

BIOSPHERE EXPEDITIONS

Not for profit, for wildlife: Award-winning, hands-on, non-profit conservation expeditions for everyone. Adventures with a purpose.

Expedition report

Surveying whales, dolphins and turtles around the Azores archipelago in the Atlantic Ocean



Expedition dates: 5 April – 29 May 2004

Report published: September 2004

Authors: Lisa Steiner & Chris Beer
Whale Watch Azores

Matthias Hammer (editor)
Biosphere Expeditions

Abstract

In 2004 Biosphere Expeditions concluded a successful first year of cetacean photo-identification and distribution studies in the Azores. The expedition was based in Horta on the island of Faial and work was conducted around three islands - Faial, Pico and São Jorge. The expedition ran from 5 April until 29 May 2004 and concentrated on the four main projects below. Prior to this expedition, no work had been done in April and not many hours of effort logged at sea during May. Sightings of all cetacean species were recorded. A total of 13 different species of cetacean and 2 species of turtle were encountered. Photo-identification, which has been ongoing for sperm whales, bottlenose and Risso's dolphin since 1987 and baleen whales since 1997, continued.

Photo-ID. Sperm whale photo-identification, which has been ongoing since 1987 in the Azores, continued with 44 identifiable individuals photographed, including several animals seen in previous years. Baleen whales, including blue, fin sei and minke whales, have been seen with increased frequency over the last few years. This expedition photographed all baleen whales encountered with the aim of comparing photographs taken around the Atlantic over the next several months and years to see if any animals have been sighted in any other regions, thus gaining an insight into the movements of these large whales. Dolphin photo-identification, which has been ongoing for bottlenose and Risso's dolphin since 1987 in the Azores, continued. 22 groups of bottlenose dolphin and 14 groups of Risso's dolphin were photographed. These photographs will be analysed at a later date.

Europhlukes is a Europe-wide project that has brought together different researchers from several countries to share data and photo-identification pictures of various species. The automatic contour extraction program for sperm whales was in its test phase and expedition members learned how to extract sperm whale flukes and participated in testing the Europhlukes system. The test involved different people extracting contours from the same whales and then the resulting contours matched against each other. The data was sent off to the test co-ordinator and is in the process of being analysed. In addition, actual extraction of sperm whale fluke contours for the North Atlantic and Mediterranean Catalogue commenced. Once the backlog of fluke images have been extracted, the photographs that are taken on a particular day can be analysed and matched to the catalogue of individuals that have been previously seen around the North Atlantic. There is also a programme being developed for the dorsal fins of dolphins as well as the baleen whales that will be put into use when completed.

Turtles. Loggerhead Turtles have been collected and tagged in the Azores since 1988 for a joint venture between the University of Florida and the University of the Azores. During this expedition 9 loggerhead turtles were measured and tagged, as well as many others sighted that were not captured. In addition to the loggerhead turtles sighted, leatherback turtles were also seen.

POPA. Data collection for the Department of Oceanography and Fisheries (DOP) of the University of the Azores, for the Observer Program for the Fisheries of the Azores, POPA, was initiated for the first time from a non-fishing boat. Information was collected for random cetacean sightings, along transects, designated turtle and bird counts as well as environmental parameters. During this expedition, team members recorded the occurrence of several marine species such as loggerhead and leatherback turtles, baleen and toothed whales, dolphins and several species of seabirds. The information recorded during the expedition will be validated and included in the POPA database.

Resumo

Em 2004, a “Biosphere Expeditions” concluiu com sucesso o seu primeiro ano de foto identificação de cetáceos e estudos de distribuição nos Açores. A expedição ficou sediada na Horta, ilha do Faial e o trabalho de campo foi efectuado em três ilhas: Faial, Pico e São Jorge. A expedição decorreu no período compreendido entre 5 de Abril e 29 de Maio de 2004 e esteve envolvida com 4 projectos que são descritos mais à frente. Antes desta expedição, nunca tinham sido feitas amostragens do género no mês de Abril e poucas tinham ocorrido em Maio. Todos os avistamentos de cetáceos foram registados. Foram observadas 13 espécies diferentes de cetáceos e 2 de tartarugas. Deu-se seguimento à foto identificação de cachalotes, roazes e grampos, que já ocorre desde 1987 e de outras baleias, que ocorre desde 1997.

Foto identificação. A foto identificação de cachalotes, que decorre já desde 1987, prosseguiu com 44 registos efectuados com sucesso, onde se incluíram vários animais que já tinham sido fotografados anteriormente. Algumas baleias como a b. azul, a b. comum, a sardineira e a b. anã têm sido avistadas cada vez com mais frequência nos últimos anos. A expedição em causa fotografou todas as baleias encontradas com o objectivo de comparar registos com outros recolhidos por todo o Atlântico de forma a complementar os conhecimentos sobre os seus padrões de movimento. A foto identificação de golfinhos, que tem vindo a ser efectuada nomeadamente para roazes e grampos desde 1987 nos Açores, prosseguiu no período já referido. Foram fotografados 22 grupos de roazes e 14 de grampos. As fotografias em causa serão analisadas posteriormente.

Europhlukes. Este projecto europeu reuniu vários investigadores de diferentes países com o objectivo de partilhar dados, nomeadamente fotografias de foto-identificação de diferentes espécies. Esteve em teste o programa automático de extracção de contornos de barbatanas caudais para cachalotes e os membros de expedição aprenderam a extrair esses contornos participando no processo de teste do sistema Europhlukes. O teste envolveu diferentes pessoas na extracção de contornos das mesmas baleias de forma a que no final os resultados obtidos fossem comparados uns com os outros. Os dados foram depois enviados para o coordenador de testes. Complementarmente e em consequência, foi iniciado com base nos contornos de caudais de cachalotes, o catálogo para o Atlântico Norte e o Mediterrâneo. Depois de existir o catálogo de contornos as fotografias tiradas num qualquer dia podem ser analisadas e eventualmente serem encontrados indivíduos que já foram previamente avistados no Atlântico Norte. Também está a ser desenvolvido um programa dirigido às barbatanas dorsais de golfinhos bem como de outras baleias que estará disponível para utilização depois de estar completo.

Tartarugas. Tem se procedido á recolha e marcação de tartarugas bobas nos Açores desde 1988, numa iniciativa conjunta entre a Universidade da Florida e a Universidade dos Açores. Durante esta expedição, foram capturadas, medidas e marcadas 9 tartarugas e muitas outras, que não chegaram a ser capturadas, foram avistadas, incluindo-se nestes avistamentos tartarugas de couro.

POPA. Pela primeira vez, foi utilizada uma plataforma não comercial para a recolha de dados para o Programa de Observação para as Pescas dos Açores (POPA) do Departamento de Oceanografia e Pescas da Universidade dos Açores. A recolha de informação incluiu registos de avistamentos de cetáceos e tartarugas marinhas em transectos definidos pela embarcação/membro da expedição, censos visuais de aves marinhas e registo de parâmetros ambientais. Durante esta expedição foram observadas diferentes espécies nomeadamente, delfínidos, baleias de barbas e de dentes, tartarugas bobas e de couro e várias aves marinhas. A informação recolhida durante a expedição será validada e incluída na base de dados POPA.

Contents

Abstract	1
Resumo	2
Contents	3
1. Expedition Review	4
1.1. Background	4
1.2. Research Area	5
1.3. Dates	5
1.4. Local Conditions & Support	6
1.5. Local Scientists	6
1.6. Expedition Leaders	7
1.7. Expedition Team	7
1.8. Expedition Budget	8
1.9. Acknowledgements	9
1.10. Further Information & Enquiries	9
2. Whale, dolphin & turtle study	10
2.1. Introduction	10
2.2. Methods	11
2.3. Results	16
2.4. Discussion and conclusions	26
3. Observer Programme for the Fisheries of the Azores (POPA)	27
2.1. Introduction	27
2.2. Results	27
4. Expedition leader's diary	29

1. Expedition Review

M. Hammer (editor)
Biosphere Expeditions

1.1. BACKGROUND

Biosphere Expeditions runs wildlife conservation research expeditions to all corners of the Earth. Our projects are not tours, photographic safaris or excursions, but genuine research expeditions placing ordinary people with no research experience alongside scientists who are at the forefront of conservation work. Our expeditions are open to all and there are no special skills (biological or otherwise) required to join. Our expedition team members are people from all walks of life, of all ages, looking for an adventure with a conscience and a sense of purpose. More information about Biosphere Expeditions and its research expeditions can be found at www.biosphere-expeditions.org.

This expedition report deals with an expedition to the Azores that ran from 5 April to 29 May 2004. The expedition was part of a long-term research project to elucidate the life histories and migration patterns of whales, dolphins and turtles across the oceans and assist with the formulation of effective conservation strategies.

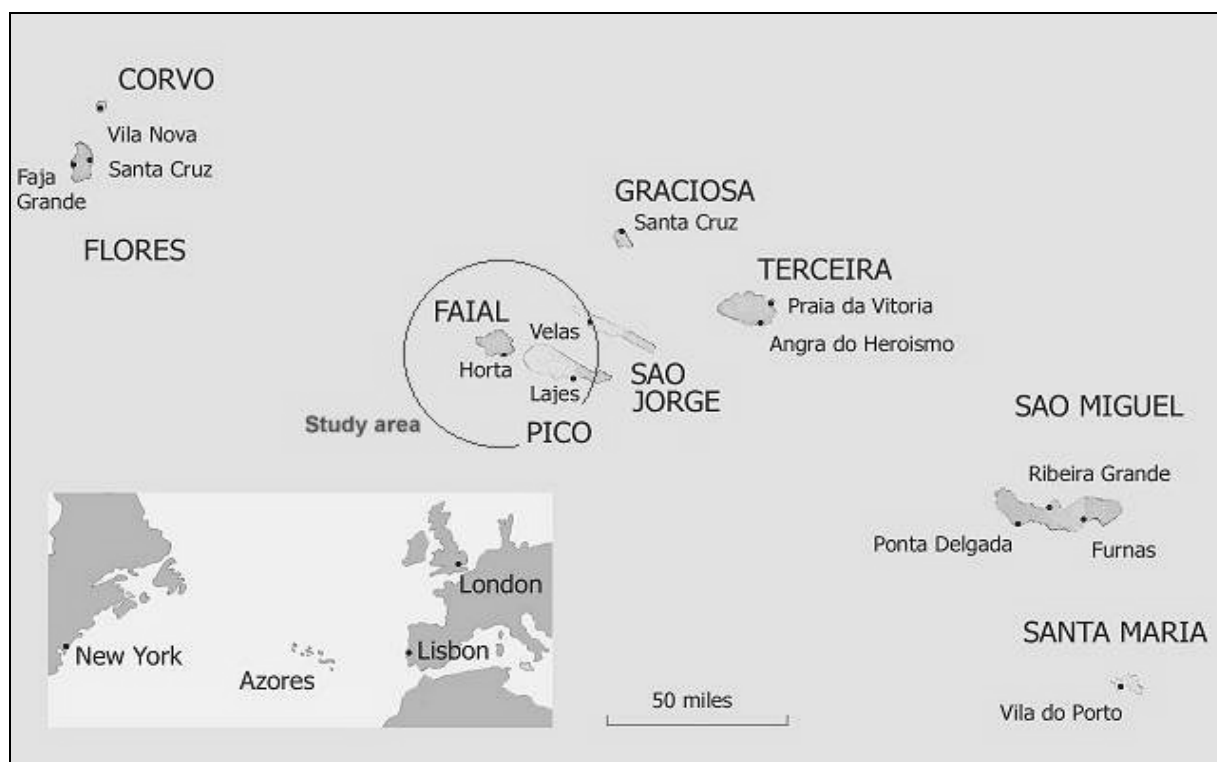
The Azores archipelago, which sits near the middle of the Atlantic Ocean, about 1400 kilometres off the coast of Portugal, is one of the prime whale and dolphin hotspots in the world and around 30% of the world's known cetacean species have been recorded there. For management purposes the International Whaling Commission (IWC) has included the Azores archipelago in the East Greenland and Iceland stocks, but there is little evidence to support this.

