



EXPEDITION REPORT

Expedition dates: 4 April – 5 May 2016

Report published: April 2017

**Photo-identification and surveys of
cetaceans in the central group of the
Azores islands**





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Abstract

In 2016 Biosphere Expeditions concluded its thirteenth successful 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 the three islands of Faial, Pico and São Jorge. The expedition ran from 4 April to 5 May and concentrated on six main projects.

Sightings of all cetacean species were recorded. 244 sightings of eleven different species of cetacean and one species of turtle were recorded during the expedition period.

Blue whale: The expedition encountered 16 blue whales in 14 encounters in 2016 and has contributed 108 individuals to the East North Atlantic catalogue since 2004. Matches achieved for blue whales sighted in the Azores by the expedition include three matches to animals seen in previous years in the Azores: one sighted in 2016 was seen in 2010 and two matches from 2012, one to an animal from 2006 and the other from 2010. Within the North Atlantic, where an estimated 2,000 animals live, the rarity of matches between the East and West North Atlantic catalogues, suggest that there are two largely discrete populations in the North Atlantic. One population appears to live between West Greenland South along the coast of North America, centred in Eastern Canadian waters. The other extends from the Denmark Strait, Iceland and Jan Mayen, Spitzbergen, to the Barents Sea in the summer, and south to the northwest African coast in the winter. The 14% yearly re-sighting rate of blue whales from the Azores catalogue suggests that at least some individuals use a route past the Azores on their migration. Elucidating such movements and population locations and boundaries is important, because blue whale populations do not seem to be recovering at the same rate as other whales, making route determination with a view to establishing effective protected areas doubly important.

Humpback whale: The expedition in 2016 encountered 12 humpback whales. The North Atlantic Humpback Whale Catalogue is currently approaching 9,000 individuals and plays an important role in discovering long-range matches. Since 2004 the expedition has contributed 18 ID photos and had one match to the Cape Verde Islands in 2010. The match made by the expedition as well as data collected outside the expedition and by other researchers, suggest that the humpbacks that are seen in the Azores are part of the endangered Cape Verde population, rather than the Caribbean population. Matching movements and populations is important, because little is known about the movements of the eastern Atlantic humpback whales.

Other baleen whales: Baleen whales have been seen with increased frequency over the last few years. This year there were 42 encounters with other baleen whales, including fin whales and a minke whale with a calf. No Sei whales were observed. The significance for whale conservation and research of these findings is that the Azores may provide a crucial 'pit stop' (between breeding grounds further South, possibly Mauritania and feeding grounds in Norway or Iceland) for some of the migrating animals that have not been feeding for a few months on the breeding grounds. The resources that they find in the Azores could be the difference between survival or death. Having a baseline of information on the number of animals and areas that they are using may also be useful in detecting any early changes in prey abundance due to global warming.

Sperm whale: Sperm whale photo-identification that has been ongoing since 1987 in the Azores, continued, with 69 identifiable individuals (seven unidentifiable) photographed from 124 encounters, including 26 animals seen in previous years. Matches now indicate that males migrate to Norway and that females spend their whole lives together and undertake at least a limited migration. In addition, sperm whale groups observed in the Azores are more stable and associations of individuals last for a much longer period of time than they do in the Pacific. This is most likely due to food availability in the different areas.

Dolphins: Dolphin photo-identification, which began in 1987 continued. Eight groups of bottlenose dolphin and 13 groups of Risso's dolphin were photographed as well as two groups of false killer whales. The ID photos of these false killer whale groups over time will show if they are residents, albeit lesser known, like the bottlenose and Risso's dolphin. At the time of writing this report, at least one individual had been observed in both groups of false killer whales that were seen at either end of the expedition, lending support to this residence theory. Knowing resident from transient species is important, because resident animals may need particular areas around the islands for feeding or breeding, while transients are just passing through. This can be seen from new laws that are being considered to prevent swimming with Risso's dolphin within three miles of the coast, which is primary habitat that mothers and calves use.

Europhlukes: Europhlukes is a European-wide project that brought together different researchers from several countries to share data and photo-identification pictures of various species. All photo identification photographs will be forwarded to the database. Sperm whale fluke extractions were made from the photos taken during the expedition and compared with sperm whales sighted in previous years and in other areas of the Atlantic. No matches were found to any other regions.

POPA: Data collection for the Department of Oceanography and Fisheries (DOP) of the University of the Azores, for the Tuna Boat Observer program, POPA, was successfully collected for a twelfth year. The expedition vessel "Physeter" is the only non-fishing vessel in the programme. Information was collected for random cetacean sightings along transects, as well as designated turtle and bird counts and environmental parameters. This year a "trash watch" was added to the data collected.

Turtles: Loggerhead turtle data have been collected and animals tagged in the Azores since 1988 for a joint venture between the University of Florida and the University of the Azores. During this expedition 47 loggerhead turtles were seen; none were caught and tagged.

Sumário

A “Biosphere Expeditions 2016” concluiu com sucesso o seu décimo terceiro ano de recolha de dados sobre a distribuição de cetáceos nos Açores, com recurso a observações visuais e foto-identificação. A cidade da Horta, na ilha do Faial, foi a base da expedição e o trabalho foi conduzido em redor das três ilhas do Faial, Pico e São Jorge. Esta expedição decorreu entre 4 de Abril e 5 de Maio, e concentrou-se em seis projectos principais.

Foram registados um total de 244 avistamentos de 11 espécies distintas de cetáceos e 1 espécie de tartaruga.

Baleia-azul: A expedição registou 16 baleias-azuis em 14 encontros em 2016 e, desde 2004, contribuiu com 108 indivíduos para o catálogo do Atlântico Nordeste. Os resultados obtidos para as baleias azuis avistadas nos Açores através da expedição incluem 3 reavistamentos de animais fotografados em anos anteriores nos Açores: uma baleia avistado em 2016 foi observado em 2010 e duas correspondências em 2012, uma foi observado em 2006 e o outra também fotografado em 2010. No Atlântico Norte, onde se estima viverem cerca de 2000 animais, é muito raro observarem-se reavistamentos entre os indivíduos constantes dos catálogos das costas Este e Oeste, o que sugere existirem 2 populações distintas de baleias-azuis no Atlântico Norte. Uma delas parece viver entre o Sudoeste da Gronelândia e a costa da América do Norte, estando centrada nas águas do leste do Canadá. A outra população ocorre no estreito da Dinamarca, Islândia e “Jan Mayen, Spitzbergen”, e o Mar de Barents no verão, e a sul até à costa Noroeste de África no inverno. A taxa anual de 14% de reavistamentos de baleias-azuis do catálogo dos Açores sugere que, pelo menos alguns indivíduos, usam uma rota que cruza os Açores durante a sua migração. É importante obter informações sobre os movimentos, localização e zonas limite de ocorrência destes animais, porque ao contrário de outras baleias, as populações de baleia-azul não parecem estar a recuperar à mesma velocidade, o que faz com que a delimitação de áreas protegidas efectivas seja ainda mais importante.

Baleias-de-bossa: Em 2016, a expedição registou 12 baleias-de-bossa. O catálogo de baleias-de-bossa do Atlântico Norte está a aproximar-se a um total de 9000 indivíduos e desempenha um papel importante na detecção de reavistamentos de longo alcance. Desde 2004 que a expedição contribuiu com 18 fotografias identificativas e registou um reavistamento com as ilhas de Cabo Verde em 2010. Este reavistamento, juntamente com dados recolhidos por outros investigadores sugerem que as baleias-de-bossa observadas nos Açores fazem parte da população ameaçada de Cabo Verde e não da população das Caraíbas. Estes reavistamentos são importantes, porque actualmente existe pouca informação sobre os movimentos das baleias-de-bossa na costa Este do Atlântico.

Outras baleias de barbas: As baleias de barbas têm sido observadas com maior frequência nos últimos anos. Em 2016 houveram 42 encontros com outras baleias de barbas, como as baleias-comuns e uma baleia-anã com uma cria. Não foram observadas sardinheiras. Os esforços desenvolvidos na conservação e investigação de baleias de barbas demonstram que os Açores poderão ser um ponto de paragem/abastecimento (entre as áreas de reprodução a sul e as áreas de alimentação a norte, como Noruega e Islândia) crucial para alguns animais migradores, que não tenham tido a oportunidade de se alimentarem nas áreas de reprodução, durante os últimos meses. Os recursos que eles encontram nos Açores podem significar a diferença entre sobrevivência ou morte. A recolha de informação base sobre o número de animais e áreas que eles estão a usar pode ser útil na detecção prévia de mudanças na disponibilidade de presas, devido a alterações climáticas.

Cachalote: Desde 1987 que está em curso nos Açores um programa de foto-identificação de cachalotes, com 69 indivíduos identificados (7 não-identificados) e fotografados em 124 encontros, incluindo reavistamentos de 26 animais observados em anos anteriores. Os reavistamentos detectados indicam que os machos migram para as águas da Noruega e as fêmeas passam a sua vida em grupos e efectuam migrações/movimentações mais limitadas. Para além disso, os grupos de cachalotes observados nos Açores são mais estáveis e as associações entre indivíduos permanecem por períodos mais longos do que as que ocorrem no Pacífico. Este facto deve-se, provavelmente, à diferença de disponibilidade de alimento entre ambas as áreas.

Golfinhos: A foto-identificação de golfinhos, que iniciou em 1987, tem continuado. Até ao momento conhecem-se 8 grupos de roazes e 13 grupos de grampos e também foram fotografados 2 grupos de falsas-orcas. Com o tempo, as fotografias identificativas de falsas-orcas poderão mostrar se existem indivíduos residentes, apesar de serem menos conhecidas, como no caso de roazes e grampos. À data de elaboração deste relatório, pelo menos 1 indivíduo foi observado em ambos os grupos de falsas-orcas, que foram observados no fim da expedição, o que poderá suportar esta teoria. A diferenciação entre animais residentes e transientes é importante, porque os primeiros poderão necessitar de determinadas áreas em redor das ilhas, para alimentação e reprodução, enquanto que os transientes apenas se encontram de passagem. Isto pode ser considerado aquando da implementação de nova legislação, como a que tem sido discutida sobre a interdição de natação com grampos, a menos de 3 milhas da costa, que é o habitat crucial para mães e crias.

Europhlukes: Europhlukes é um projecto Europeu que reúne investigadores de diversos países para partilhar dados de foto-identificação de várias espécies. Todas as fotografias recolhidas no âmbito desta expedição serão enviadas para esta base de dados. As extracções das caudas dos cachalotes fotografados durante a expedição serão comparadas com fotografias obtidas em anos anteriores e noutras áreas do Atlântico. Até ao momento nenhum dos cachalotes fotografados nos Açores foi reavistado noutras áreas.

