



# Abaco Whale Expedition

EXPEDITION BRIEFING

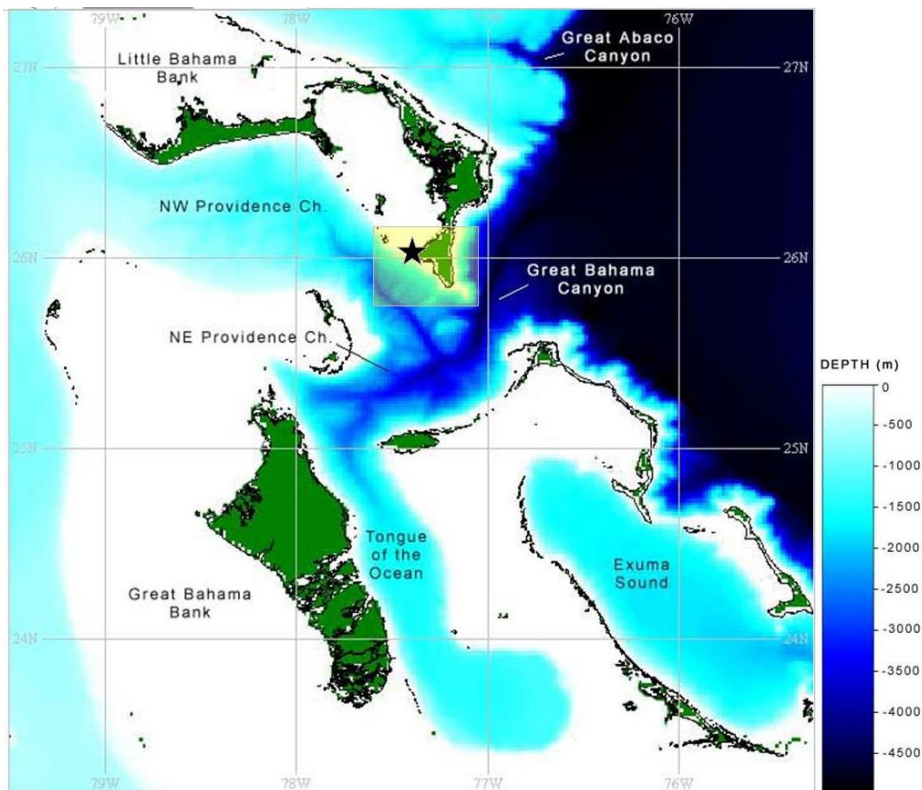
July 25 - 30<sup>th</sup>, 2010



# THE EXPEDITION

## 1. PROJECT OVERVIEW

The islands and shallow banks of the Bahamas are made up of limestone or calcium carbonate deposited over millennia, estimated to be at least 5 kilometers deep. Extremely deep canyons, such as the Great Bahama Canyon off the southwest coast of Abaco Island, divide the shallow banks, reaching as deep as 4100 meters (that's over 2 ½ miles deep!). As a result, the area offers an amazing variety of inshore and oceanic habitat readily accessible to research from shore-based stations (see Figure 1).



**Figure 1.** The deep waters of the Great Bahama Canyon divides Little and Great Bahama Banks. The canyon branches into Northwest Providence Channel and from Northeast Providence Channel south into Tongue of the Ocean. The Bahamas Marine Mammal Research Organisation is based in Sandy Point (black star) and the study area (yellow shaded area) includes both the deep canyon waters as well as the shallow bank.

Research biologists from the Bahamas Marine Mammal Research Organisation (BMMRO) have been conducting a long-term study tracking marine mammals around the Bahamas since 1991. Currently based in Sandy Point, Abaco this project provides the only comprehensive data on marine mammals in this part of the world. Line transect surveys are conducted from boats to describe the distribution and habitat use of different marine mammal species. Photo-

identification is used to recognize individual whales and dolphins and acquire information about their life histories, and determine the number of animals in the area. This photographic sampling is complemented by the collection of skin and fecal samples for genetic analysis to assess levels of genetic diversity and to investigate the structuring of marine mammal populations. Acoustic monitors are deployed at key sites to learn how often animals are found in those areas. Detailed observations are made on behaviors, habitat use, and social interactions to better understand the ecology of marine mammal species sighted. Participants will be trained to assist with all aspects of the data collection, photographic and acoustic analysis.