The expedition initiated the first long term concerted study on baleen whales in the Azores. These animals in particular have not been studied around the Azores and accurate knowledge of the origins of the baleen whales passing the archipelago from March to May will help to determine which stocks they come from and assess more accurately their true numbers (which are often inflated in efforts to set hunting quotas).

The expedition also continued existing sperm whale, bottlenose and Rissos's dolphin studies. The sperm whale study is part of a larger migration and social study, and the dolphin study is in the early stages of assessing animal numbers and migratory behaviour around the archipelago. Loggerhead turtles were also studied and tagged as part of an international research project studying their life history and migration around the Atlantic.

1.2. Research Area

The Azores Archipelago, Europe's westernmost point, is a group of nine distinct islands, lying on the same latitude as New York and Lisbon, around 1600 kilometres off the coast of Portugal (of which they are part). Lying on the mid-Atlantic ridge, the islands display spectacular volcanic scenery, with large blue-green crater lakes, impressive black lava sea cliffs, and, towering above them all, the highest mountain in Portugal on Pico.



Map of the Azores

The Azores were discovered in 1427 by Portuguese explorers and colonised shortly after by people of mainly Portuguese and Flemish descent. During the 20th century the islands were an important stopover point for undersea communications cables, trans-Atlantic flights and yachtsmen. Their main income is from agriculture and fishing and tourism has all but passed by the islands.

1.3. Dates

The expedition ran over a period of eight weeks divided into four two-week slots, each composed of a team of international research assistants, scientists and an expedition leader. Slot dates were:

5 - 17 April | 19 April - 1 May | 3 - 15 May 2004 | 17 – 29 May 2004

Dates were chosen to coincide with the migration of baleen whales past the archipelago.

1.4. Local Conditions & Support

Expedition base

The expedition team was based in modern, small self-catering accommodation in the centre of the town of Horta, about 800 metres from the marina. Three to four team members shared a small apartment with two double rooms, a kitchenette and sitting room, shower and toilet. All meals were self-catering and vegetarians could be accommodated.

Field communications

The boat carried two radios for communication with other boats. There were telephones at base and mobile phone coverage on the island and within a few kilometres out at sea.

Transport, vehicles & research vessel

Team members made their own way to the Horta assembly point. From there onwards and back to the assembly point all transport, vehicles and boats were provided for the expedition team, for expedition support and emergency evacuations.

Our research vessel, the “Physeter” (after the Latin name for Sperm Whale), was a modern offshore motor catamaran with large fore and aft decks and equipped with liferafts, lifejackets, emergency beacon, two radios, radar, fish finder and other safety features. Unfortunately she was not ready in time for the first couple of slots, because the marina crane was broken and unable to lift her into the water. A smaller boat was hired from “Norberto Diver” as a replacement during this period.

Medical support & insurance

The expedition leader was a trained first aider, and the expedition carried a comprehensive medical kit. The standard of medical care in the Azores is high and further medical support could have been provided by a hospital in town. All team members were required to carry adequate travel insurance covering emergency medical evacuation and repatriation. Emergency evacuation procedures were in place but did not have to be invoked. There were no serious medical incidents. There were a few minor cases of seasickness, some painful falls on the boat deck and one fall off the boat.

1.5. Local Scientists

Biosphere Expeditions was working with Lisa Steiner and Chris Beer of Whale Watch Azores on this project.

Lisa Steiner graduated in Marine Science in 1988 at Miami University and joined the IFAW (International Fund for Animal Welfare) cetacean research vessel “Song of the Whale” two weeks later, which at the time was based in the Azores. Since then Lisa has spent all her summers working on cetaceans around the Azores and at other times has also studied them in Alabama, Hawaii, Cape Verdes, Bermuda, Scotland and Madeira. She has published numerous research papers on cetaceans.

Chris Beer, Lisa's husband, is a marine engineer and qualified yachtmaster. He has worked on square rig ships with Operation Raleigh (now Raleigh International) and on the "Song of the Whale", where he met Lisa. Chris has also worked for Encounter Overland, leading expeditions from London to Kathmandu and back, around India, Tibet and the Middle East. He has also published research papers together with Lisa.

1.6. Expedition Leader

David Moore was born and educated in England and now lives in the UK and France. He graduated in French and German and studied Japanese while working for two years in Tokyo. His expedition/group leading experience began with Japanese educational trips in Australia and he has since worked in the Caribbean and throughout Europe for companies such as P&O, Explorica and Alyson Adventures. David joined Biosphere Expeditions in 2003.

1.7. Expedition Team

The expedition team was recruited by Biosphere Expeditions and consisted of a mixture of all ages, nationalities and backgrounds. They were:

5 – 17 April 2004

Natalie Bush (UK), Sam Elson (UK), Melanie Irsch (Germany), Graham Lowman (UK), Monika Mandal (UK), Joerg Maubach (Germany), Anne Nicholls (UK), Martyn Roberts (UK), Anne Schmidt (Germany), Eva-Maria Sonnack-Ritter (Germany). Also: Matthias Hammer (Biosphere Expeditions).

19 April – 1 May 2004

Vicky Carter (UK), Stewart Ellett (UK), Lars Hankammer (Germany), Geraldine Illien (France), Rosemarie Laudahan Patzen (Switzerland), Andrea Lindner (Germany), Paul Morris (UK), Andreas Patzen (Switzerland), Anja Petersen (Germany), Deborah True (UK), Janine Wainwright (UK), Sabine Zok (Germany).

3 – 15 May 2004

Kayleigh Felice (Canada), Ursula Forster (Austria), Mark Wolf Harling (UK), Jasmin Lange (Germany), Jane Lee (UK), Larisa McAnally (USA), Jo & Tim Malpass (UK), Claudia Praxmayer (Germany), Sven Strohschein (Germany).

17 – 29 May 2004

Natalie Bush (UK), Patricia Frochoux (Switzerland), Judith & Roger Gibbon (USA), Christine Hallacker (Germany), Sarah Jeffries (UK), Susan Jones (UK), Simon Peaty (UK), Calumn Taylor (UK).

Also: scientific assistant (slots 1 – 3) Pere Morera (Catalonia, Spain) and POPA coordinator Miguel Machete (Portugal).

1.8. Expedition Budget

Each team member paid towards expedition costs a contribution of £1250 per person per two week slot. The contribution covered accommodation and meals, supervision and induction, special non-personal equipment, all transport from and to the team assembly point. It did not cover excess luggage charges, travel insurance, personal expenses like telephone bills, souvenirs etc., as well as visa and other travel expenses to and from the assembly point (e.g. international flights). Details on how this contribution was spent are given below.

Income	£	
Expedition contributions	53,461	
Expenditure		% of which spent directly on project
Base camp and food includes all board & lodging, base camp equipment	12,906	100
Transport Includes boat fuel & oils, taxis	4,907	100
Equipment and hardware includes research materials & gear etc purchased in UK & Azores	3,800	80
Biosphere Expeditions staff includes salaries, travel and expenses to Azores	3,196	100
Administration includes registration fees, sundries etc	1,100	100
Scientific services & logistics organisation Payment to Whale Watch Azores including boat wear & tear allowance	5,657	100
Team recruitment Azores as estimated % of PR costs for Biosphere Expeditions	4,800	100
Income – Expenditure (unadjusted)	17,095	
Income – Expenditure (adjusted to % spent on project)	17,855	
Total percentage spent directly on project		68%

1.9. Acknowledgements

This study was conducted by Biosphere Expeditions which runs wildlife conservation expeditions all over the globe. Without our expedition team members, who are listed above and provided an expedition contribution and gave up their spare time to work as research assistants, none of this research would have been possible. The support team and staff, also mentioned above, were central to making it all work on the ground. Thank you to all of you, and the ones we have not managed to mention by name (you know who you are) for making it all come true. Biosphere Expeditions would also like to thank Land Rover, Motorola, Silva, Field & Trek, Globetrotter Ausrüstung and Gerald Arnhold for their sponsorship.

1.10. Further Information & Enquiries

More background information on Biosphere Expeditions in general and on this expedition in particular including pictures, diary excerpts and a copy of this report can be found on the Biosphere Expeditions website www.biosphere-expeditions.org.

Enquires should be addressed to Biosphere Expeditions at the address given below.

2. Whale, dolphin & turtle study

Lisa Steiner & Chris Beer
Whale Watch Azores

2.1. Introduction

The Azores are a group of nine islands located about 1500 km off the coast of Portugal. 22 species of cetacean have been seen around the islands over the last 15 years. Sperm whales were commercially hunted here until 1985. With the cessation of whaling, whale watching was a natural successor, but did not begin in earnest until the late 1990s. Little work has been done around the archipelago before June or after September, which is why the expedition took place in April and May.

Baleen whales have been seen fairly regularly migrating past the islands in May and June, but it is unknown where they have come from or where they are migrating to. It is thought that they travel north to feed in the waters around Iceland for the summer. Photo-identification of the animals passing the Azores will enable us to match photos with any taken in Iceland or elsewhere for comparison through Europlukes.

Although sperm whales were caught in the Azores all year round, it is thought that there are not many female sperm whales and calves around during the winter months. Working in April will give us the opportunity to see if females and calves are present at that time and in the future expand the effort to include the winter months as well to test this theory.

Photo-identification of sperm whales has been going on in the Azores since 1987 and roughly 1500 individuals have been identified so far. A new programme has now been developed to match the photographs automatically through Europlukes, which will make the matching process proceed much faster.

Some bottlenose and Risso's dolphin are thought to be resident around the islands year round. By photographing individuals in the early part of the year, we can start to see patterns of habitat use by different groups of resident dolphin and compare the photos to existing catalogues

2.2. Methods

Physeter, a 12 m motor catamaran, and Jonas an 11 m monohull motorboat were used to go to sea on days when the weather conditions permitted. So-called "vigias", local lookouts, were located on the cliffs about 150 m above sea level. They began to look for whales at 07:30 to be able to direct the boats on departure at around 09:00. The boat also had three additional lookouts onboard, two on the bow and one in the stern searching for cetaceans. Two crew members were dedicated to filling in POPA forms (transects and bird and turtle surveys). Other crew were on camera duty or data sheets or the ship's log.

Sperm whales and humpbacks were approached from behind in order to obtain fluke photographs. Blue fin, sei and minke whales were also approached from behind, but moving further forward to obtain photographs of the chevrons (white markings below and behind the blow hole) and the dorsal fins. Bottlenose and Risso's dolphin were also paralleled to obtain dorsal fin photographs for identification of individuals. Other dolphin sighted were approached for species identification and then the boat would usually move on to look for other animals. The boat remained at sea from 09:00 until approximately 15:00 to 16:00. When cetaceans were sighted, the boat moved closer for species identification and photo-identification. The start and end time of the encounter, the position of the sighting as well as number of animals, presence or absence of calves and general behavioural state (milling, feeding, bowriding or travelling) were recorded. If the animals were travelling, a direction of travel was noted. Blow rate was recorded using a stopwatch for encounters with sperm whales when only one whale was present at the surface. The dive times for the baleen whales were also recorded using a stopwatch. This data will all be analysed at a later date.