POPA: Pelo décimo terceiro ano foram recolhidos dados para o Programa de Observação das Pescas nos Açores (POPA) coordenado pelo Centro do Instituto do Mar da Universidade dos Açores. O “Physeter” é a única embarcação que não se dedica à pesca comercial e que contribui para o POPA. A informação foi recolhida aleatoriamente ao longo de transectos de observação de cetáceos. Foram também efectuadas contagens de tartarugas, aves marinhas e recolhidos parâmetros ambientais. Em 2016 foi adicionado a observação de lixo.

Tartarugas: As tartarugas *Caretta caretta* são capturadas e marcadas nos Açores desde 1988, para um projecto conjunto entre a Universidade da Flórida e a Universidade dos Açores. Durante esta expedição, 47 tartarugas-boba foram avistadas, mas nenhuma foi capturada ou marcada.

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Please note: Each expedition report is written as a stand-alone document that can be read without having to refer back to previous reports. As such, much of this section, which remains valid and relevant, is a repetition from previous reports, copied here to provide the reader with an uninterrupted flow of argument and rationale.

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 4 April to 5 May 2016. 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 1,400 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.

In 2004 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. Accurate knowledge of the origins of the baleen whales passing the archipelago on their migration 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 Risso'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 1,400 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.



Figure 1.2a. Map of the Azores.
An overview of Biosphere Expeditions' research sites, assembly points, base camp and office locations is at [Google Maps](#).

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, transatlantic flights and yachtsmen. The islands' main income is from agriculture and fishing; tourism has all but passed by the islands.

1.3. Dates

The expedition ran over three periods totalling two ten-day groups.

4 - 13 April | 15 - 24 April | 26 April - 5 May 2016

Team members can join for multiple slots (within the periods specified). 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 on the island of Faial, near the harbour in a guesthouse consisting of modern en suite, twin and double rooms. Dinner was eaten at local bistros/restaurants, a breakfast buffet was served by participants on a rota and each participant prepared a lunch pack from the buffet. Vegetarians and some special diets were catered for. Accommodation was on a twin-share basis.

Weather

The climate is mild maritime Mediterranean with average daytime temperatures during the expedition months from 12° to 22°C. Extremes are usually buffered by the Gulf Stream passing by, but it can get quite cold, especially on the boat, with the wind chill factor.

Field communications

The boat carried two radios for communication with other boats. Mobile phones did work on the island and within a few kilometres out at sea. There was also wireless internet access at base. The expedition leader also posted a [diary with multimedia content on Wordpress](#) and excerpts of this were mirrored on Biosphere Expeditions' social media sites such as [Facebook](#) and [Google+](#).

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 life raft, lifejackets, emergency beacon, two radios, radar, fish finder and other safety features.

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 was available at a hospital in town. All team members were required to carry adequate travel insurance covering emergency medical evacuation and repatriation. Emergency procedures were in place, but did not have to be invoked as there were no medical or other emergencies.

1.5. Expedition scientist

Biosphere Expeditions works on this project with Lisa Steiner of Whale Watch Azores. Lisa graduated in Marine Science in 1988 at the University of Miami 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.

1.6. Expedition leader

Craig Turner was born in Oxford, England. He studied biology, ecology and environmental management at Southampton, Aberdeen and London universities. Soon after graduating from his first degree, he left the UK for expedition life in Tanzania. Since then, he has continued to combine his interest in travel and passion for conservation, working with a wide range of organisations on projects and expedition sites in the Americas, Africa, Asia and the Pacific. He has managed expedition grant programmes for the Zoological Society of London, been a frequent contributor to the 'Explore' conference held by the Royal Geographical Society, and is an active member of the British Ecological Society Review College. Having visited and/or worked in more countries than years have passed, he is ever keen to share his exploits, writing for several magazines and is a published photographer.

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 (with country of residence):

4 - 13 April 2016

Céline Geiger (France), Susanne Hirsch (Germany), Lynn Jackson (USA), Angelika Krimmel (Germany), Ralf Markowitz (Germany), Zsuzsanna Nemeth (UK), Kathie Priebe (USA), Dominique Stadler (Portugal)*, Laura Trudel (USA).

15 - 24 April 2016

Helga Bachmann (Switzerland), Uwe Burkhardt (Germany), Carol Jackson (UK), David Jackson (UK), Julie Bork (Denmark), Stuart McDonald (UK), Brian Oikawa (Canada), Camila Olsen (Denmark), Ala & Scott Sobel (USA).

26 April - 5 May 2016

Ann-Kathrin Brandt (Germany), Kátia Pereira da Silva (Portugal)*, Gonçalo Piedade (Portugal)*, Antje Reichel (Germany), Silvio Solleliet-Ferreira (Portugal)*, Evangelia Vordogianni (Greece).

*Placement kindly supported by the [Friends of Biosphere Expeditions](#) and a GlobalGiving crowdfunding campaign. The [Biosphere Expeditions placement programme](#) seeks to identify, train and encourage the next generation of local conservationists.

1.8. Partners

Our main partner on this project is Whale Watch Azores, a whale watching and research group founded by our local scientists and operating from Faial Island. Other partners include Europhlukes (a European cetacean photo-ID system and research database), the University of the Azores, POPA (the Observer Programme for the Fisheries of the Azores), the University of Florida (for research into turtles), as well as the local community of whale spotters (vigias).

1.9. Expedition budget

Each team member paid towards expedition costs a contribution of £1,390 per person per 10-day slot. The contribution covered accommodation and meals, supervision and induction, special non-personal equipment, and all transport from and to the team assembly point. It did not cover excess luggage charges, travel insurance, personal expenses such as telephone bills, souvenirs etc., or 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	34,651
 Expenditure	
Base camp and food includes all board & lodging, base camp equipment	4,679
Research vessel & transport includes fuel, oils, wear & tear for research vessel, taxis on land	4,566
Equipment and hardware includes research materials & gear, etc.	287
Staff includes local and Biosphere Expeditions staff & expenses	6,718
Administration includes registration fees, sundries, etc.	36
Team recruitment Azores as estimated % of PR costs for Biosphere Expeditions	6,430
Income – Expenditure	11,935
 Total percentage spent directly on project	 66%

1.10. 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) who 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 happen. Biosphere Expeditions would also like to thank the Friends of Biosphere Expeditions for their sponsorship and/or in-kind support.

We would also like to thank our partners Europhlukes, the University of the Azores, POPA, the University of Florida, and the local community of whale spotters (vigias). A final thanks goes to skippers Gyro & Nuno, as well as James Rosa and Claudia Steube, our excellent hosts at Banana Manor.

1.11. 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 info@biosphere-expeditions.org.

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2. Whale & dolphin study

Lisa Steiner*

Whale Watch Azores

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2.1. Introduction

The Azores is a group of nine islands located about 900 nautical miles off the coast of Portugal. 28 species of cetacean have been seen in the islands over the last 20 years. Sperm whales were commercially hunted there 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, which is why the expedition usually takes place in April and May.

Baleen whales have been seen fairly regularly migrating past the islands from March to June over the last several years, but it is unknown where they have come from or where they are migrating. It is thought that they are travelling north to feed in the waters around Iceland, Greenland, Norway or even Nova Scotia for the summer. Photo-identification of the animals passing the Azores enables us to match photos with photos taken elsewhere to hopefully determine some of these migration routes. So far, there have been several matches between blue whales to other areas: several of the animals sighted in Spitzbergen, Norway have also been seen in the Azores. There are two matches between the Azores and Iceland and probably the most interesting match to date is from 2014: a blue whale that had been seen in the Gulf of St. Lawrence, Canada in 1984, was seen off the South coast of Pico, 30 years later! In addition several blue whales have now been seen in different years in the Azores. Twelve humpback whales have been observed in both the Azores and the Cape Verde Islands and Nine have also been re-sighted in Norway. Two individuals have been seen in all 3 places.

Although sperm whales were caught in the Azores all year round, it has been thought that there are not many female sperm whales and calves around during the winter months. Working in April has given us the opportunity to see that females and calves are present at this time of year. In future, we would like to expand the effort to include the winter months to see if some females and calves are present in the archipelago all year round.

Photo-identification of sperm whales began in the Azores in 1987 and over 3000 individuals have been identified since then. The Europhlukes matching program makes matching individuals much faster than it was manually.

Some bottlenose and Risso's dolphin are resident in the islands year round. By photographing individuals we can start to see patterns of habitat use by different groups of dolphin at different times of year and compare id photos to existing catalogues to determine what home ranges might exist for these resident individuals. This requires a lot of time spent matching ID photos on the computer to identify individuals and their groups. Most of this work will be done in the future by MSc or PhD students.

2.2. Methods

Physeter (Latin for sperm whale), a 12 m motor catamaran, was used to go to sea on days when weather conditions permitted this. Vigias, local lookouts, were located on the cliffs about 150 m above sea level. They would begin to look for whales at around 07:30 to be able to direct the boat on departure at 09:00. If the lookouts did not sight any whales, the boat was equipped with a towed hydrophone to locate sperm whales acoustically. The boat also had up to four additional lookouts onboard, three on the bow and one in the stern searching for cetaceans. Two expedition members were usually dedicated to filling in POPA forms (transects and bird, turtle and trash surveys) (Fig. 2.2a). Other crew were on camera duty (Fig. 2.2b), data sheets, hydrophone monitoring (Fig. 2.2c), filling in the log or collecting water temperatures when required. On occasion crew members may have had to do more than one job.



Figure 2.2a. POPA sheet duty.



Figure 2.2b. Camera duty.



Fig. 2.2c. Hydrophone deployment and listening.

Sperm whales were approached from behind in order to obtain fluke photographs. The baleen whales were also approached from behind but moving further forward to obtain photographs of dorsal fins as well as chevron (fin whale) and mottling (blue whale) patterns. Bottlenose and Risso's dolphin and false killer whales were also paralleled in order to obtain dorsal fin photographs for identification of individuals. Two cameras were used to obtain the ID photographs: a Canon 7D MK II with a Canon 100-400mm lens and a Nikon F70 with a 70-300mm lens.

Other dolphin sighted would be approached for species identification and then the boat would usually move on to look for other animals if they were not one of the main target species. Data collected for non-sperm whale sightings included: start and end time of the encounter, position of the sighting as well as number of animals, presence or absence of calves and general behavioural state (milling, feeding, bowriding or travelling).

Only four categories of behaviours were differentiated because generally not enough time was spent with the animals to break them down further. If the animals were travelling, a direction of travel was noted. 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 as was the presence of other whale watching vessels.

Data collected for sperm whale sightings included: date, start and end time, number of whales, number of calves (the calves also count in the whale column), if the calf was suckling, visible callous (a growth on the top of the dorsal fin which indicates the whale is female) or if the whale was male, position, fluke heading, defecation, or recordings made and the presence of other whale watching boats.

When loggerhead turtles were sighted their position was recorded on the POPA forms. If the animal was caught, then it would be measured and tagged for the University of Florida/University of the Azores turtle tagging programme, as well as positional data being recorded.