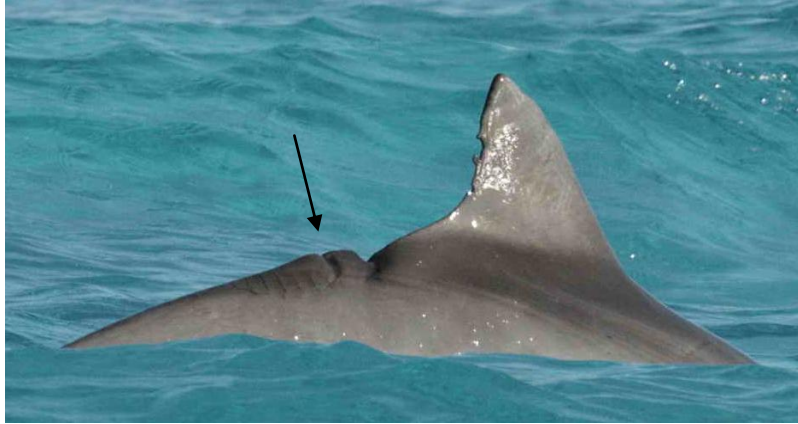
To date the project has documented almost 2,500 encounters with marine mammals in the Bahamas and recorded 24 different species, including endangered species such as sperm whales (*Physeter macrocephalus*), humpback whales (*Megaptera novaeangliae*) and the West Indian manatee (*Trichechus manatus*). The majority of species found around the islands are deep-diving toothed whales and dolphins, some of which scientists know very little. The data therefore aids in the development of both nationwide and global conservation policies. This is most notable for Ziphiid beaked whales, which are difficult to study in many parts of the world but can be found regularly in the deep-water canyons that divide the islands of the Bahamas (Figure 2). Beaked whales have been shown to be particularly vulnerable to military sonars. Numerous strandings have occurred coincident in time with these sonar exercises, including an event in the Bahamas in March 2000 during which at least 16 beaked whales stranded during a US Navy anti-submarine warfare exercise. As such, information on their ecology is critical to understand how to effectively mitigate Navy operations. The study of beaked whales that BMMRO scientists have undertaken is helping to fill these data gaps and address their conservation needs.



**Figure 2.** Two sub-adult Blainville's beaked whales in Tongue of the Ocean.

The project also conducts a detailed study of the population ecology of Atlantic bottlenose dolphins (*Tursiops truncatus*) that inhabit the shallow water of Little Bahama Bank. The dolphins on Little Bahama Bank exhibit a relatively high level of genetic diversity, low contaminant levels and high survival rates. This is in contrast to more depleted populations of dolphins around the world, which indicates the healthy status of this population. The researchers anticipate that biological information on this population will serve as a baseline for monitoring the status of bottlenose dolphin populations in less pristine environments around the world. However,

Abaco's dolphins may now be exhibiting response to recent changes to the marine environment, primarily from coastal development and associated increased vessel traffic (Figure 3).



**Figure 3.** Deep propeller scars across the tail stock of Tt516, an adult male bottlenose dolphin.

## 2. FIELD METHODOLOGIES

### **Research Vessels**

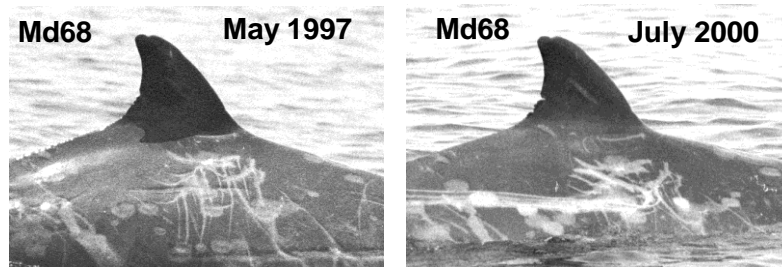
The research vessels include two rigid-hull inflatable boats ranging in size from 18 to 23 feet. All boats are equipped with VHF radios as well as other safety gear, including PFDs for all crew and participants. There will be four observers (two staff, two participants) assigned to a dedicated search on a rotating basis during surveys, using binoculars whenever the boat is idling or stopped. A hydrophone will also be used to help locate vocalizing marine mammals. The daily vessel tracks and positions of marine mammals will be recorded using a Global Positioning System (GPS). Later, the tracks will be downloaded to a computer. Water depths and sea surface temperatures will be determined from hull-mounted sensors. Survey effort and environmental conditions will be recorded in the boat's logbook every half-hour.

