed by local dogs. All available bones were collected including ribs, scapula and vertebrae (skull could not be located) and remain in a freezer (-20C) in Spanish Wells awaiting use in scientific experiments. Skin samples were unfortunately not collected. A local had observed a floating dolphin carcass several days prior off of Meeks's Patch Island and may be the same specimen.

## **RECOMMENDATIONS TO THE GOVERNMENT OF THE BAHAMAS**

The Government of the Bahamas is urged to join the Agreement for Specially Protected Areas and Wildlife (SPA) within the UN Cartagena Convention. By participating in this regional agreement, the Bahamas will qualify for much needed funding opportunities, e.g. to maintain the Bahamas Marine Mammal Stranding Network. Additionally, we can contribute important cetacean data and expertise to the group which will help with conservation efforts for all marine mammal species in the region.

It is also recommended that the Government adopt a manatee management plan to contribute towards conservation directives through partnership with managers throughout the wider Caribbean region. Such a plan will provide guidance for the type of response to be carried out when manatees are sighted, whether supplementing diet is appropriate, rescue and rehabilitation necessary, and address educational needs.

It is our view that the Bahamas Marine Mammal Stranding Network is working effectively, with great help from the collaboration between the Department of Marine Resources and BMMRO. BMMRO would advise that in order to maintain this high level of communication and reporting throughout the Bahamas, that the government provides funds for more training and for some follow-up analysis of collected samples of strandings so far and in the future.

## **ACKNOWLEDGEMENTS**

The Bahamas Marine Mammal Research Organisation acknowledges the US Office of Naval Research, Friends of the Environment and the Rotary Club of Abaco for funding during 2010. This field season, research efforts were assisted by the following scientists and research assistants: Vanessa Brisson, Diane Claridge, Charlotte Dunn, Dr. John Durban, Holly Fearnbach, Leigh Hickmott, Olivia Patterson, Robert Pitman, David Rees, Nikita Rolle; and the Young Bahamian Marine Scientists students who participated in the Abaco Whale Camp.

## **PUBLICATIONS & PRESENTATIONS**

*Scientific papers:*

Tyack PL, WMX Zimmer, D Moretti, BL Southall, DE Claridge, JW Durban, CW Clark, N DiMarzio, S Jarvis, E McCarthy, R Morrissey, J Ward and I Boyd (in press). Beaked whales respond to simulated and actual Navy sonar. *PLoSOne*.

Fearnbach, H, J Durban, K Parsons and D Claridge (in press). Seasonality of calving and predation risk in bottlenose dolphins (*Tursiops truncatus*) on Little Bahama Bank. *Marine Mammal Science*.

*Reports and Presentations:*

Claridge, DE, CA Dunn and JW Durban (2010). Residency and movement patterns of Blainville's beaked whales at the US Navy's Atlantic Undersea Test and Evaluation Center (AUTECE): Response to sonar use? Presentation at the Abaco Science Alliance Conference, January 2010.

Claridge, DE (2010). Bahamas beaked whale ecology study. Presentation to the public made in Hope Town, June 2010.

*Popular articles:*

Claridge, DE and OM Patterson (2010). Guide to the most common whales and dolphins of Abaco, in "Cruising Guide to the Abacos", White Sound Press, New Smyrna Beach, FL.

*World wide web:*

<http://bahamaswhales.org/> Bahamas Marine Mammal Research Organisation's website  
<http://seamap.env.duke.edu/> We have contributed marine mammal and sea turtle sightings data (1985-2008) to project OBIS-SEAMAP (Ocean Biogeographic Information System - Spatial Ecological Analysis of Megavertebrate Populations).