When the boat returned to port, there was a debriefing on board to show where the boat had been during the day (Fig. 2.2d) and later sperm whale photos could be matched to the catalogue (Fig. 2.2e).



Figure 2.2d. Daily debrief.



Figure 2.2e. Matching flukes & fins.

Results were analysed using EXCEL data analysis tools: summary statistics to obtain average group sizes and ranges.

2.3. Results

2.3.1. Effort

Physeter would normally leave the harbour around 09:00 and return around 16:00 weather permitting. The boat went to sea 18 days during the expedition and spent between 2.75 and 7.75 hours (hr) per day on the water, with an average of 6.3 hr. A total of 114 hr with sea conditions less than sea state 5 were recorded. A comparison of the yearly effort since 2004 is presented in Fig 2.3a (next page). It should be noted that prior to 2009 expedition slots were 13 days and have since been reduced to 10 days. Also note that in 2009, 2011, 2013 and 2015 there were no expedition slots in May.

2.3.2. Encounters

During the expedition 120 groups of non-sperm whales and 124 sperm whale groups were encountered (Table 2.3a.).

Table 2.3a. Species encountered.

COMMON DOLPHIN, <i>Delphinus delphis</i>	22
BOTTLENOSE DOLPHIN, <i>Tursiops truncatus</i>	8
RISSE'S DOLPHIN, <i>Grampus griseus</i>	13
STRIPED DOLPHIN, <i>Stenella coeruleoalba</i>	6
FALSE KILLER WHALE, <i>Pseudorca crassidens</i>	2
BEAKED WHALE, <i>Mesoplodon sp.</i>	1
BLUE WHALE, <i>Balaenoptera musculus</i>	14
FIN WHALE, <i>Balaenoptera physalus</i>	41
HUMPBACK WHALE, <i>Megaptera novaeangliae</i>	12
MINKE WHALE, <i>Balaenoptera acutorostrata</i>	1
SPERM, <i>Physeter macrocephalus</i>	124

These encounters resulted in a relative sightings frequency as shown in Fig. 2.3b. Sperm whales were the species encountered most at 51%, then fin whales (16.5) and followed by common dolphin (9.1) and blue whales (5.8). These four species accounted for over 80% of all sightings.

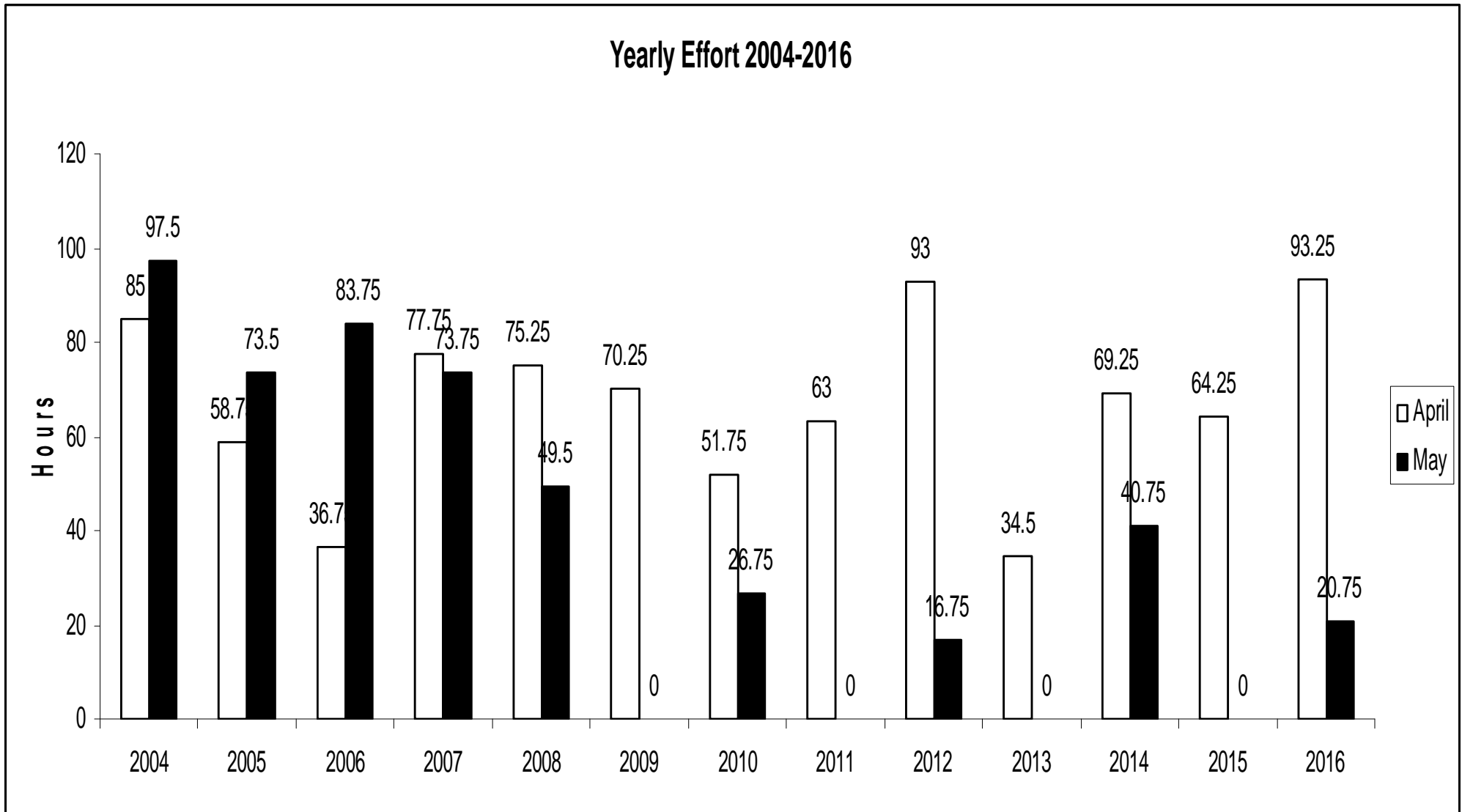


Figure 2.3a. Yearly effort.

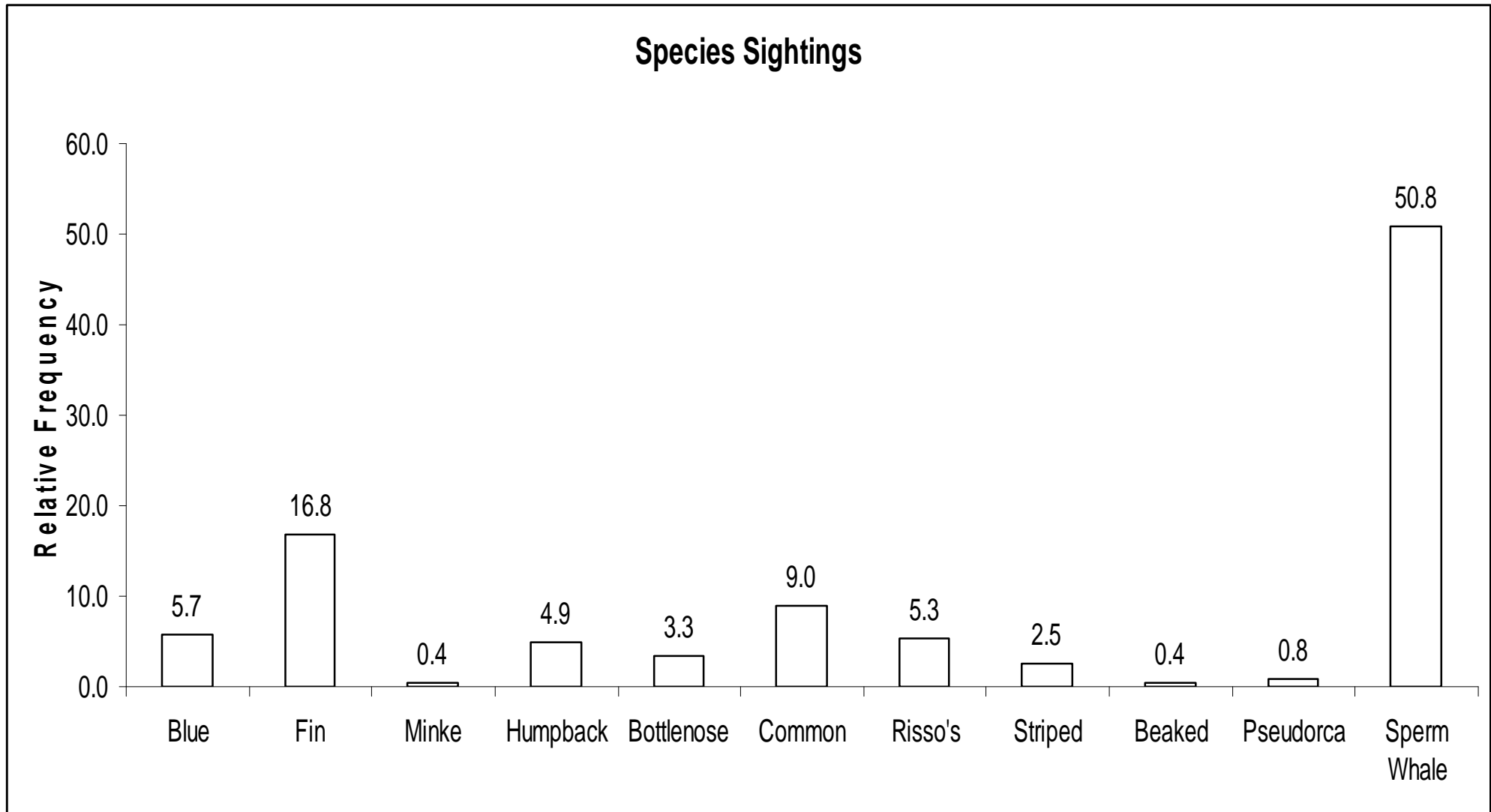


Figure 2.3b. Species sightings frequency.

2.3.3. Species sightings

Common dolphin

This species was encountered 22 times. The group size ranged from 2-100 and the average group size was 23.94 (Fig. 2.3c). This group size is consistent with the average group size from existing data for June-September. Calves were first observed on 7 April and seen nine times in total during the expedition. There was a significant difference in group size when calves were seen in the group: an average of 39 versus 13.5 when no calves were present in the group (t-test $t < .05$). This is what is generally thought, that calves are present in larger groups, which provide more protection for the youngsters.