In addition, environmental information was also recorded including: water temperature, wind speed and direction, sea state (Beaufort scale), and visibility. The number and behaviour of birds associating with the dolphins or whales was also recorded.

When loggerhead turtles were sighted their position was recorded on the POPA forms. If the animal was captured, it was measured and tagged for the University of Florida/University of the Azores turtle tagging programme. Positional data was also recorded.

2.3. Results

Effort

Physeter/Jonas normally left the harbour around 09:00 and returned between 15:00 and 16:00, weather permitting. In total the expedition spent 85 hours out at sea in April and 97.5 hours in May in sea conditions less than sea state 5, logging a total of 182.5 hours.

Sightings

During the expedition 267 different groups of whales and dolphins were encountered.

Table 2.3a. Species encountered during the expedition.

Species	Encounters
COMMON, <i>Delphinus delphis</i>	65
BOTTLENOSE, <i>Tursiops truncatus</i>	22
RISSO'S, <i>Grampus griseus</i>	14
STRIPED, <i>Stenella coeruleoalba</i>	9
PILOT, <i>Globicephala macrorhynchus</i>	1
BLUE, <i>Balaenoptera musculus</i>	5
FIN, <i>Balaenoptera physalus</i>	16
SEI, <i>Balaenoptera borealis</i>	7
MINKE, <i>Balaenoptera acurostrata</i>	2
HUMPBACK, <i>Megaptera novangliae</i>	5
BEAKED, <i>Mesoplodon sp.</i>	2
PYGMY SPERM, <i>Kogia breviceps</i>	1
UNKNOWN BALEEN, <i>Balaenoptera sp.</i>	1
SPERM, <i>Physeter macrocephalus</i>	117

These encounters resulted in a relative sightings frequency as shown below. Sperm whales were the species encountered most often, followed by common dolphin, bottlenose dolphin, fin whales and Risso's dolphin accounting for 87.6% of all sightings.

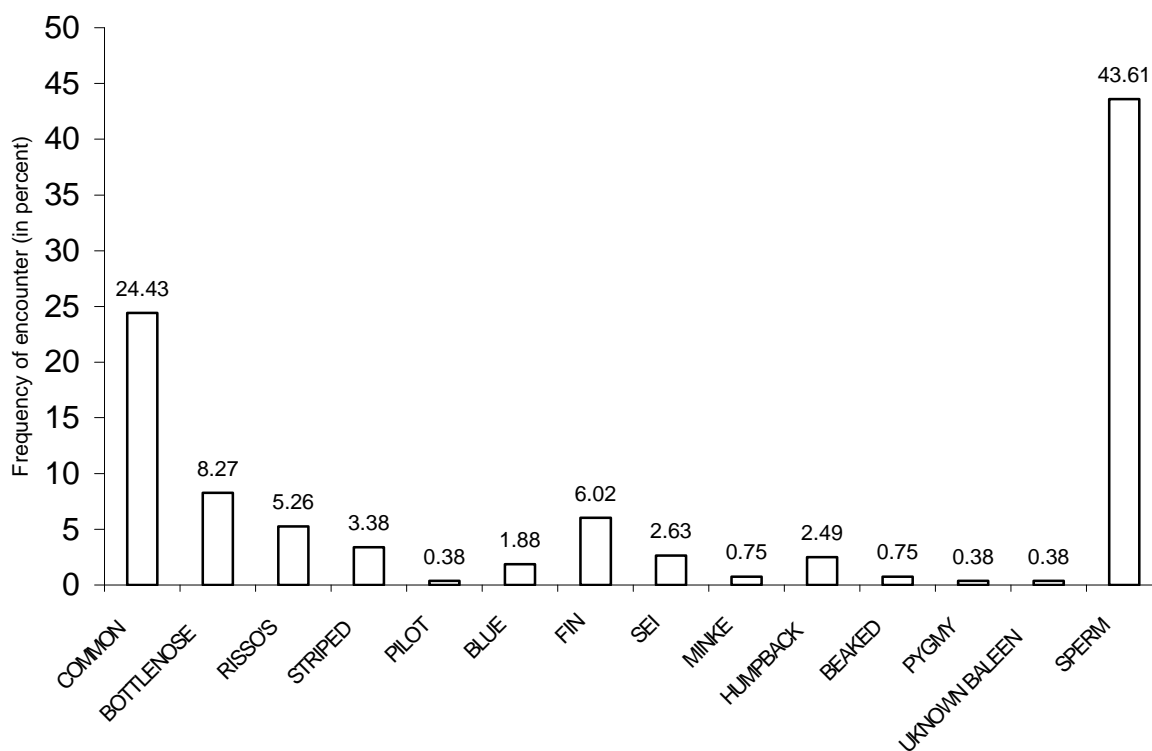


Figure 2.3a. Percentage frequency of encounters by species during the expedition.

Common dolphin

This species was encountered 65 times. The group size ranged from 1 to 300 and the average group size was 46.67. This group size is lower than the average group size of 108 for existing data from June-September. The first calves were not seen until 21 April and not consistently observed until the beginning of May, indicating that the end of April or the beginning of May is the start of the main calving period.

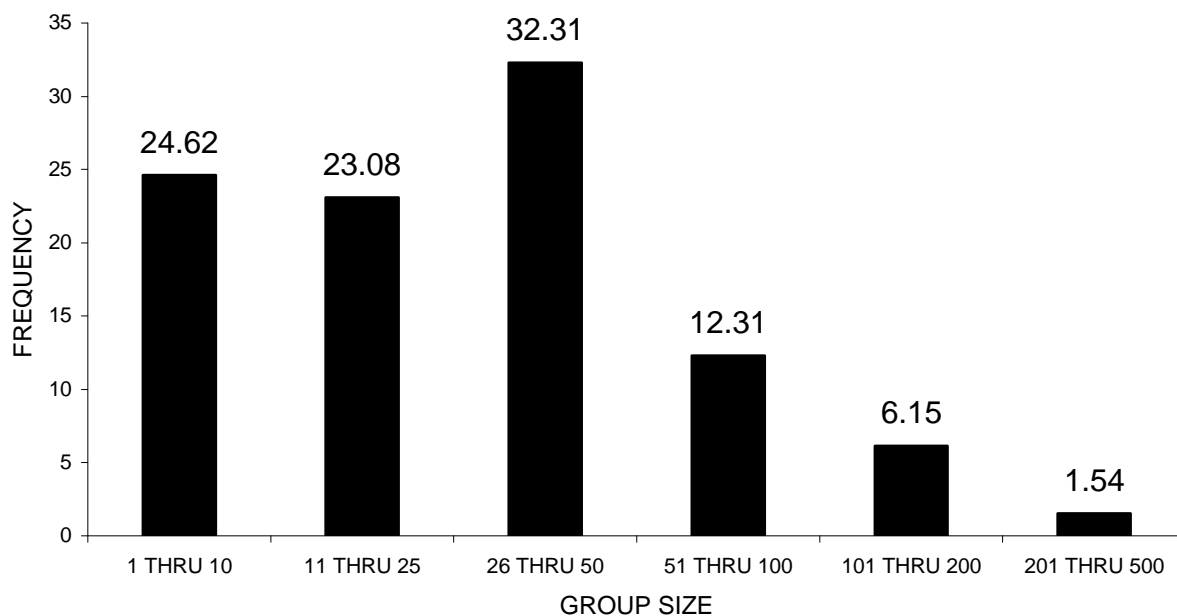


Figure 2.3b. Common dolphin group size.

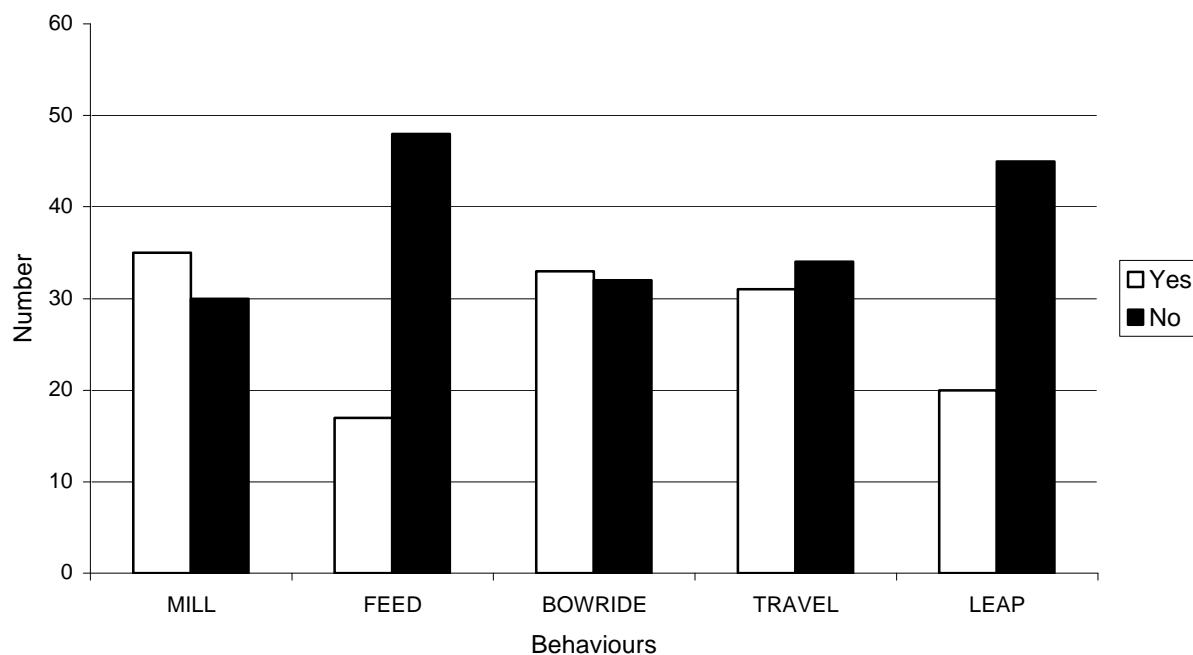


Figure 2.3c. Common dolphin behavioural patterns.

Bottlenose dolphin

This species was observed 22 times. The group size ranged from 1 to 150 and average group size was 42.9, higher than the average of 27.3 seen when considering previously collected data. Transient groups of dolphin passing by during the early part of the year may cause this difference. Calves were not seen until the end of April and nearly all groups sighted in May had calves, suggesting that May is also the start of the calving season for bottlenose dolphin.