Whenever marine mammals are encountered, identification photographs will be taken of the head, dorsal fin, lateral view and/or tail flukes of each animal. Behavioral observations, encounter information and environmental data will be recorded using a standardized encounter form, which will later be entered into a computer. Whenever possible, underwater photographs will be taken using an amphibious digital camera to document the sex of individuals, and prey species being pursued. When possible, acoustic recordings will be made using a hydrophone and DAT recorder. Encounters may be videotaped using a digital video camera to further document behavioral observations and to confirm species identification. Feces and sloughed skin will be collected opportunistically, stored in preservative, and later analyzed to determine prey species and genetic relationships.

### **Photo-Identification**

Each animal acquires a unique pattern of natural markings, nicks and scars which allow researchers to distinguish between individual whales and dolphins in the wild (Figure 4). By tracking the movement patterns of individuals within a population, we can learn about their population ecology. Such as estimating the population size (using a method called mark-recapture), assessing their residency patterns (do they remain in the same area throughout their

lifetime), their reproductive biology (how often do they have a calf) and their social organization (who is photographed with who). The status of a population can be monitored over time and potential threats from changes to their environment can be assessed. During encounters, groups are approached closely to acquire high-quality identification photographs of as many individuals as possible using digital SLR cameras with telephoto and zoom lenses. Later, the photographs are downloaded and participants will help to identify or match individuals photographed during the encounter with those from a catalogue of all animals photographed in the area since the study began.



**Figure 4.** Photo-identification photographs of Blainville's beaked whale Md68 demonstrate that individuals can be tracked over periods of years (1997-2000) using high quality photographs of the natural markings on the body.

### **Cataloguing Individual Dolphin Signature Whistles**

Acoustic monitors will be placed in selected locations to determine how often bottlenose dolphins use an area as well as record presence and absence of vessel noise. Additionally, bottlenose dolphins each have its own signature whistle that can be used to identify it individually, and a catalogue of signature whistles is being developed from the Abaco population. The acoustic recordings will be analysed using a software programme that can determine the number of individual dolphins present, and these results will be compared to the number of individuals photo-identified during the same time period. If successful, this will demonstrate that remote acoustic monitoring of a resident wild population of dolphins may be possible. Participants will aid in analyzing recordings and identifying signature whistles.

## **3. PROJECT STAFF**

### **Lead Scientists:**

**Diane Claridge** was born in Nassau, Bahamas and graduated from Florida Institute of Technology with her B.Sc. in Environmental Science in 1988. She has been volunteering for the Center for Whale Research as a Research Biologist since 1987 and has worked for The Bahamas National Trust as a Park Officer in the Pelican Cays Land and Sea Park in Abaco. Diane co-founded The Bahamas Marine Mammal Survey in 1991 which has become the non-profit, Bahamas Marine Mammal Research Organisation (BMMRO) and has served as the Director. In 2006, she earned a Research Master's of Science in Zoology from the University of Aberdeen (as an overseas student) examining the distribution of beaked whales around Abaco Island. In 2008, Diane began her PhD in Biology at the University of St Andrews where she is studying the population ecology of beaked whales in the Bahamas.