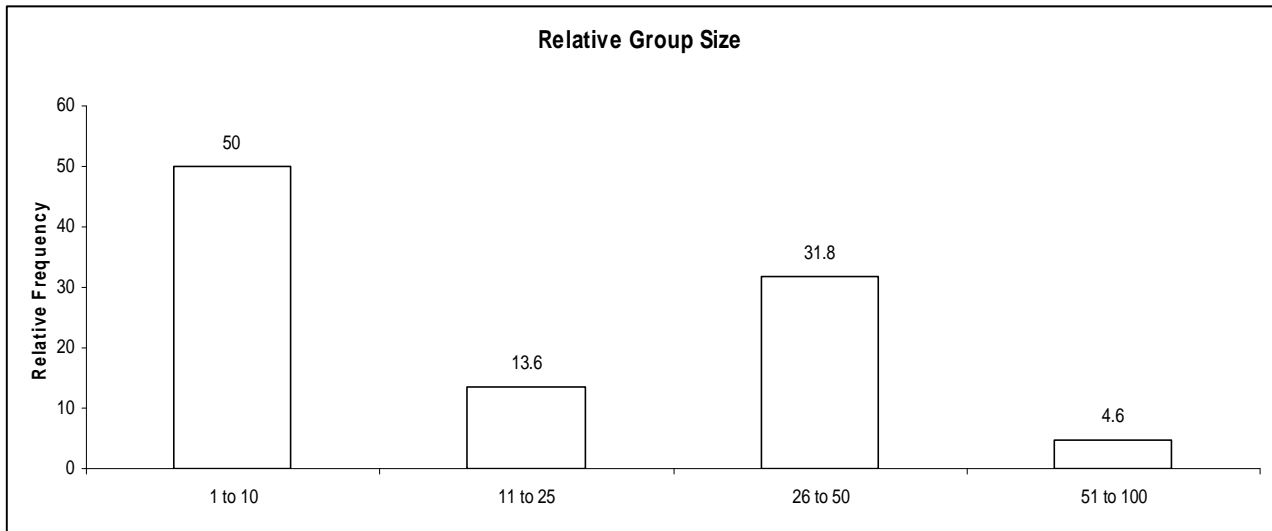


Figure 2.3c. Common dolphin group size.

The most common behaviour observed by common dolphin was milling followed by bowriding then travelling. They were not seen feeding (Fig. 2.3d).

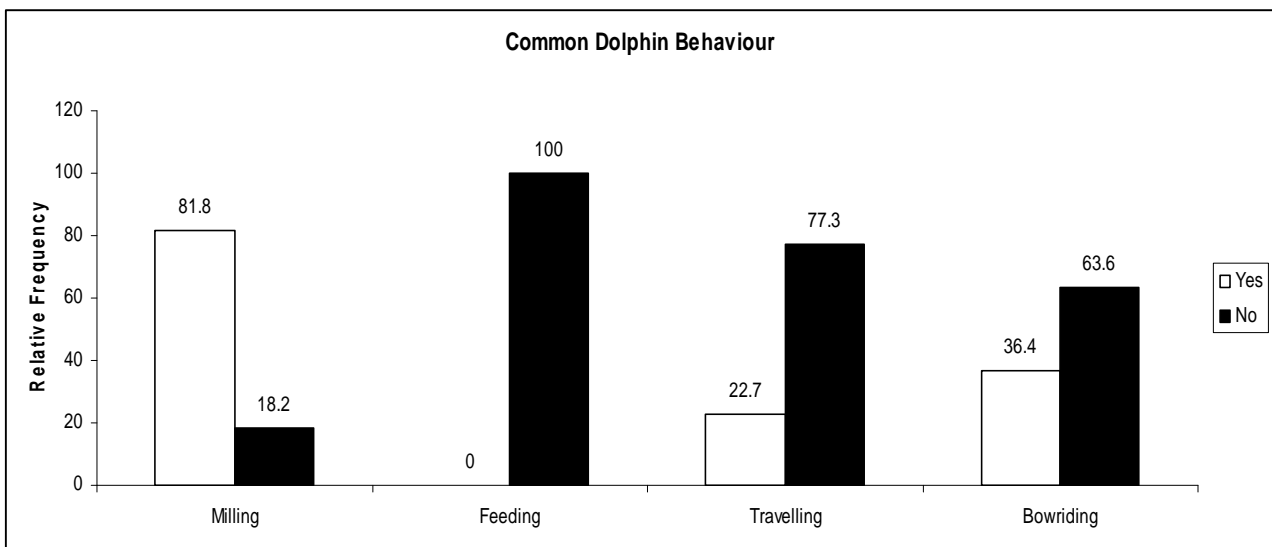


Figure 2.3d. Common dolphin behaviour.

Bottlenose dolphin

This species was observed eight times. The group size ranged from 3-50 and average group size was 22.25. This is consistent with other data. Calves were seen four times during the expedition. There was a significant difference in group size when calves were seen in the group: an average of 31.25 versus 13.25 when no calves were present in the group (t-test $t > .05$).

Bottlenose dolphins were observed travelling during most encounters and rode the bow three times. Other times they were seen milling. Feeding was never observed. (Fig. 2.3e).

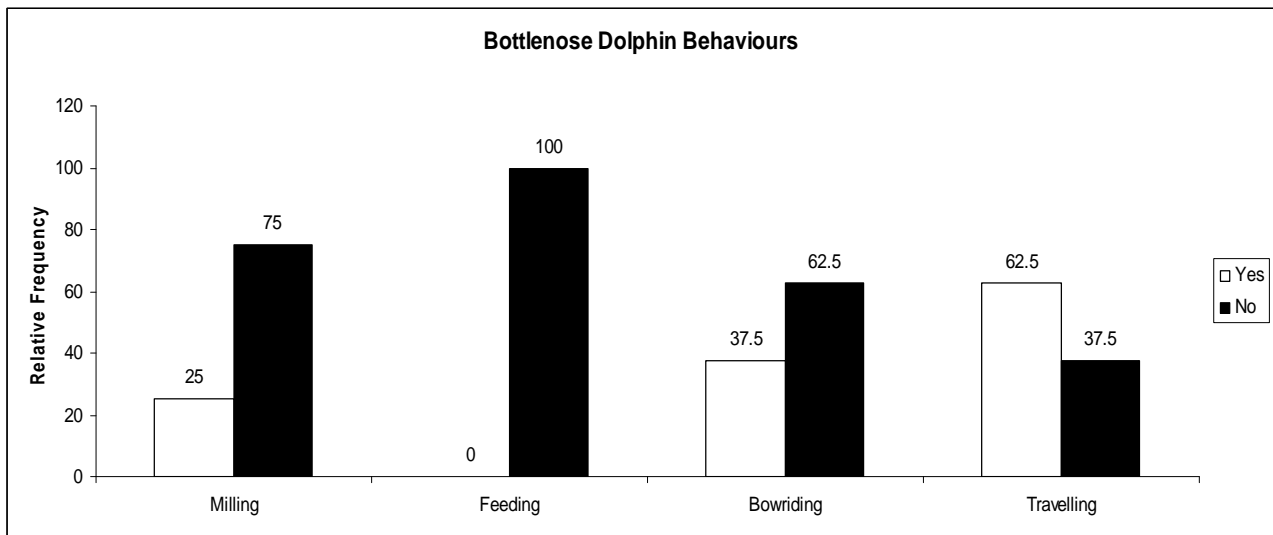


Figure 2.3e. Bottlenose dolphin behaviour

Photo identification pictures were taken during the encounters and some of the resident animals were seen on multiple days (Fig. 2.3f). Photos will be analysed in more detail at a later date.



Figure 2.3f. Bottlenose dolphin photo ID.

Risso's dolphin

This species was observed 13 times. Average group size was 9.4 ranging from 3-50. Calves were seen on eight occasions. There was no significant difference between group size with or without calves; 12 vs. 5. (t-test $t > .05$).

One group of the usual resident animals was seen during this expedition, including some of the same individuals seen in 2014 & 2015. Fig. 2.3g shows how fin scratches accumulate over the years. Nicks in the trailing edge of the fin are used to match right & left sides of the dorsal fin, since the markings are not identical (Fig. 2.3h). Note how few scratch markings are present on the juvenile (bottom) compared to the older individuals. As they age, Risso's dolphins become whiter, enabling age estimations of individuals (Fig. 2.3i).

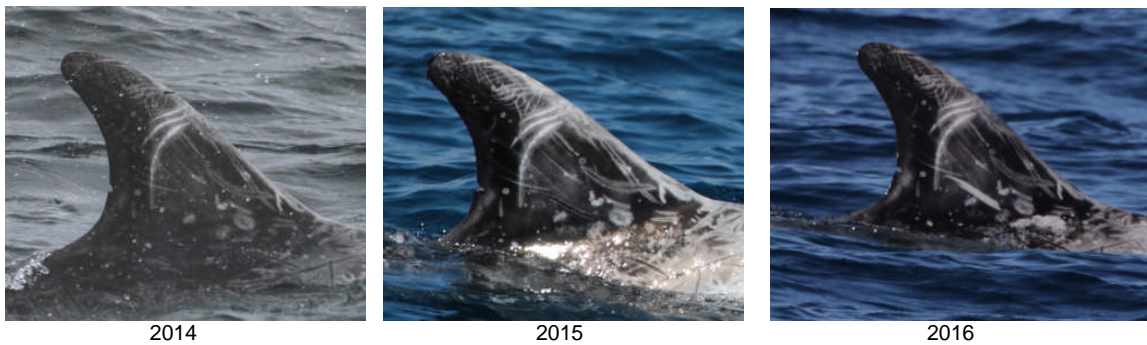


Figure 2.3g. Risso's dolphin dorsal fin photo-ID match to 2014.



Figure 2.3h. Risso's dolphin dorsal fin right and left side identification using nicks.



Figure 2.3i. Risso's dolphin age progression, younger individuals (bottom) are darker.

Behaviour of Risso's was almost evenly split between encounters: 54% of encounters were milling, the other 46% were travelling. No feeding was observed and Risso's dolphin do not generally bowride.

Striped dolphin

Striped dolphins were seen six times. Group size varied from 25-200 with an average of 104. Calves were observed in all groups. On all sightings, except one (when they were travelling), the dolphin were milling. Striped dolphins do not bowride often in the Azores.

False killer whale

False killer whales were seen twice. One group of 30 and another of 40 adults and calves were seen at either end of the expedition. ID photographs were taken of the dorsal fins to be matched with other false killer whales (Fig. 2.3j). One individual was seen in both groups. One group was travelling and the other group appeared to be feeding.



Fig. 2.3j. False killer whale ID photos.

Blue whale

Blue whales were observed on 14 occasions, one individual travelling with two fin whales. Average group size was 1.1 with a range of 1-2. Calves were not seen during the expedition. Behaviour was almost evenly split between milling and travelling. No surface feeding was observed, but the animals may have been feeding at depth while milling.

Identification photos, mottling patterns around the blowhole or dorsal fin as well as occasional fluke (Fig. 2.3k) were taken of all the animals and sent to Richard Sears for matching to the Atlantic catalogue. A blue whale seen in April had previously been seen in the Azores in 2010. There were no long distance matches to blue whales seen during the expedition.