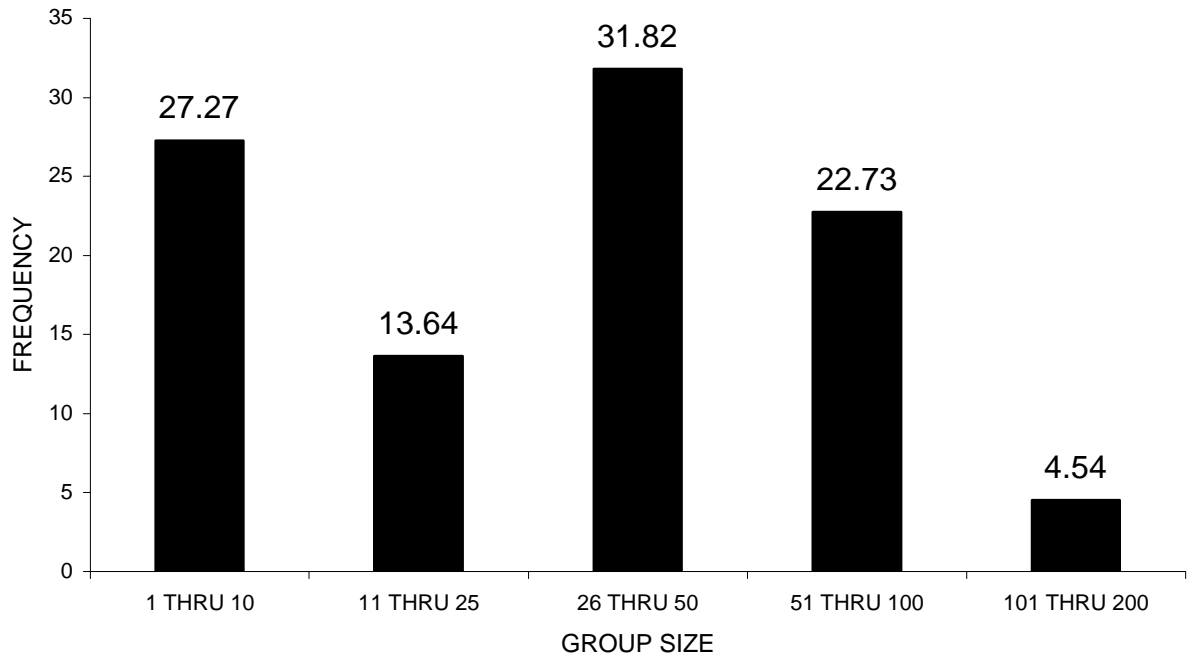


Figure 2.3d. Bottlenose dolphin group size.

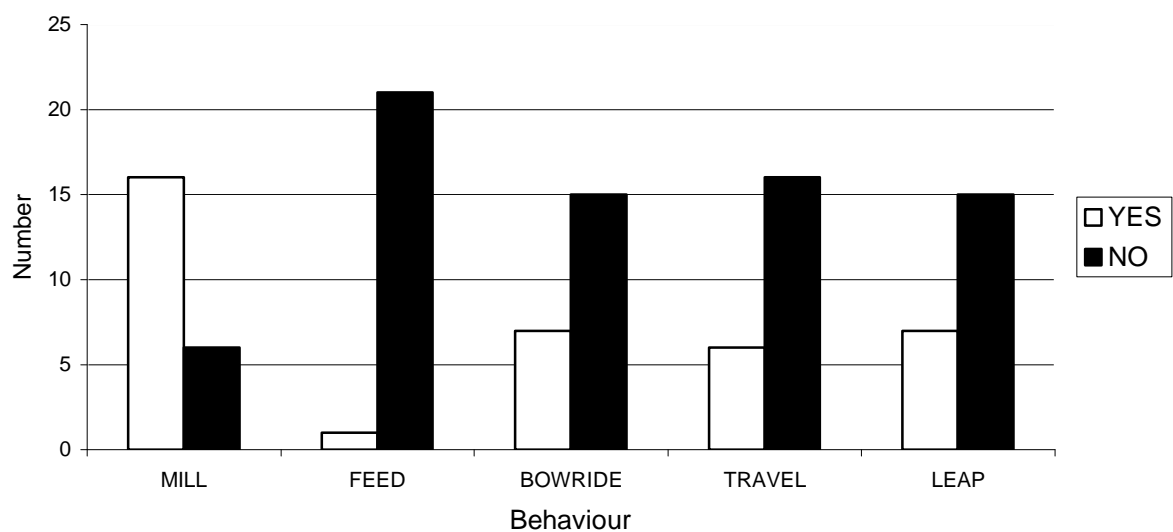


Figure 2.3e. Bottlenose dolphin behavioural patterns.



Figure 2.3f. Bottlenose dolphin behavioural patterns - leaping.

Risso's dolphin

Risso's Dolphin were observed 14 times, group size ranged from 2 to 15 with an average group size of 6.71 being less than the average group size of 15 observed for other months of the summer. Calves were seen consistently throughout April and May signifying an earlier calving period than for bottlenose and common dolphin.

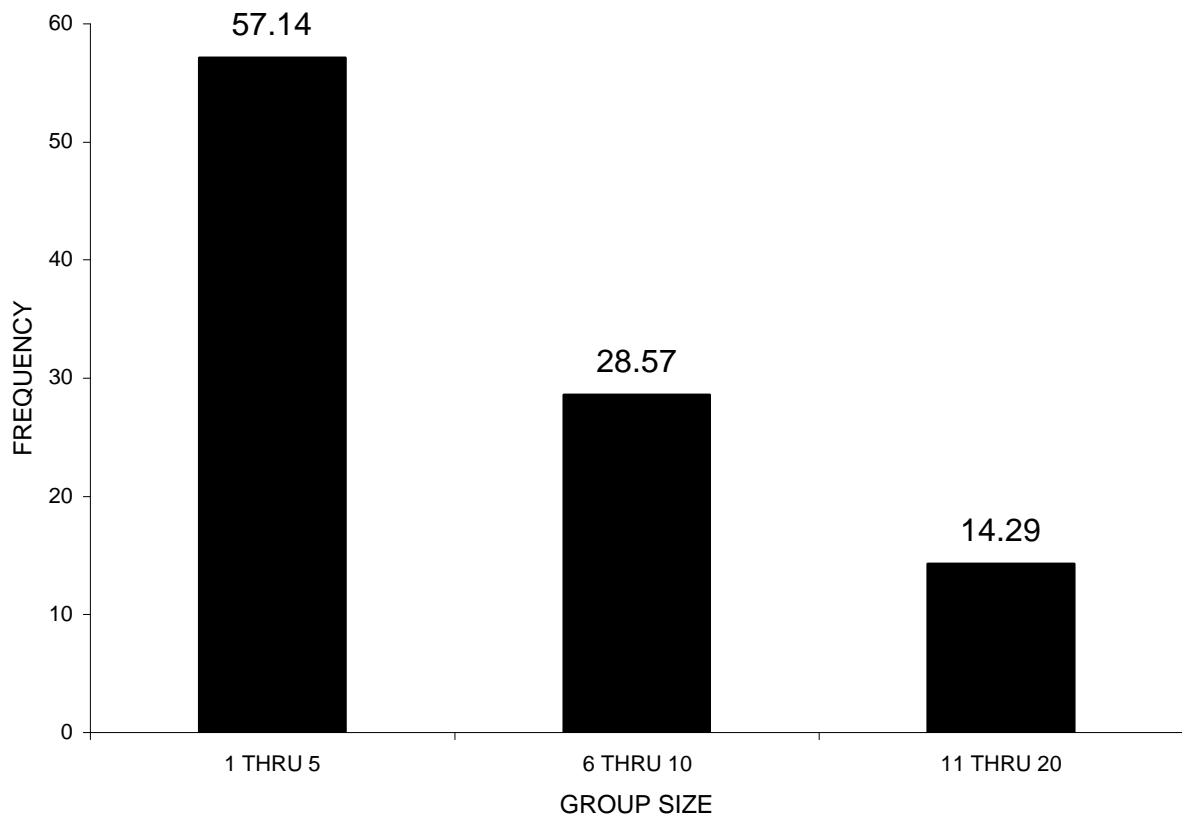


Figure 2.3g. Risso's dolphin group size.



Figure 2.3h. Risso's dolphin photo ID fluke.

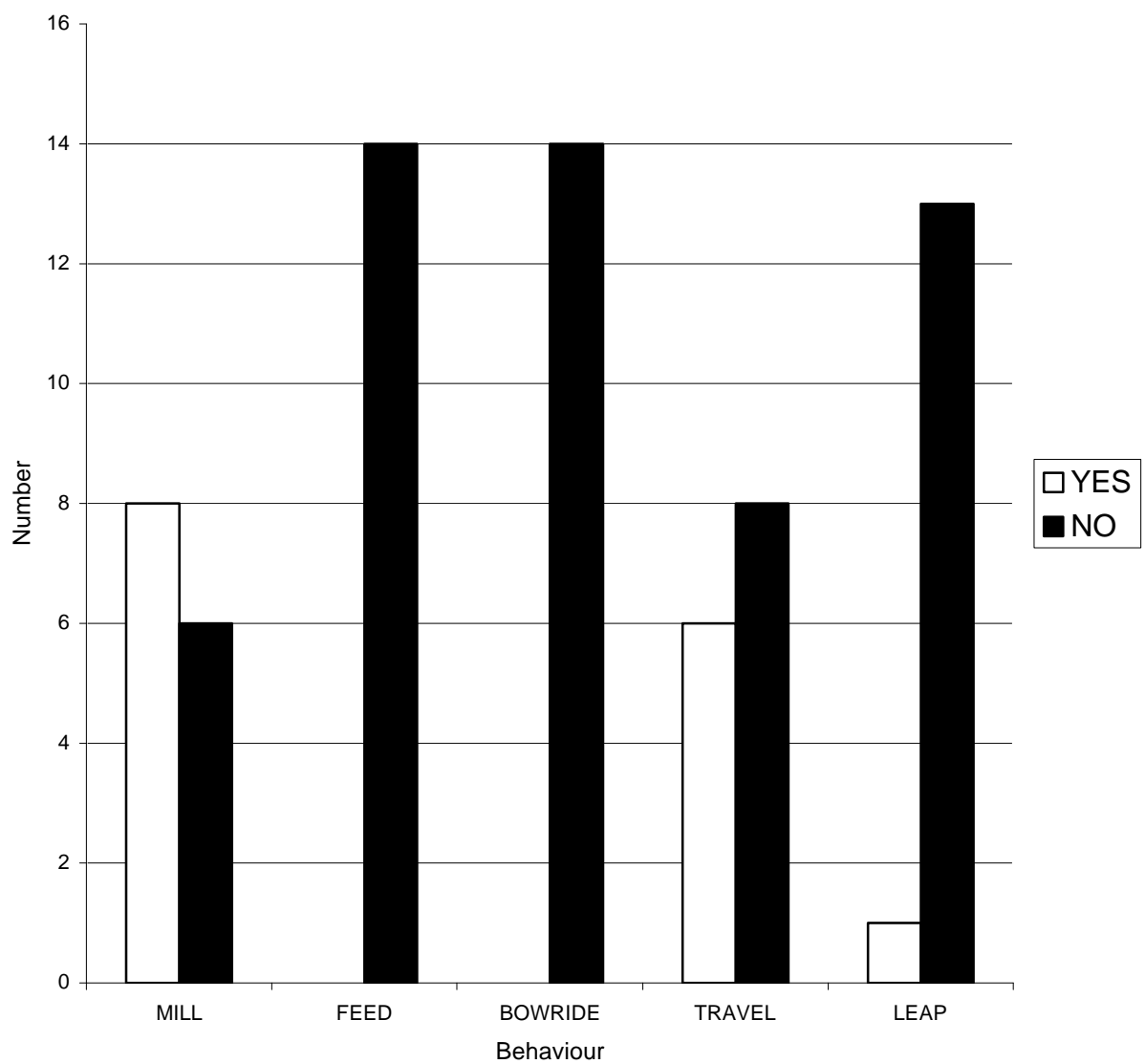


Figure 2.3i. Risso's dolphin behavioural patterns.

Striped dolphin

Striped dolphins were observed 9 times in total and only once in April. The average group size of 138.9 is not significantly different from the average of 118 that was observed over the rest of the summer. Calves were seen on 7 of the 9 sightings, but with only 1 encounter in April (with calves). These data do not offer conclusive evidence for the striped dolphin calving season. Calves are present in most groups in May, but the calving season may actually begin earlier. More work at this time of the year will lead to more knowledge of this species' calving periods.