**Charlotte Dunn** was born in Nassau, Bahamas and has grown up in Hong Kong and the United Kingdom. Her background is in computer programming, but she completed her M.Sc. in Environmental Biology at the University of St. Andrew's, Scotland in 2005. Her primary area of interest is cetacean acoustics and she is conducting a study to monitor bottlenose dolphins off south Abaco by recording their presence using remote acoustical techniques. Charlotte has participated in the project since 2004 on a full-time basis at the research center and is the President of BMMRO. Charlotte began her PhD in Biology at the University of St Andrews in 2008 and her topic is vocal communication in Blainville's beaked whales and its implications for conservation and social interaction.

#### **Summer Interns:**

**Vanessa Brisson** is from Quebec City, Canada and is an undergraduate student at Dalhousie University in Halifax, Canada. Vanessa graduates in May 2010 with an Honours Bachelor of Science degree in Marine Biology. She is undertaking a summer internship with BMMRO to gain field experience in marine mammal studies before continuing her studies.

**Katrina MacIver** is from the Shetland Islands in Scotland, UK and Manhattan, New York. She is an undergraduate student at the University of St Andrews where she is pursuing a Bachelor of Science degree in ecology and conservation. She has volunteered in two projects involving studies of killer whales and is joining BMMRO's team as an intern during summer 2010.

## **4. FIELD TRAINING**

During the first day in the field, research staff will provide a thorough on-site briefing concerning the project's significance and methods, explaining how participants will contribute towards this long-term effort. Staff will review what you can expect from the project and what is expected of you. Safety concerns, the daily schedule and itinerary, and the rotation of chores will be discussed. The formal orientation of assigned tasks usually begins the first afternoon to insure familiarization with the equipment and safety procedures. Participants will learn how to complete the vessel logs and data entry forms and use the Global Positioning System (GPS) and VHF radio before the first vessel survey. If weather permits, all participants will be taken on a brief survey (up to three hours on the water) and will be introduced to the safety procedures on the boat, how to operate the boat (in case of emergency), how to search for animals and what to do when they're found. During this initial survey, you will learn how to prepare yourself for a full day of survey work. A slide show on the project's background will provide an overview of the research and help participants with species identification.

The remaining days will be spent continuing the formal orientation. Participants will be given instruction in data entry and photo-identification. Slide shows will be given presenting the various species that may be encountered to help participants recognize and learn the differences between species and become familiar with various cetacean behaviors.

When on the boat, participants will help search for and record the presence of marine mammals and other marine life. Although everyone is expected to help search for marine mammals at all times, there will be four observers (two staff, two participants) assigned to a dedicated search effort on a rotating basis. The extra eyes on the water help greatly with not only finding marine mammals but also staying with them once they are found. The research staff will primarily take the identification photographs but sometimes, particularly when large groups are encountered, participants may be asked to take photographs as well. Personal photography is allowed when

participants are not helping with completing the data forms. Participants will help record behaviours observed and environmental conditions on a rotating basis. The boat's captain, one of the project staff members, will be in charge of the vessel's operation and safety at all times.

During time ashore, participants may chose to help with entering data gathered during encounters and sightings of marine mammals, vessel logbook entries, and information noted on transect and effort data sheets into the project's customized database. Participants can also identify individual animals from the photographs taken.

Preparation of the evening meal will be rotated among participants and staff.

## 5. ITINERARY

Below is a tentative itinerary for the expedition. If inclement weather prevents vessel survey, field trips may be organized that could include a kayaking trip, a visit to an inland hole, visit to the Abaco National Park to see the Bahama parrot and/or a beach cleanup.

### Day 1

The participants will arrive at the BMMRO research centre in Sandy Point. Once all participants have arrived, there will be an introduction to the research center during which participants and research staff will introduce themselves. Participants will be given brief orientation to the research site, survey methods, data collection, and there will be a discussion regarding safety concerns, including boat safety and operation. If weather permits, a short vessel survey will be conducted. Two people will be responsible for preparing the evening meal, after which there will be an evening presentation on the background of the project.

### Days 2-4

Whenever weather permits, each day will be spent on the water conducting a survey for whales and dolphins. If poor weather prevents surveys, participants will have a chance to learn about data processing, photo-identification techniques and acoustic monitoring. Two people will be responsible for preparing the evening meal each night. There will be an evening lecture after dinner every night. The group will have dinner at a local restaurant in Sandy Point the last night.