Figure 2.3k. Blue whale ID photos.

Fin whale

Fin whales were seen 41 times during the expedition, including a pair swimming with a blue whale (Fig. 2.3l). Group size ranged from 1 to 2 with an average size of 1.4. Calves were seen on 5 occasions. The behaviour of the animals was split evenly between travelling and milling. They were not observed feeding, although they may have been feeding at depth while milling.



Figure 2.3l. Blue whale in front of a fin whale.

Photo identification pictures of the chevrons and dorsal fins were obtained (Fig 2.3m) and these photos were sent to the College of the Atlantic for matching to their Atlantic catalogue. No matches were found so far.



Figure 2.3m. Fin whale ID photos.

Humpback whale

Humpback whales were recorded 13 times during the expedition. ID photos were taken of the flukes and sent to the North Atlantic Humpback Whale Catalogue. Four different individuals were identified over the expedition. One of the whales had been seen in the Azores since 8 March 2016 (Fig. 2.3n). None of the individuals seen during the expedition matched to other regions.

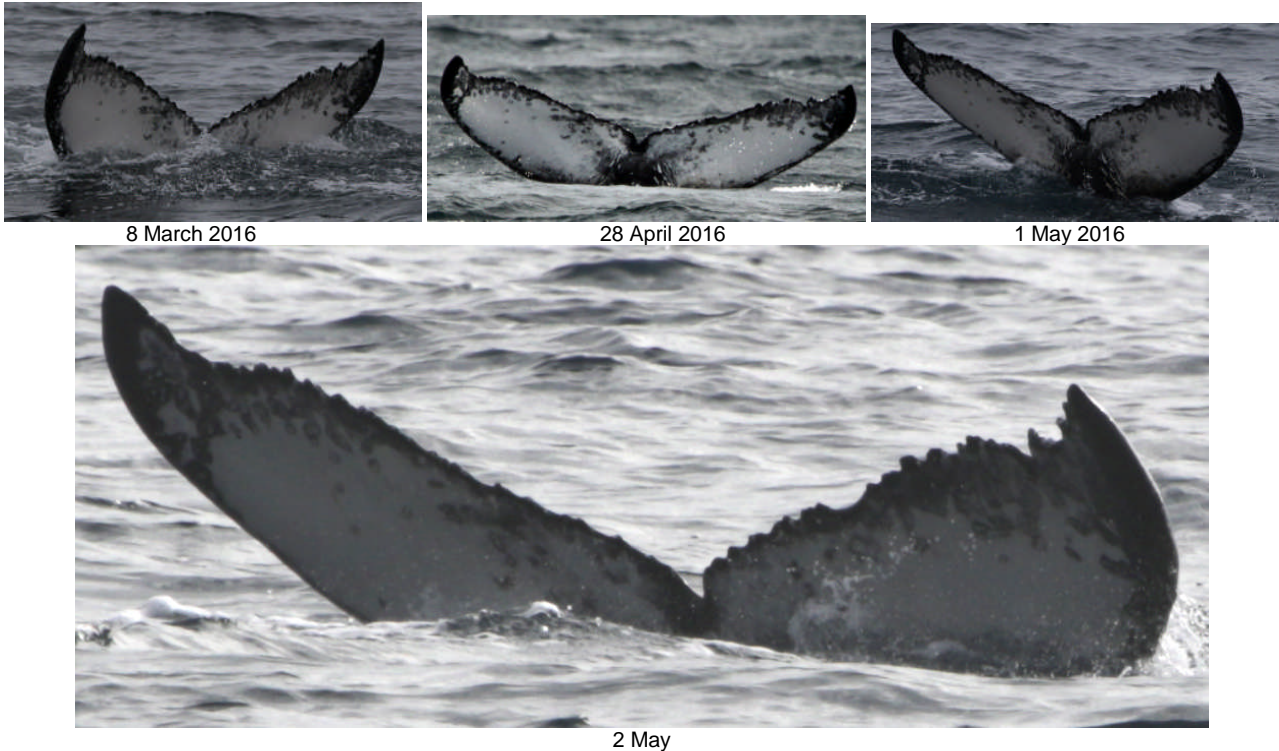


Figure 2.3n. Humpback whale ID photos.

Minke whale

A mother and calf minke whale were observed on 8 April 2016. They were travelling to the West. Minke whales are more difficult to spot than the other baleen whales, because their blow is not large. It was difficult to get an ID photo of the dorsal fin. One ID photo clearly showed the diagnostic white patch on the pectoral fins, which is unique to minke whales (Fig. 2.3o).



Figure 2.3o. Minke whale ID photos.

Sperm whale

Sperm whales are one of the main target species of the expedition. They were encountered 124 times, comprising 171 animals (not all different individuals). The average group size was 1.4, ranging from 1-6, which is similar to that encountered during other parts of the summer. Five different large males were seen and females with calves were observed 19 times. 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 due mainly to wear and tear as the flukes beat through the water. 70 individuals were identified in total, with seven un-identifiable due to poor photo quality. 44 new animals and 26 re-sighted from previous years were seen.

There was one outstanding sperm whale day with 26 individuals identified as well as two other impressive days with 13 and 10 individuals respectively. This year's IDs include "19", first seen in 1987, as well as "1554" and "1645" (1991), and the male "3736" also seen in 2009 (Fig. 2.3p). "19", "1554" and "1645" are part of the same group and have been photographed together since 1991. It appears that sometime between 1994 & 1999, this group may have been attacked by orcas, since many new contours appeared on the trailing edge of the flukes during that timeframe. "19" has been observed ten times over the past 29 years. The male "3736" was seen in almost exactly the same spot at the same time seven years ago in 2009, a remarkable re-sighting.

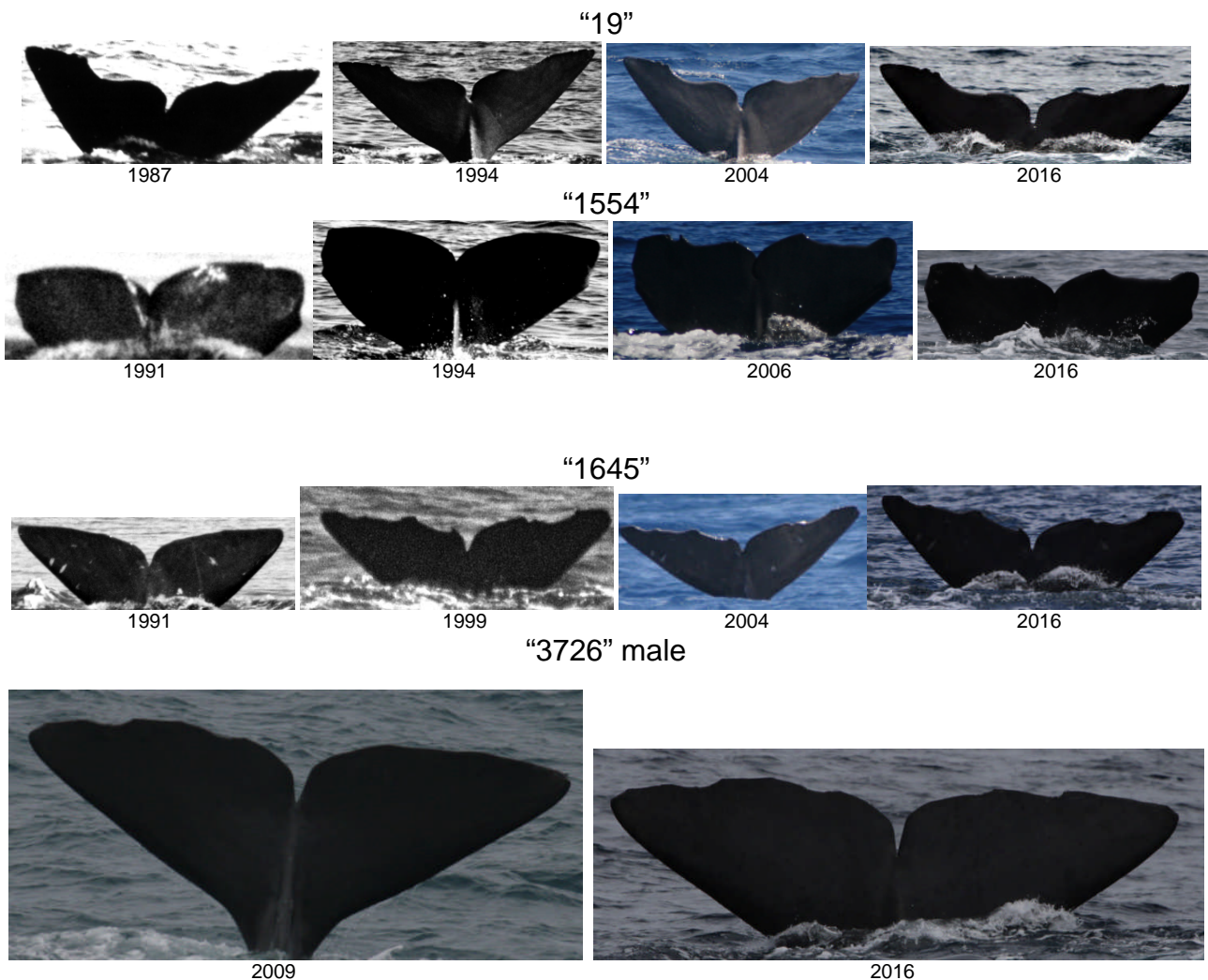


Figure 2.3p. Sperm whale ID photos.

Miscellaneous sightings

Loggerhead turtles were observed 47 times during the expedition. These turtles feed mainly on jellyfish. A sunfish and a blue shark were also seen (Fig. 2.3q). Sunfish also feed on jellyfish.



Figure 2.3q. Sunfish.

Sightings during the expedition

Figs. 2.3r-t show locations of species sightings in relation to the islands of Pico, Faial and São Miguel, and over the three expedition slots.