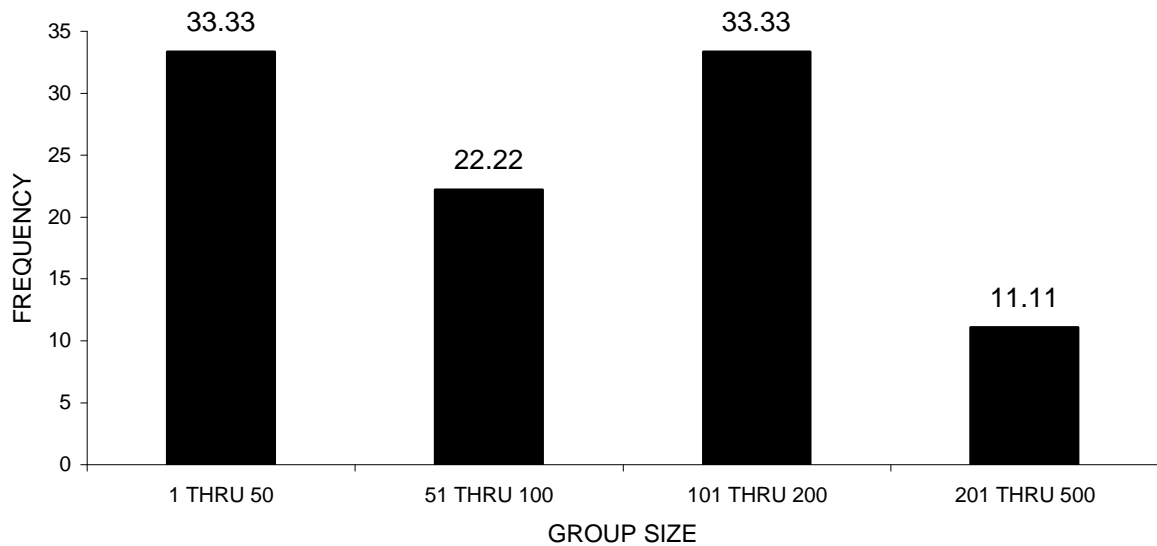


Figure 2.3j. Striped dolphin group size.



Figure 2.3k. Striped dolphin behavioural patterns – leaping.

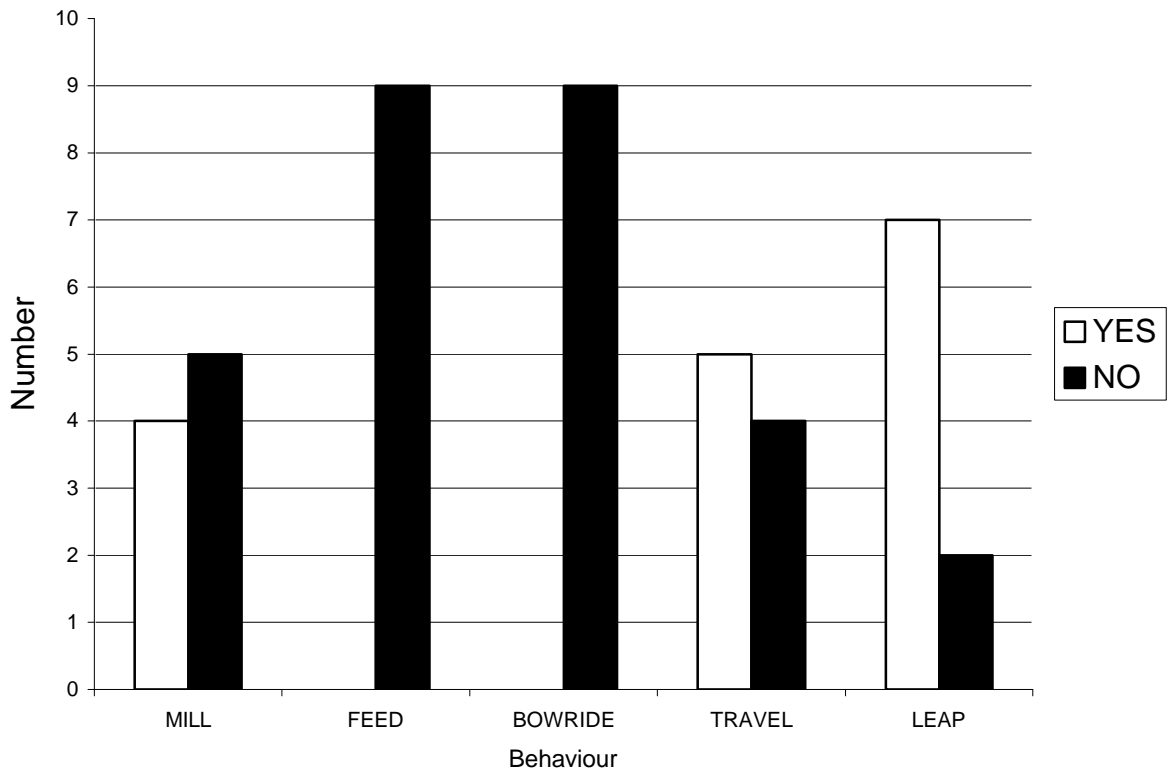


Figure 2.3I. Striped dolphin behavioural patterns.

Short fin pilot whales

One group of pilot whales was seen in May. The group size was 150, which matches the largest pod seen to date in the Azores. If, as is thought, the short fin pilot whales do not overwinter in the Azores, but only migrate to the area for the summer and spend winters further south, then this large group size can possibly be explained due to the fact that aggregations of migrating cetaceans are generally larger than those seen at the feeding or breeding grounds. Once the large pod arrives at the destination, it is thought to split into smaller foraging groups for the duration of the summer, coming together again in the autumn for the return south.

Sperm whale

Sperm whales were one of the target species of the expedition. They were encountered 117 times. The average group size was 1.95, which is similar to that encountered during other parts of the summer. Calves were observed 28 times, 11 times in April and 17 times in May. Photographs were taken of all whales which fluked up. Individuals can be recognised by the nicks and scallops formed on the trailing edge of the tail, which are formed mainly due to wear and tear as the flukes beat through the water. 44 individuals were identified, including several animals seen in previous years (see below). Seeing animals that have been seen in previous years this early in the season is a promising development. It shows that some of the sperm whales returning to the area do not have a seasonal preference and can be seen in all months.



19 (first seen 1987)



DOP Pma27_68 (first seen 1997)



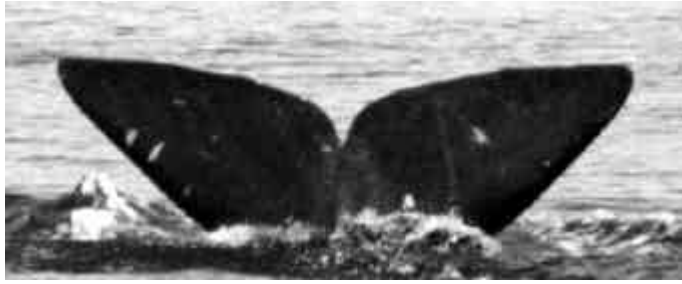
1703 (first seen 1993)



2034 (first seen 1995)

Figure 2.3m. Sperm whale individuals seen by the expedition and also recorded previously.

One very important recommendation has been forwarded to Europhlukes from the testing phase performed by the expedition team members. White marks on the flukes should be listed in one way or another in the extraction programme to enhance matching capability. In addition, as seen below, the white markings remain constant where the trailing edges do not always do so. The changes in the trailing edge of the animal pictured below actually occurred prior to 1999, seen in the third photo, but the animal was not recognised at that time as the same individual because the white markings were not very visible in the photograph.



1645 (first seen 1991)



1645 (as recorded by the expedition in 2004)



1645 as seen in 1999 (found using the Europhlukes matching programme)

Figure 2.3n. Sperm whale white fluke markings.

Attempts at sperm whale skin collection were unsuccessful for several reasons: unavailability of primary research vessel at the start of the season due to port authority equipment failure, bad weather (too rough) preventing swimmers entering the water to search for skin samples (normal method for collection) and thirdly the experimental collection equipment (mark I & II) were not strong enough, and although used on a few attempts, broke after several uses and were not easily replaced. In addition it is possible that not as much skin is shed in April and May when the water is cooler than later in the summer. In general skin is collected more often on hot, sunny calm days, than cloudy, choppy days. Redesigning of the experimental collection equipment to make it possible to collect skin samples from the deck (when swimming is not possible) will be in place for next season. This will improve chances to collect skin samples for other scientists who are studying genetics, using DNA extracted from the skin or using stable isotope analysis to look at the diet of the sperm whales observed.

Fin whale

Fin whales were observed on 16 occasions, which is equal to half the total sightings of fin whales in the Azores to date (33)! This indicates that fin whales pass the islands more frequently in April and May than May and June, which is when work has been done in the past. The average group size was 1.94, which is slightly lower than the 2.4 average seen previously. A single calf was present on one occasion. Previous sightings of calves have occurred in June. Fin whales may follow the same pattern as humpback whales, with pregnant females, juveniles and males returning earlier to the feeding grounds, while the females with calves return later.

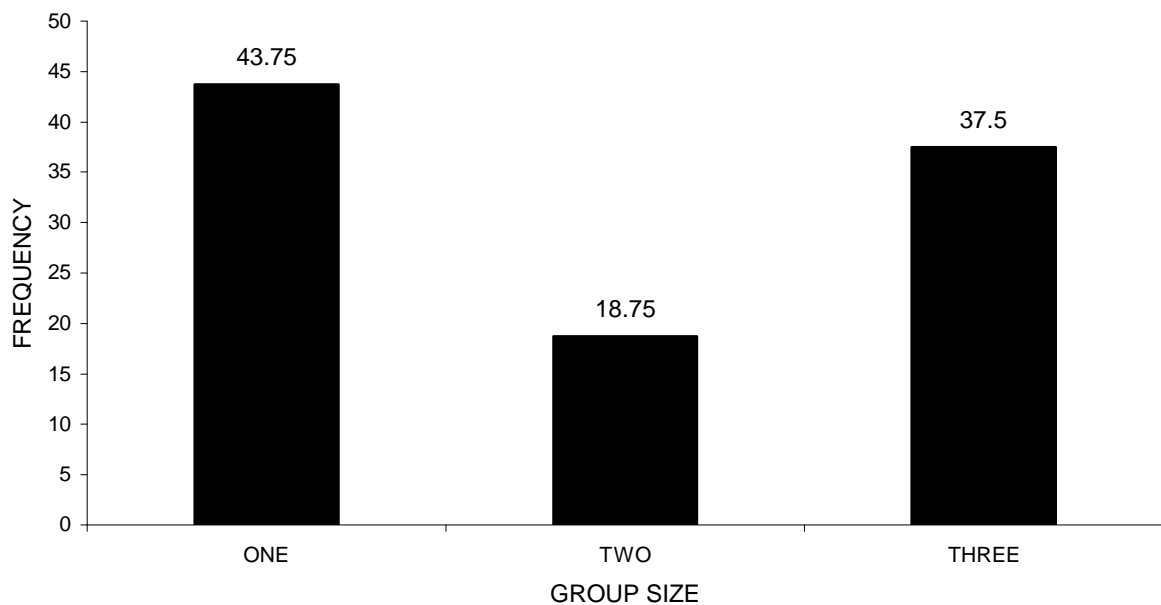


Figure 2.3o. Fin whale group size.



Figure 2.3p. Fin whale behavioural pattern - female fin whale circling the boat.