### Day 5

A group photo will be taken, evaluation forms completed and participants will depart BMMRO.

## 6. DAILY SCHEDULE

Below is a tentative daily schedule, however, participants should be aware that schedules can and do fluctuate due to weather and project needs. Should this situation arise, your cooperation and understanding are appreciated.

- Sunrise:** Boat group begins preparing for vessel survey and departs as soon as possible, weather permitting. The boat may be out all day.
- 9:00 am:** If poor weather, morning meeting to discuss day's alternate plan which may include data entry, photo-identification work, etc.

- 5:00-7:00 pm:** Boat group returns. Free time. Project staff checks over data collected and work done. Cooks prepare dinner.
- 7:00 pm:** Dinner and informal discussion of day's findings.
- 8:00 pm:** Video, slide show, or free time for music jam sessions, beach fire, games, etc.
- 10:00 pm:** Quiet hours begin.

## 7. ACCOMMODATIONS

The participants will be housed in 2 houses on the beach in Sandy Point. The research centre is based in one of the houses with the research vessels moored directly in front. This house has three bedrooms, a large open living room, dining room, kitchen, and office. All meals, training, briefing and data entry will be conducted in the house. The second house has three bedrooms and two bathrooms. The participants will be divided between these two houses.

The center is equipped with wireless internet connectivity that is available 24 hours a day. You may bring your own laptop if you wish to use internet services, however, regular internet usage is discouraged as it often interferes with participation in team activities. Likewise, the center has cable television, but this is used primarily for monitoring the weather and other use may not be permitted. The research center is Diane and Charlotte's home and they ask that participants respect it as such. It is also home to their family of three dogs: Bruno, Ford and Harry.

### **Personal Communications**

Participants can receive phone calls/messages and faxes at 242-366-4155. Phone calls can be made from the research center provided participants have a valid phone card. Phone calls will be limited in duration and time available as there is only one phone line at the research base. Wireless internet access is available and participants can receive emergency email messages at [info@bahamaswhales.org](mailto:info@bahamaswhales.org).

## 8. FOOD

All meals will be prepared at the research center, which has a full kitchen with a gas stove, large oven and microwave, and an outdoor grill. Both participants and the project staff will be responsible for cooking and cleaning. Breakfast and lunch are self-serve, and the team will prepare bag lunches for boat days or field trips. There will be two people assigned each day to be in charge of preparing the evening meal and cleanup.

**Special Dietary Requirements:** Please alert us to any special dietary requirements as soon as possible (e.g. diabetic, lactose intolerant, etc.).

Participants will need to pay for the dinner out in Sandy Point and alcohol separately.

# 11. HEALTH INFORMATION

## Physical Demands

Participants are expected to be in good condition, both physically and psychologically, in order to meet the demands of this expedition. You must be able to walk 3.2 kilometers/2 miles on a sandy beach and swim 91 meters/300 feet unassisted. Participants should be familiar with boats, and must feel comfortable being on the water distant from land in choppy sea conditions. You must be able to swim. Participants should also be reasonably agile, as rapid entry into and exit from the boat may have to be made when embarking and disembarking. Developing a regular exercise program of walking/jogging, aerobics and swimming would help you prepare for the expedition. Note that snorkeling is optional.

Be aware that the boats have no conventional toilet facilities. Team members may urinate by squatting off the back of the boat. Most of the time the team will stop for a quick swim/wade at a beach but it is possible to be offshore for 6-8 hours at a time if tracking animals. It is most important, however, that participants maintain their fluid intake at sea; holding back because of anxiety about using the “toilet” could lead to dehydration. Please be aware of the potential hazards listed below.