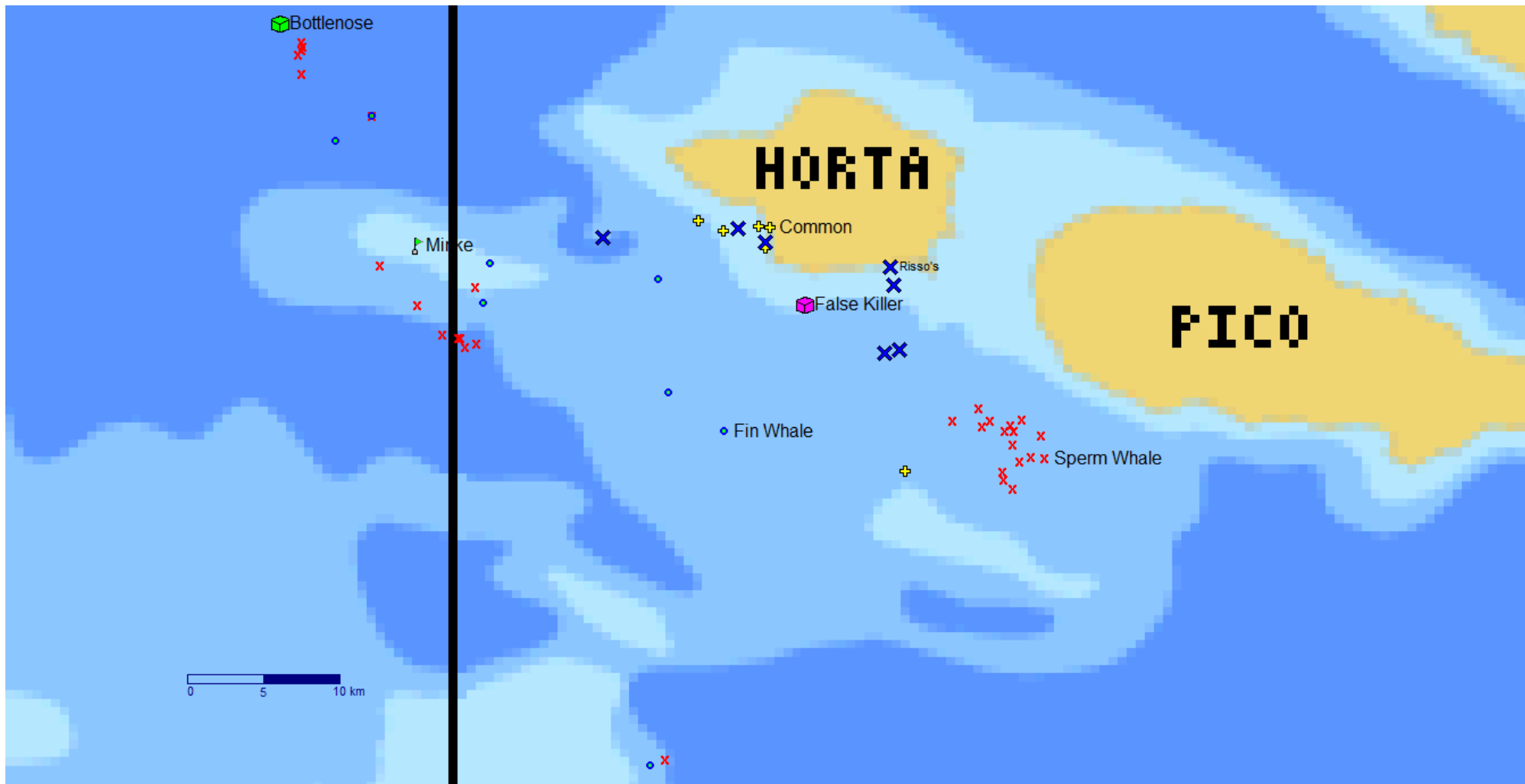


Figure 2.3r. Sightings during slot 1 (4 – 13 April 2016).



Figure 2.3s. Sightings during slot 2 (15 – 24 April 2016).



Figure 2.3t. Sightings during slot 3 (26 April – 5 May 2016).

2.4. Discussion & conclusions

April and May are a productive time in the Azores. Biosphere Expeditions are playing an important role in collecting vital information at a time of year when little or no work has been done in the past. Many species of cetacean can be observed in the archipelago. In fact, the variety of cetaceans is usually greater at this time of year than any other time of the summer. Sightings of baleen whales are unpredictable, but the use of lookouts (vigias) on the cliffs greatly enhances the chance of sighting them.

Blue whales

The expedition encountered 16 blue whales in 14 encounters in 2016 and has contributed 108 individuals to the East North Atlantic catalogue since 2004. Matches achieved for blue whales sighted in the Azores by the expedition include three matches to animals seen in previous years in the Azores: one sighted in 2016 was seen in 2010 and two matches from 2012, one to an animal from 2006 and the other from 2010.

The Azores blue whale catalogue now contains 350 individuals (not all the author's photos), making up the majority of the North East Atlantic Blue Whale Catalogue (560) out of an estimated 2,000 animals in the North Atlantic.

Within the North Atlantic, the rarity of matches between the East and West North Atlantic catalogues, suggest that there are two largely discrete populations in the North Atlantic. One population appears to live between West Greenland South along the coast of North America, centred in Eastern Canadian waters. The other extends from the Denmark Strait, Iceland and Jan Mayen, Spitzbergen, to the Barents Sea in the summer, and south to the northwest African coast in the winter. (Fig. 2.4a, Sears et al. 2015). This is also supported by the genetic structure of blue whales across the Atlantic (Oosting et al 2014 in Sears et al 2015) Tags put on blue (and fin) whales by the University of the Azores show northerly movement of blue whales from the Azores (Fig. 2.4b. from Silva et al. 2013), corroborating blue whale northward routes from the Azores that stay within the East North Atlantic population/catalogue.

Further evidence of a distinct East North Atlantic blue whale population comes from other long distance matches from the Azores: two to Iceland and five to Spitzbergen (although not the author's photos) (Richard Sears, pers comm.). In addition, in 2016 a blue whale was seen in the Bay of Biscay that had been previously seen in the Azores (Richard Sears pers comm.). There are also a few inter-island Azores photos, as well as the matches between years. There is a 14% yearly re-sighting rate of blue whales from the Azores catalogue (Richard Sears pers comm.), indicating that at least some individuals use the same route, past the Azores, on their migration.

However, two years ago, after the expedition, a blue whale was seen on the south coast of Pico that had previously been seen in the Gulf of St. Lawrence, Canada in 1984, 30 years previously. Its whereabouts over the last 30 years remain a mystery, demonstrating (1) that there may be limited mixing between East and West North Atlantic populations/catalogues, and (2) the need for continuous photo ID collection to elucidate whale movements and population boundaries. Elucidating such movements and population locations and boundaries is important, because blue whale populations do not seem to be recovering at the same rate as other whales, making route determination with a view to establishing effective protected areas doubly important.

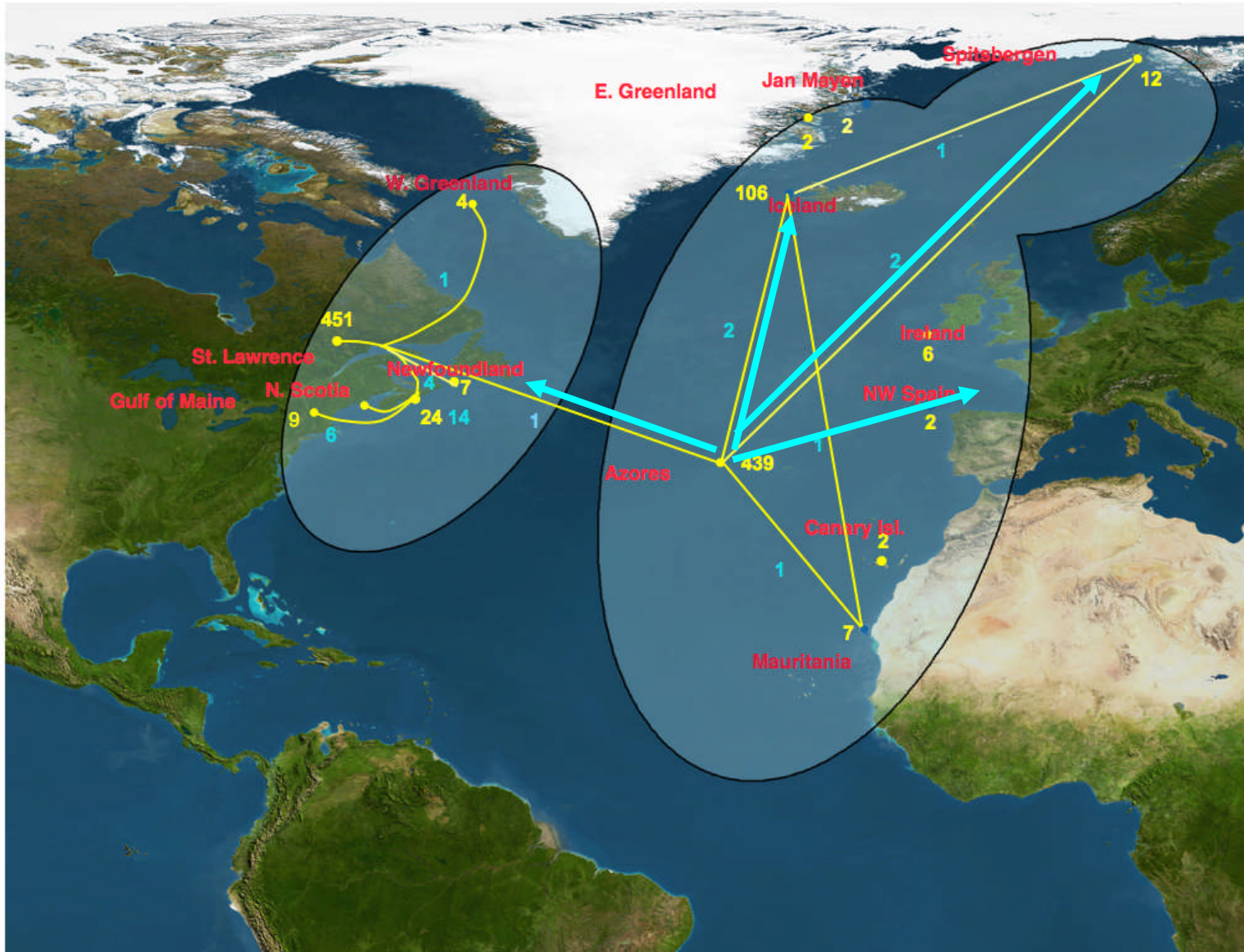


Figure 2.4a. Blue whale movements in the North Atlantic (from Sears et al. 2015). Matches discussed above in turquoise.