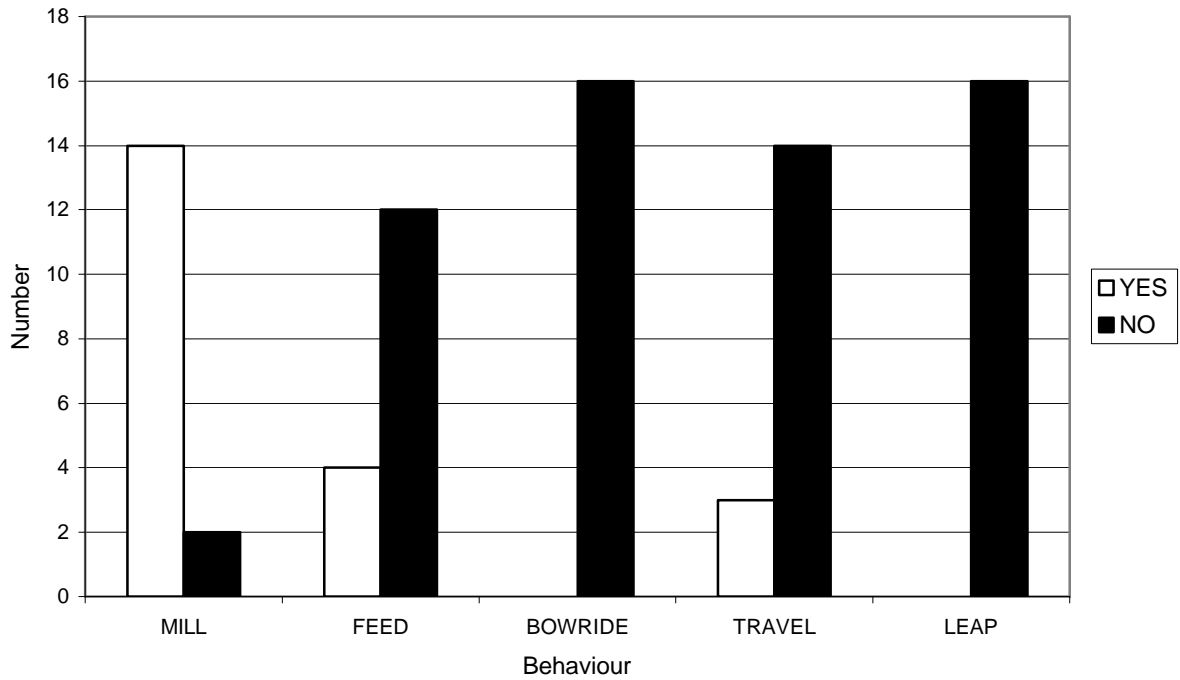


Figure 2.3q. Fin whale behavioural patterns.

Sei whale

Sei whales were sighted 7 times. The average group size was 2.57, which is similar to the 2.51 average seen previously. Calves were never seen. In previous years calves were seen from the end of May until July, again suggesting that it is pregnant females which head to the feeding grounds first with females and calves following.

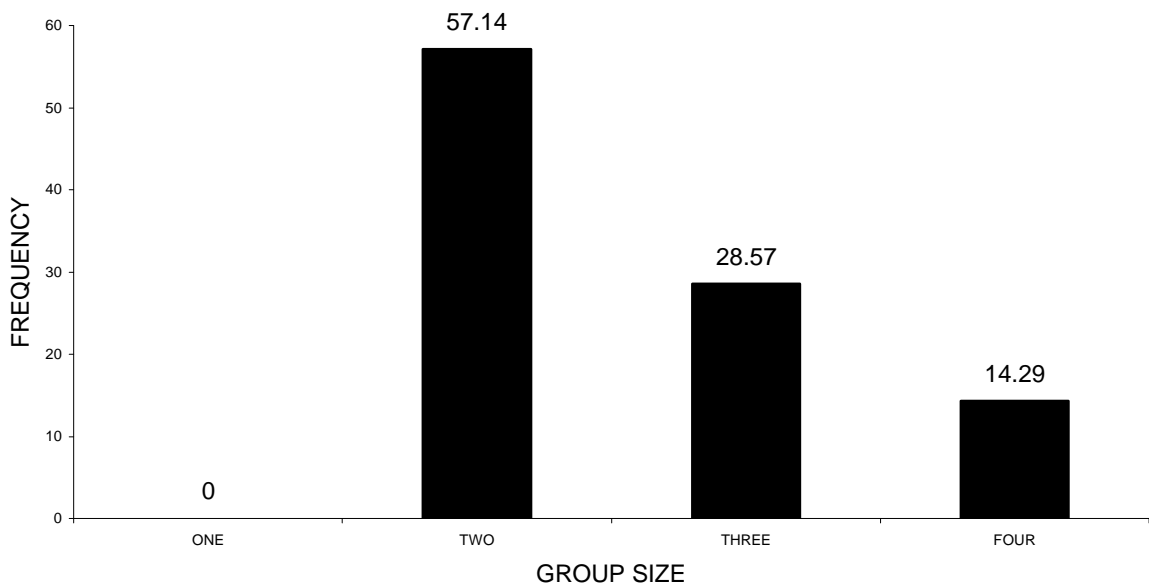


Figure 2.3r. Sei whale group size.

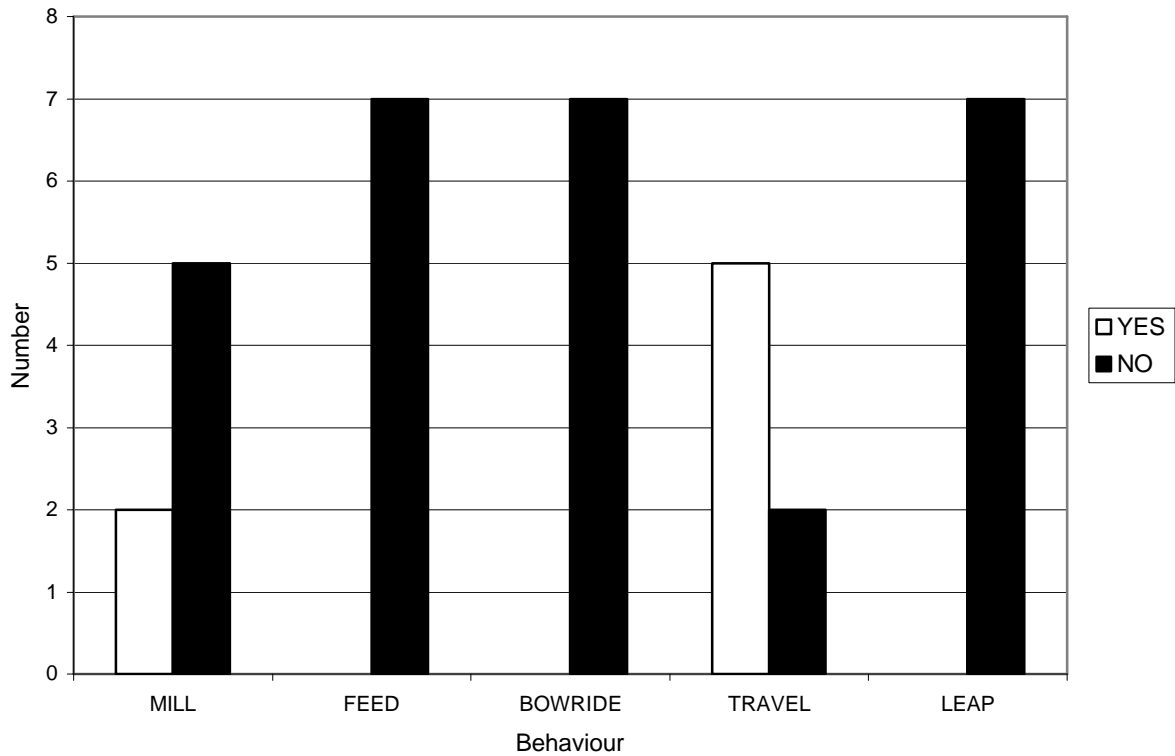


Figure 2.3s. Sei whale behavioural patterns.

Blue whale

Blue whales were seen five times in May. No calves were observed and the average group size was 1.4, which is similar to the 1.58 of earlier years. Blue whales have generally been seen more often in June than May, so the timing of their migration may be slightly later than the other baleen whales. Identification photographs have been sent to IFAW (International Fund for Animal Welfare) as their boat, Song of the Whale, hopes to work in Icelandic waters during the summer of 2004. Reports of any matches made will be made known to Biosphere Expeditions if they occur.

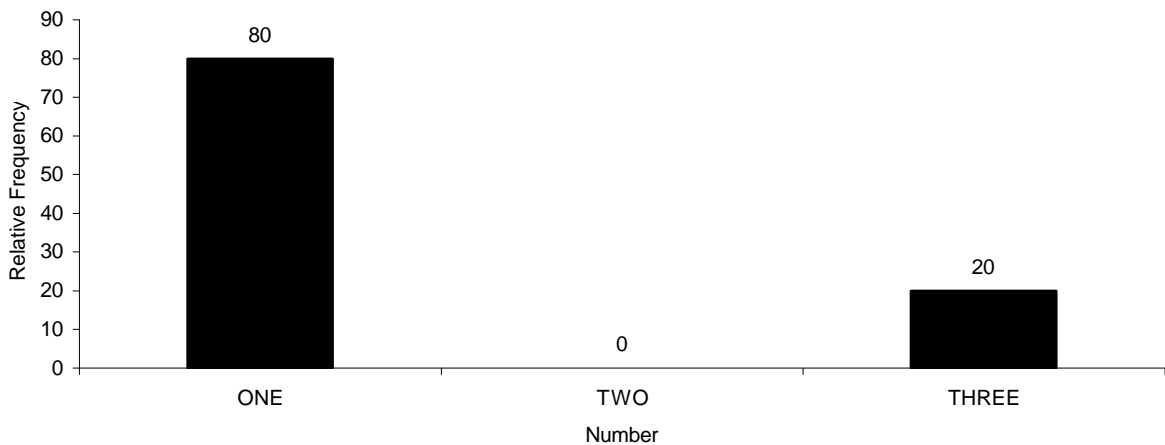


Figure 2.3t. Blue whale group size.