## Potential Hazards

<b>Hazard Type</b>	<b>Associated Risks and Precautions</b>
Working on a boat	Working aboard a small boat poses inherent risks. Bouncing and jostling can be quite uncomfortable for those with bad backs or neck pain. Boat surfaces are wet and can be slippery, putting one at risk of falling and injury. Unplanned immersion in the water from falling overboard can also put one at risk of injury. The boats are carefully maintained and are equipped with appropriate safety equipment including PFDs for each person. Staff will brief participants on boating risks and precautions.
Transportation	Participants will be transported using the project vehicles, and typical driving-related risks will be present. Traffic laws will be followed, seatbelts are installed in the vehicles, and participants will not drive.
Climate/ Weather	Participants will be exposed to the sun (UV index levels of up to 10) and are at risk of sunburn and heat related illnesses. Protective clothing (wide-brimmed hat, long-sleeved shirt and trousers/pants), sunglasses, and waterproof sunscreen (SPF 30+) are essential. Heat exhaustion and dehydration can be prevented by drinking lots of fluids throughout the day.
Swimming/ Snorkeling	Boat traffic, sharks, jellyfish, urchins, fire coral, stone fish, stingrays, and high surf during storms are all risks present when swimming or snorkeling in the area. Participants will be trained to identify dangerous marine species and to avoid them. Staff members will watch for sharks when swimmers/snorkelers are in the water. Staff members will advise participants when sea conditions are unsuitable for swimming and water sports.
Walking/ Hiking	Walks/Hikes are optional and recreational only. The area has uneven terrain and the coastline is rocky, which could result falling or twisted ankles. A First Aid kit will be taken on hikes and participants must have proper footwear.
Insects	Mosquitoes and sand flies are present. For those who are allergic to insect bites, be extra cautious and bring the necessary treatments as recommended by a doctor. This is especially important for participants who may find bites highly irritating.

Plants	Poisonwood trees are present and, if touched, can cause a rash similar to poison ivy. You will be trained to recognize and avoid these trees.
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### **Emergencies in the Field**

The boat has both a VHF radio and a mobile phone to communicate with the research base. However, during lightning storms in the summer, the VHF radio may need to be turned off, and the mobile phone does not always get service.

A vehicle will always be available for transport to the nearest medical facility at Sandy Point (less than one mile away), where a government clinic is staffed by a medical doctor and two registered nurses. The doctor does not reside in Sandy Point, and provides care for other neighboring communities as well and is often not present at the clinic. In Marsh Harbour, 50 miles/80 kilometers away by road, there are several private clinics which hold regular office hours and the doctors are on-call 24 hours a day. There is also a resident dentist in Marsh Harbour. Minor injuries will be treated at the research center and/or the clinic. In the case of a serious emergency, the injured person would be evacuated by plane or sent by helicopter from Sandy Point to a fully equipped hospital in Nassau, Freeport or Florida.

## 12. EXPEDITION PACKING CHECKLIST

### **Required Items**

#### ***Clothing/Footwear for Fieldwork***

- Lightweight, quick drying, long-sleeved shirts and pants/trousers (for sun protection)
- 5 t-shirts
- 2 pairs of shorts
- 2 swimsuits
- 1 waterproof jacket
- 1 pair of sandals/shoes that can get wet (e.g. hiking/rafting sandals)
- 1 pair of tennis shoes or deck shoes (good walking shoes)
- 2 pairs of light socks
- A hat for sun protection (one with a wide brim that ties under your neck is ideal for the boat)

#### ***Field Supplies***

- Daypack/small rucksack for daily needs on boat
- Water and sweatproof sunscreen lotion (SPF 30 or higher)
- Lip balm (SPF 30 or higher)
- Seabands or seasickness preventative medication
- 1-liter water bottle (you will be able to refill this throughout the day)
- Sunglasses with retaining strap – polarized recommended
- 1-2 towels

### ***Personal Supplies***

- Personal toiletries (biodegradable soaps and shampoos are recommended)
- Personal First Aid kit
- Insect repellent for sand flies (Citronella Oil is good, but please DO NOT bring AVON Skin So Soft)

### ***Miscellaneous***

- Spending money
- Camera, film/memory card(s), extra camera battery (180-300 millimeter telephoto or zoom lens recommended)
- Digital wristwatch (water-resistant)

### **Optional Items**

- Flashlight/Torch or headlamp with extra batteries
- Field notebook
- Snorkel gear, including mask, snorkel, fins and dive skin or rash guard
- Mesh dive bag for snorkel gear
- Binoculars