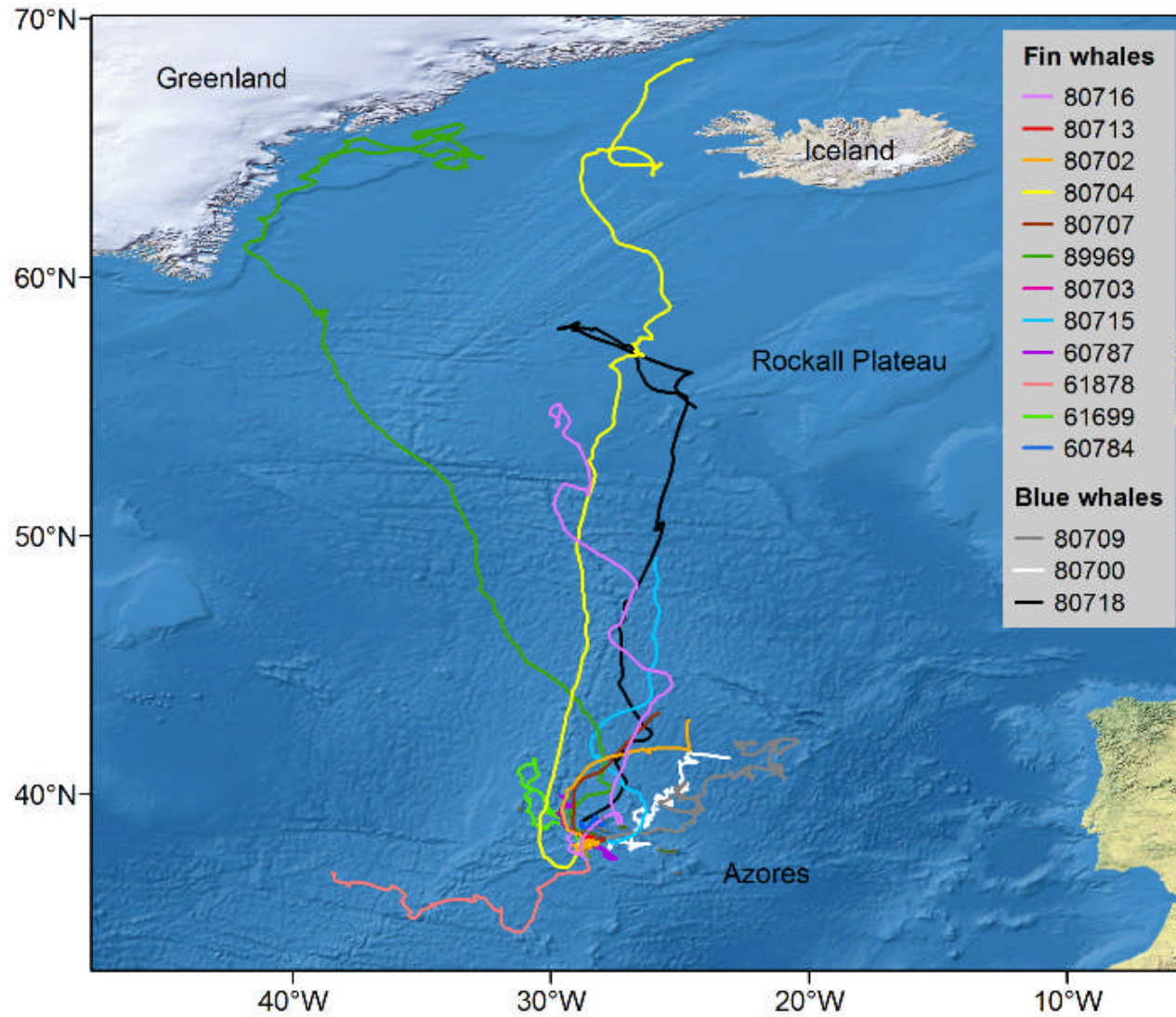


Figure 2.4b. Movement of blue and humpback whales tagged in the Azores (Silva et al. 2013).

Humpback whales

The expedition in 2016 encountered 12 humpback whales. In wider research on this species, there have been several humpback whales sighted in the Azores that have also been seen in the Cape Verde Islands (Wenzel et al. 2009). During this expedition, we showed that an individual humpback remained in the Azores from 8 March until 2 May 2016. Although feeding was not recorded, any feeding at depth would be undetected by us at the surface. After the expedition, three humpback whales matched to Norway and two males had previously been seen in the Cape Verde Islands together.

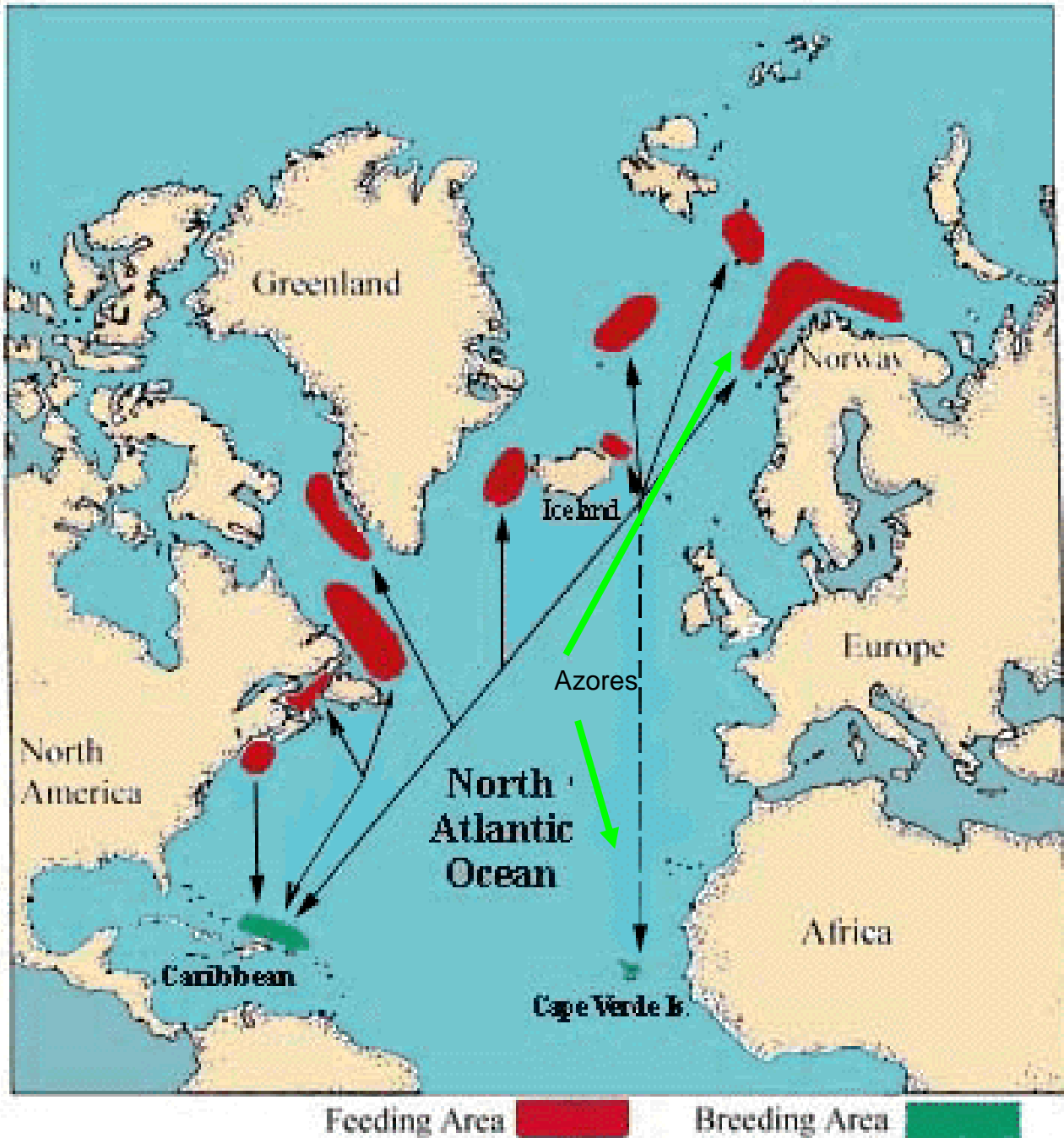


Figure 2.4c. Movement of humpback whales in the North Atlantic (from Wenzel et al. 2009). Azores matches in green.

The North Atlantic Humpback Whale Catalogue is currently approaching 9,000 individuals on record and although the Azores photos are a very small part of this catalogue, they play an important role in discovering some long-range matches. Since 2004 the expedition has contributed 18 ID photos and had one match to the Cape Verde Islands in 2010..

The match made by the expedition as well as data collected outside the expedition and by other researchers, suggest that the humpbacks that are seen in the Azores are part of the endangered Cape Verde population, rather than the Caribbean population, which was taken off the endangered list in 2016 (Fig. 2.4c., Wenzel et al. 2009). Matching movements and populations is important, because little is known about the movements of the eastern Atlantic humpback whales and as an endangered population, it is good to keep an eye on its recovery or decline. Some animals appear to stop in the Azores for a snack on their way to the feeding grounds, as well as on their way back to the breeding grounds and the expedition has made a contribution to this important work.

Most researchers will not risk coming to the Azores to find baleen whales, because their migration patterns are just too unpredictable as seen by the expedition's very variable success in finding them. Researchers could come to the islands for a couple of months and not find a single baleen whale. The expedition has the luxury of already being in place and with the vigia (lookout) network, if the animals are present, can take advantage of any opportunities that present themselves. Researchers responsible for the baleen whale catalogues are always thankful for the expedition's data and continue to tell the author what an important contribution the expedition's baleen whale photos are, since the Azores may be a route marker for animals travelling north (Richard Sears, Peter Stevick, pers comm.).

Baleen whales

Baleen whales, other than the blue and humpback whales already mentioned above, documented by the expedition include fin, minke and Sei whales. Two collaborative projects are currently underway with the University of the Azores looking at the sightings of (non-baleen) sperm whales (Boys et al. 2016), as well as the baleen whales with respect to environmental data collected by the university (depth, slope and tide as a few examples). One poster on baleen whales, using photo-ID from 1998-2015 was presented at the 2016 European Cetacean Society conference in Madeira (Chevallard et al. 2016). This corroborated the results mentioned above, i.e. that some blue whales have been seen in multiple years, fin whales have not, and only one sei whale has been seen in multiple years. Some individual blue and fin whales remain in the Archipelego for a few weeks, while the sei whales do not.

The significance for whale conservation and research of these findings is that the Azores may provide a crucial 'pit stop' (between breeding grounds further South, possibly Mauritania and feeding grounds in Iceland and Norway) for some of the migrating animals that have not been feeding for a few months on the breeding grounds. The resources that they find in the Azores could be the difference between survival or death. Having a baseline of information on the number of animals and areas that they are using may also be useful in detecting any early changes in prey abundance due to global warming.

Dolphin species

This year's sightings of the resident bottlenose and Risso's dolphin were in line with previous years. The expedition saw resident individuals of both species, including a very well known individual "Mischa". The ID photos of the Risso's were forwarded to a biologist who has just completed her PhD (Hartman 2014) on Risso's around Pico for future analysis.

False killer whales are not a common sighting in the Azores, although the number of encounters has increased in the past few years, possibly in relation to an increase in their main prey, tuna. The ID photos of these groups over time will show if they are also residents, albeit lesser known, like the bottlenose and Risso's dolphin. At the time of writing this report, at least one individual had been observed in both groups of false killer whales that were seen at either end of the expedition, lending support to this residence theory.