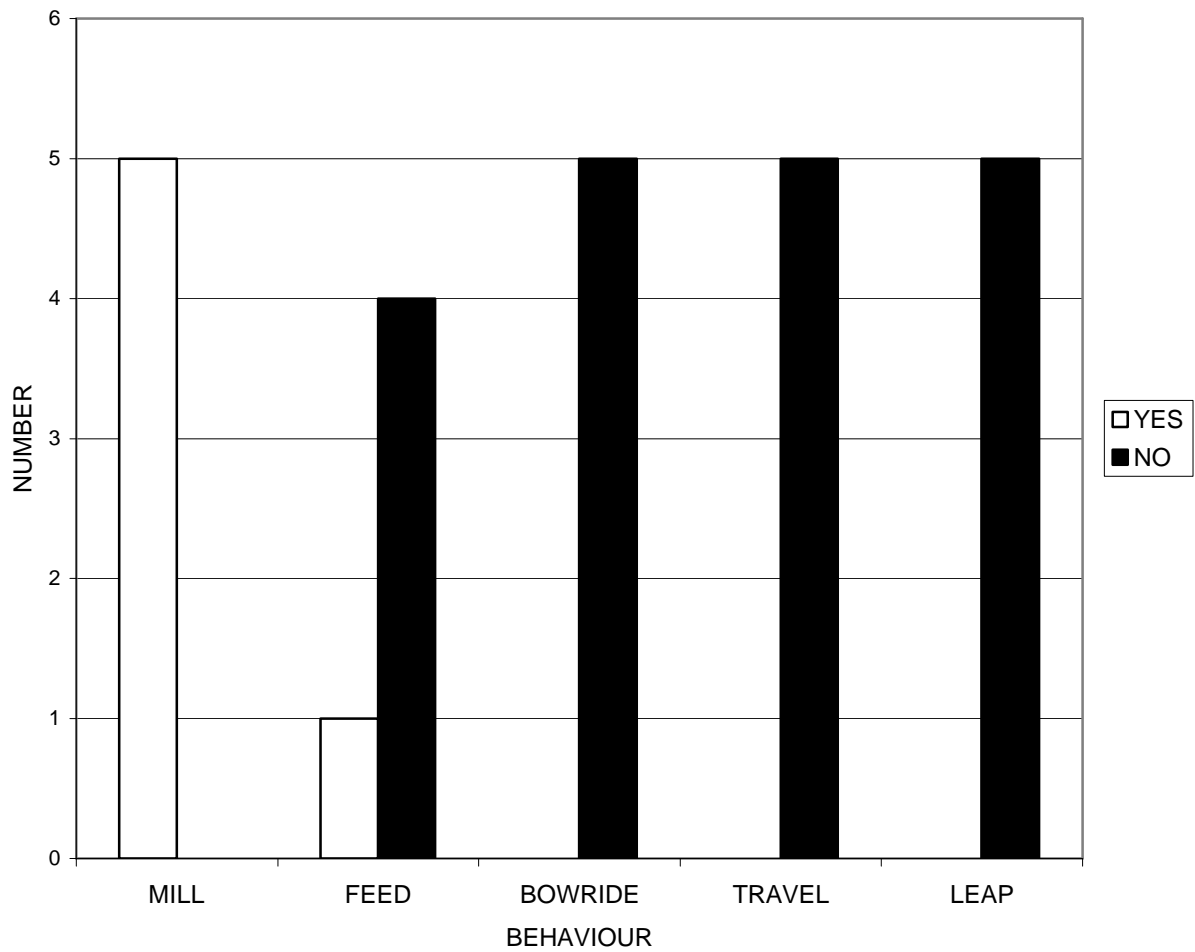


Figure 2.3u. Blue whale behavioural patterns.

Minke whale

A single animal was observed very briefly on two occasions in April. No calves were observed during either sighting. Prior to these sightings minke whales were only seen twice; a mother and calf in June 1996 and a single individual in May 1999.

Humpback Whale

Four individual humpback whales were observed on five occasions. A single juvenile was seen twice close to the south coast of Pico. Prior to 2004, only a single humpback had been seen in the Azores in 1996. Only 2 of the 4 whales raised their tails while diving. Photographs were taken of these two flukes and will be sent to the North Atlantic Humpback whale catalogue, as well as Europhlukes, for matching. Humpback whales found in the eastern part of the Atlantic are thought to breed around the Cape Verdes and feed in Icelandic waters, but this has yet to be shown with a photographic match between areas. Again, any matches will be made known to Biosphere Expeditions.



11 May 2004



10 April 2004

Figure 2.3v. Humpback whales fluke IDs recorded by the expedition.

Beaked whale

A single unidentified beaked whale was seen in April and a group of five in May. Calves were not observed. Beaked whales are very difficult to distinguish at sea. Their beak breaks the surface of the water first followed by a rolling back with a small dorsal fin and occasionally an indistinct blow is seen. This process is usually repeated 4 to 7 times before they disappear. Most species are identified by the location of two teeth of male whales, along the lower jaw that are usually impossible to observe at sea. The most frequently sighted beaked whales in the Azores are usually Sowerby's or Cuvier's, but on these two occasions it was not possible to determine the species.

Pygmy Sperm Whale

A pair of pygmy sperm whales were observed "logging" on the surface on 24 May. They were only seen for a couple of minutes before disappearing below the surface. Logging, lying at the surface and then disappearing, is typical behaviour of pygmy sperm whales.

Loggerhead Turtles

Loggerhead turtles were observed on 28 occasions and tagged 9 times. The length of the turtle, its position and tag numbers are noted on the data sheet. These data were sent to the University of Florida/University of the Azores joint project at the end of the summer. This information is stored in a large database which will be accessed in the event of the turtle being recaptured at a later date, either as bycatch in a fishery, part of the tagging programme, or in 10-20 years when the turtle returns to the same beach where it hatched to lay its own eggs.

2.4. Discussion and conclusions

April and May are a productive time in the Azores. Biosphere Expeditions are playing an important role in collecting vital information for the investigation at a time of year when little or no work has been done in the past. Many species of cetacean were observed. In fact, the variety of cetaceans was greater at this time of year than the rest of the summer. Although sightings of baleen whales are unpredictable, the use of lookouts on the cliffs greatly enhanced the chances of sighting them. Photo-identification of the baleen whales passing the Azores will provide much needed information regarding blue, fin and sei whale movements in the eastern Atlantic, leading to a fuller understanding of their movement and association patterns. Baseline data collected on blow rates/dive times will provide a useful database for comparison in any future disturbance studies. Group sizes observed here support what is generally known, namely that large baleen whales are usually seen singly or in small groups.

Sperm whales were present in larger than expected numbers, including females with suckling calves. Several social groupings of females, calves and juveniles, of 8 to 9 individuals were observed. Before the expedition, it was expected that it would be mainly large males that would be encountered at this early part of the summer, but this proved not to be the case. Data collected at this time of year is also valuable to see if the same individuals remain around the archipelago for long periods of time. One individual (19) has now been seen in all months, May-October, since 1987. When the Europhlukes matching system is fully operational, matching individuals from year to year and, in fact, month to month, will be simplified.

Sightings in April and May of bottlenose and Risso's dolphin lend support to the idea that some groups of these two species are resident around the archipelago and present year round. When the photographs are analysed they should confirm that a few of the groups seen are the same as those seen later in the year. Risso's dolphin photo-ID pictures have already been sent to the Risso's Project, on the south coast of Pico, for comparison with their catalogue of resident animals they see throughout the summer and have seen for the past three years. The sightings earlier in the year also provide insights into calving times for bottlenose, common and Risso's dolphin that are seen in all months of the summer. In addition, varying group sizes in the earlier part of the season pose some interesting questions, such as are food resources less abundant, hence smaller group sizes for some species. Are animals migrating to the area and then splitting into smaller groups on arrival, explaining the larger group sizes of some other species?

In conclusion, this expedition was a resounding success. Sightings went well beyond expectations and even the weather was very reasonable for the time of year. Resighting individual sperm whales from previous years is a promising base to continue with the Europhlukes program. In future years matching of the baleen whales seen this year to new photographs will prove if it is the same individuals that are passing the islands each year or many different animals. Future years can now build on this new data for April and May and comparisons made.

Thank you to all expedition members for your assistance.

3. Observer Programme for the Fisheries of the Azores (POPA)

Miguel Machete

Department of Oceanography and Fisheries of the University of the Azores / IMAR – Sea Institute

2.1. Introduction

The Biosphere Expeditions research project took place between 5 April and 29 May 2004 in Faial Island (Azores, Portugal). Onboard of the vessel “Physeter” and “Jonas”, 41 participants had the opportunity to collect some information on marine life of the Azores. During the eight expedition weeks, members of Biosphere Expeditions recorded the occurrence of several marine species such as loggerhead and leatherback turtles, baleen and toothed whales, dolphins and several species of seabirds (see tables below). The information recorded during the expedition will be processed and included in the database of the POPA (Observer Program for the Fisheries of the Azores).

POPA was launched in 1998 with the main goal of certifying the tuna caught around the Azores as a “Dolphin Safe” product. This label is attributed by the NGO *Earth Island Institute* to catches made without mortality of cetaceans. POPA has built an extensive database with information collected by the observers on board the tuna fishing vessels. This database includes information on tuna fisheries (e.g. location of fishing events, catches, and fishing effort), weather conditions (e.g. SST, wind and visibility), live bait fisheries (e.g. location of fishing events, catches, gears used), cetaceans (e.g. occurrences, interaction with fishing events and association with other species), birds and sea turtles (e.g. occurrences).

2.2. Results

Table 2.2a. Species and number of sea turtles observed.

Species	Number of individuals observed
<i>Caretta caretta</i> Loggerhead turtle	28
<i>Dermochelys coriacea coriacea</i> Leatherback turtle	3

Table 2.2b. Species of marine birds spotted.

Species	Number of individuals observed
<i>Calonectris diomedea borealis</i> Cory’s shearwater	2876-6495
<i>Sterna hirundo</i> Common tern	83-141
<i>Larus cachinnans atlantis</i> Common gull	11-41

Table 2.2c. Species of whales and dolphins observed.

Baleens	N° ind	Toothed Whales	N° ind	Dolphins	N° ind
<i>Balaenoptera acutorostrata</i> Minke whale	2	<i>Physeter macrocephalus</i> Sperm whale	5	<i>Delphinus delphis</i> Common dolphin	1060-1795
<i>Balaenoptera borealis</i> Sei whale	5	<i>Kogia sp.</i> Pygmy sperm whale	1	<i>Stenella coeruleoalba</i> Striped dolphin	303-353
<i>Balaenoptera physalus</i> Fin whale	5			<i>Tursiops truncatus</i> Bottlenose dolphin	42-85
<i>Megaptera novaeangliae</i> Humpback whale	1			<i>Grampus griseus</i> Risso's dolphin	82-122

4. Expedition leaders' diary: Azores 2004

4 April

Here's my first diary entry from the Azores where we're all set for the arrival of the first group of expedition team members, due in tomorrow on the daily flight to Horta. I am here with Matthias at the apartments, which are going to operate as base camp during this expedition, getting set up for the first arrivals. Chris and Lisa, our two scientists, are down on their boat, together with their assistant, Pere, preparing the research materials and equipment. We also have our first expedition member, Martyn, giving us a hand getting everything set up. Tomorrow we should see everybody settling in and acclimatizing, before launching the boat on Wednesday to get everybody out and let them find their sea legs and start to get familiarized with the research procedures. And of course hopefully have the chance to monitor some of our target species!

I'll keep you updated of developments.

7 April

The weather and the cetaceans run the expedition life here in the Azores and since everybody's arrival on Monday we have been out along the coast of Faial where, despite the choppy seas, we were able to cruise along next to a group of common dolphins. Everybody seemed to handle the conditions on the boat pretty well. As the seas were too rough for spotting the whales and carrying out the on-boat research work today, we have been training on some of the data collection techniques, including how to input the whale flukes as 'fingerprints' on a database for matching whale sightings world-wide.

Happy Birthday, Sam, glad you like the dolphin cake!

11 April

With nearly a week of expedition work under our belts, the weather over the last three days has enabled us to get into the rhythm, leaving the marina at nine in the morning and usually getting back around three in the afternoon. The second part of the week has been calmer so we've been able to get out some distance, cruising along with a group of Risso's dolphins yesterday before heading further out to a couple of Sei whales. Other blows have been seen, but with no definite sighting. We've also had numerous common dolphin encounters as well as a lonesome bottlenose. The roles which the expedition team members undertake each day bring their own challenges. Both Melanie and Graham have had a go at photographing dorsal fins (not easy to get an effective photo ID!) whilst others have been up top collecting data on any wildlife sightings along a fixed transect for the Fishery of the Azores' 'POPA' programme.

Those who are placed on spotting duty can end up pretty cold and wet, so expedition members from future slots should make sure they don't forget their waterproofs (and then remember to wear them!). Bring plenty of warm gear as well – though the temperature has been around 16 degrees, it gets cold out at sea.

12 April

I've been on shore today, and all the expedition team members have just returned with news of their sightings. Soon after departure they found themselves amongst a large group of sperm whales and were able to spend time close to them before the onshore lookouts radioed in with sightings further out at sea. Sailing out they came across minke whales before arriving at a group of both sei and fin whales (the second largest of the species). En route there were bow-riding schools of both common and bottlenose dolphins.

I guess the cameraperson has been pretty busy so we're about to download the shots and get going on the data entry.

14 April

Forecasts have been warning for the last couple of days of a front moving in, but we've been pretty lucky so far. Yesterday we had some close encounters with a couple of sei whales out off the coast of Pico and we were pleasantly surprised when we woke up this morning to calm seas, sunshine and pretty good views of Mt. Pico. There had already been reports of sperm whales a little way out, so we headed over and were treated to quite a nice display by a group of passing striped dolphins on route. Though numerous, the sperm whales were less interested in our boat than the other day. They seemed to be waiting for some of their friends further down the channel and were passing their time lining up in formation as a way of socializing. With so many of them together, counting the blows proved pretty difficult, though we got some excellent shots of the flukes.

Good news – the database has already thrown up a match for Monday's sperm whales. He was spotted once before in the Azores back in 1997!

17 April

The last couple of days of the first slot offered the chance for a little more shore time as the sea was pretty rough. Fortunately the skies were still clear so it gave us a good opportunity to see some more of the islands. Some took the ferry over to Pico for a jaunt around the island while others spent time here on Faial, hiring a car to make a circuit of the island or walking up along the headland – Eva-Maria took a taxi up to the top of the volcano and found a route around it before walking down. At base-camp there was also scientific work to do, extracting whale flukes on the computers, inputting the cetacean sightings, log and blow rates and consolidating the photos. We also had a last venture out on the seas to say goodbye to the dolphins. There were no blue whales to wave the first slot goodbye, but Chris and Lisa and the team members feel impressed with the number of encounters we have had – important data, as it has never before been collected at this time of year.

'Blue' the (semi) stray dog has been adopted as Expedition mascot, so I'll keep you updated of his movements.....

24 April

Blue has made a dazzling impression on the second slot with several potential adoption candidates. She sneaked into my room one night and made herself at home on the rug, though has now been sent back down to the marina area so that she doesn't get too dependent on our company.

We've just come in from a long day at sea where the calmer weather enabled several encounters: a varied selection of dolphins (including that lonesome one who appears to be resident), a couple of groups of sperm whales (being a bit stand-offish like last time), and a quite a fancy pair of fin whales, showing off their white underbellies as they swam past the boat. They were quite young ones so we mistook them at first for sei whales. Earlier in the week the weather wasn't great and we were only able to make a couple of sorties to spot common dolphins and Risso's, so everyone was pretty excited and trigger-happy today. Lisa was on form, keeping everyone in line with the data collection, while Chris was in his element behind the wheel, narrating events as they unfolded for Anja's report on Austrian radio. The training seemed to have paid off, and our 'POPA' data collectors up top, Andreas and Rosemarie, were a perfect picture of calm and efficiency. I think Lars took over a hundred shots on the Nikon, so we're about to have a look at them.

We have the vegetarian delegation in the kitchen tonight – think I'll go see how they're getting along.

27 April

The lookouts had reported whale sightings down on the west side of Faial, so we headed down first thing on Sunday. Unfortunately after a couple of hours we hadn't seen anything, so we had just decided to head over to Pico when a couple of dorsal fins were spotted. After a false beaked-whale alarm we realized they were bottlenose dolphins and part of a very acrobatic group of about 60. They are one of the study species for photo ID, so we spent over an hour with them as they performed their leaps in the air. Continuing on track up the coast line we came across our first loggerhead turtle which we were able to bring on board, measure, tag and check for worms. He was a fair size, one of the largest caught around here, and further down the channel we were able to capture one of his companions (who had a flipper missing) and give him the same treatment – they were both fairly docile, probably because of the water temperature at this time of year. The best was yet to come as we sailed across the strait towards Pico. We come upon a couple of fin whales only to find them accompanied by a humpback. Unfortunately I was stuck on the ladder looking in the wrong direction when it did its impressive triple breach, but I heard the cheer go up and found Debbie down aft a few minutes later, overcome with emotion, wiping away an emotional tear (let's hope the humpback puts on another display for her 40th birthday tomorrow). Apart from that it's been fin, sei and sperm whales (as well as an unusual spotting of a leatherback turtle who rapidly dived). We spent a lot of time with sperm groups today as they were spread out across the seas like a kind of whale soup. They were busy socializing and not feeding and though we moved eagerly from group to group with cameras ready we had only a few fluke ID opportunities.

30 April

We had reduced visibility to contend with on the boat on Wednesday as a front moved in and although it looked like we may have to return to shore, the weather stayed OK and the animals kept us busy with numerous dolphin sightings and a fin whale group. We also came across a baby turtle lunching on a Portuguese-man-o'-war as well as a breaching marlin. Yesterday most were ready for a break from the seas and enjoyed time in Horta or walking around the hills and over to the neighbouring beach. We're now about to head out on the waters for our last on-boat outing of slot two. The cloud is lifting from above Pico and the white cusps are smaller....I think the blue whale has been ordered for 3pm....

6 May

Since the arrival of the third slot we have all been profiting from the good weather and calmer seas. Blue has been gracing us with her presence - she's getting in the habit of hanging around by the catamaran every morning at 9am just in case we have a tasty morsel for her. We went out on Tuesday morning and spotted a large group of Cory's shearwaters flapping around on the surface and discovered that there was in fact a huge ball of fish near the surface into which the birds and dolphins were diving and feeding.

With everybody trained up on the research procedures we went out for our first full day yesterday. A couple of turtles were spotted (both two minutes before turtle watch) and there was no shortage of dolphin encounters, though I think the humpback stole the show again. He was feeding very close to the coast of Pico, diving down for about 10 minutes at a time. Given that he was also quite young we thought he may be the same one we saw last week, though examining the photos, he appears to be a different one.

The action continued today, making a busy day for the data sheets person. We were understaffed on the boat as Lisa was over on Pico giving a talk for a cetacean conference and a couple of the team members had gone with her.

Lookouts had spotted whales up on the north coast of Faial so we headed over and came across large groups of female sperm whales, many of them with their calves. We logged 20 encounters alone today, making a total of 49 so far this expedition. As they were diving and showing their flukes we were able to drive up behind and collect some skin samples which can be sent off for DNA analysis to get information about their feeding habits.

9 May

Two contrasting days: We had a full day out on Friday and followed various transects around Faial and Pico but came across little other than common and bottlenose dolphins. Although it was pleasant out on the boat, all was quiet on the seas.

We had calm seas with us again today but it was a different story with over seven different species of cetacean as well as numerous turtles, an exotic jellyfish and a sun-fish (a kind of diagonal diamond fish with fins). Along with the common, bottlenose, Risso's and striped dolphins, we went first in pursuit of three fin whales before heading off to track down sperm whales which had been spotted by the look-outs. Just as we thought we had arrived at the point indicated by the loud clicks heard on the hydrophone, we realized that we were in fact upon a pair of beaked whales. We got close enough to take some pictures, though shy of human presence, they dived before we were able to identify what kind of beaked whales they were – possibly Sowerby's. Eventually the sperm whales turned up accompanied by calves, one of which was suckling, and we obtained some fluke ID photos. The highlight of the day was yet to come when heading back towards Horta, 400 striped dolphins gave us a spectacular jumping and diving display with clear views of Pico in the background.

In between these two days on the boat, we had a shore day when most people went around the island and up to the top of the caldera in cars. Mark became, I think, the first team member of the year to swim in the seas – apparently it's not as cold as it seems!

14 May

The mixed weather this week has provided a variety of opportunities: It was so calm on Monday that five of the team members were able to jump in the water following the diving sperm whales and dive down with snorkels in an attempt to collect skin samples. Although the winds have since been stronger, causing us on Tuesday to take shelter over in Madalena on Pico for an hour, we've nevertheless been pretty fortunate with our encounters: we're surprised by the number of humpback encounters. Data has never been collected on them during the months of April and May and they are not normally seen later in the year. Yesterday afternoon, after leaving a feeding frenzy of dolphins with thousands of birds we came upon large groups of sperm whales out towards São Jorge. Rumours have been circulating within the islands of blue whale sightings earlier in the week, though the official word is they were just large fin whales!

21 May

Tuesday was a gentle introduction for slot 4, bouncing around on the strait between Faial and Pico with bottlenose dolphins, while Wednesday turned out to be a pretty exciting full day: two turtles for tagging on board, several different fin whale encounters, and our first blue whales of the expedition: "More blue whales than you can shake a stick at!" We spotted five different individual blue whales, the largest male being an estimated 25 metres in length. It is thought they pass by the Azores at about this time of year as they head North as part of their annual migration. They may be the largest mammals on earth, but their dorsal fins are small, so the photographers were focusing on the differing mottling effect around their fins for ID purposes.

Yesterday was calm so the look-outs sent us out to a single male sperm whale, feeding fairly close to shore and diving for up to an hour at a time. After spending time with him the hydrophone led us further out to different groups of female sperm whales with calves. One of those seen out yesterday has been noted in the same location on three other occasions during the last ten years. With the water now up to 19 degrees, attempts were made at skin collection, though the divers on this occasion came back without any positive samples.

Today we have been out with sei whales and are now back on shore sheltering from the Easterly winds which, predicted for the last few days, have finally arrived.

By now Pere will have passed via Barcelona to be up in northern Iceland working on his next project. Best of luck Pere! Welcome back to Nathalie who, here for slot 1, is here with us to experience the Azorian marine life for a second time....

26 May

Monday was certainly our most impressive day out on this slot when we encountered eight different cetacean species during the course of the day as well as an excess of passing turtles and sun-fish – the surface water temperature got up to 20.9 degrees. Along with the bottlenose encounters and striped dolphin displays, we came across a mixed group of common and striped dolphins jumping together. It was also our first chance to see short-finned pilot whales travelling in a large group together with the bottlenose. We also came across a lone Risso's dolphin and a juvenile minke - even a pygmy sperm whale popped her head up briefly.

Although Sunday was a quieter day focused more on dolphin encounters, we had a nice surprise late afternoon when we came across a mother-calf pair of fin whales. After the mother had dived the calf approached the boat and circled us several times before being joined by the mother who also came close up to the boat. After a few circles they displayed their flukes and swam off.

Today we have been out in a deep bay along the coast of Pico where a large group of sperm whales have been making their way along the deep water contours. There were also reports of a humpback feeding just out from Horta, though he was not to be seen by the time we returned this afternoon.

May 30

Last reports from your expedition leader at Horta International Airport where I am enjoying my last galão after a successful slot 4! The flag is down from the *Physeter* and fog permitting I'll be back at Biosphere Expeditions HQ by tomorrow morning. We've just said goodbye to Chris who treated us to a chorus of "Whale meet again, don't know here, don't know when...." Lisa was last spotted heading in the direction of Modello to do some shopping for a group of visitors arriving any moment.

We have been impressed by the amount of marine activity around the islands during this Spring period: Each slot encountered between 8 and 11 cetacean species and experienced quiet days as well as very active and exciting ones, whether in the form of the blue whales in slot 4, the striped dolphins of slot 3, the humpback of slot 2 and the scientist-overboard scenario of slot 1! From our sperm whale encounters we have five matches to previous years, and no doubt more will turn up. As the sperm whale extraction work is now very close to completion, it looks like next year's team will set to work on bottlenose dolphin photographs.

Thank you to everybody who has contributed to the project over the past two months, whether by spotting, data entry, taking pictures, extracting flukes, cooking, shopping or all the other ways which have helped to make it a success.