Knowing resident from transient species is important, because resident animals may need particular areas around the islands for feeding or breeding, while transients are just passing through. This can be seen from new laws that are being considered to prevent swimming with Risso's dolphin within three miles of the coast, which is primary habitat that mothers and calves use (K. Hartman, pers. comm).

Sperm whales

The 2016 expedition had a total of 124 encounters of 171 sperm whales, including females with suckling calves, as has been observed during previous expeditions, as well as a few big males.

Before Biosphere Expeditions began, the expectation was that it will be mainly large males that will be encountered in this early part of the summer, but this has been proven not to be the case, although we do tend to see more males in the spring than the rest of the summer. Five different males were seen during this expedition. This year, as usual, most of the males were sighted alone. On one day, six males were observed together, although for most of the day they were not seen at the surface at the same time. It is normal for very large males to become more solitary, the older they get, but while they are "teenagers" they usually associate with other male "teenagers" in bachelor groups.

Re-sightings of male sperm whales are rare, because they move around looking for female groups to breed with when they are not in their feeding areas, which tend to be further north from the Azores. However, this year, there was one. Of added interest was the fact that this whale had been seen exactly seven years ago, in almost exactly the same spot, and at the same time too. It may be that he had some success locating females last time he visited, so came back again.

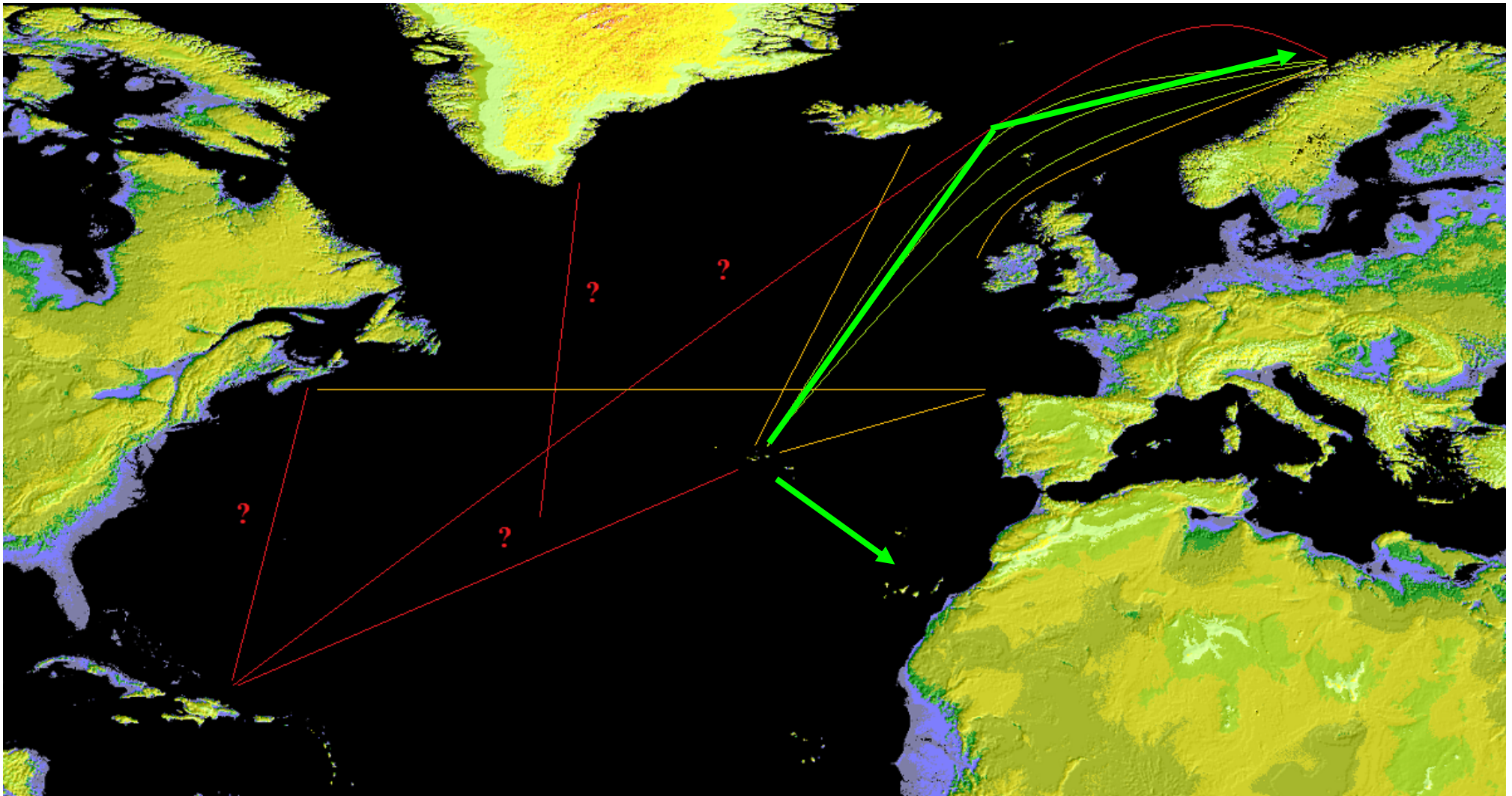


Figure 2..4d. Movements of male sperm whales in the Atlantic (from Steiner et al 2012). Azores matches in green.

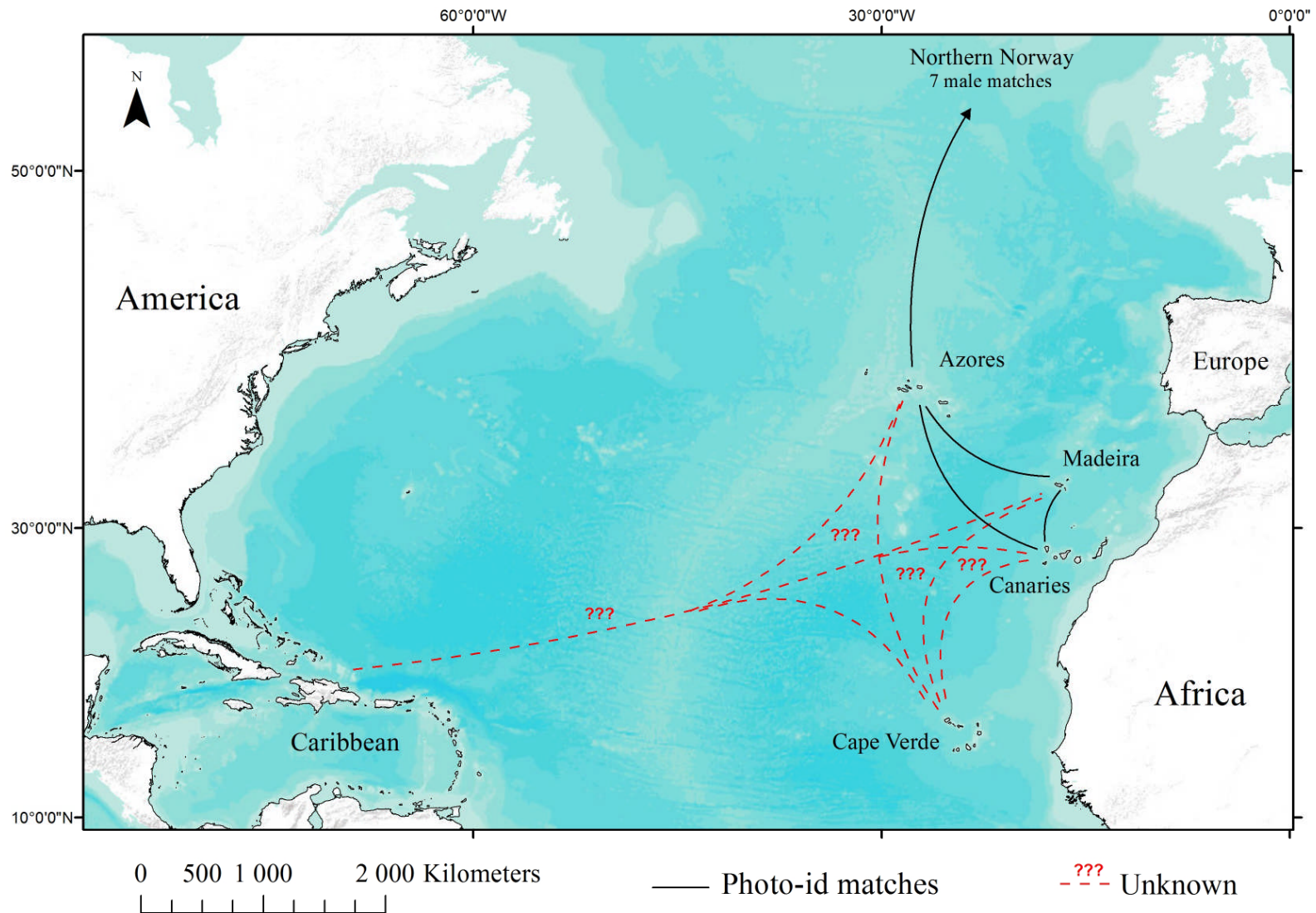


Figure 2.4e. Movements of female sperm whales in the North Atlantic (from Steiner et al. 2015).

In October 2009, the author presented a poster on the movements of male sperm whales around the Atlantic, at the Marine Mammal Conference in Quebec (with assistance from the Friends of Biosphere) (Steiner et al. 2012). Three males seen in the Azores were matched to animals re-sighted in Norway in 2007 and 2008 (Fig. 2.4d). This gave researchers the first indication of where the males observed by the expedition may go when they are not in the Azores. The collaboration with biologists working in Norway is continuing, but none of the males from this year's expedition matched to Norway. However, there was the seven year re-sighting mentioned above. This work has now been published (Steiner et al. 2012). Since then another nine males have now been matched from Norway to the south of Pico, the last one seen on 9 August 2016, having been seen previously in Norway in 1993, 23 years ago.

Data collected at this time of year are valuable to elucidate if some of the same individual sperm whales remain in the archipelago for long periods of time. There is some indication that more 'unknown' individuals are present in the early part of the season with the 'known' animals arriving later. It would be very interesting to see which individuals are present in the archipelago over the winter. Maybe some groups prefer summer in the Azores and others prefer winter. The weather in the winter, as well as the difficulty of recruiting citizen scientists for this harsh and challenging time of year, are the main obstacle to investigating this theory.

Seeing re-sighted animals this early in the season shows that some of the sperm whales that return to the area do not have a seasonal preference and can be seen in all months or they possibly move around the archipelago all year round. Photographs of "19"'s group confirm that female sperm whales spend their whole lives together; it is the juvenile males that leave the group. Some of the animals observed in previous years have been seen together for 27 years and in the case of "19" and her pod, since 1991, at least 25 years. Usually when one animal from a group has been seen before, the rest of the animals in the group have also been seen. Sometimes it is not possible to identify all the animals of a group on a given day, but repeated sightings of the same group over time give more chances to catalogue all of the individuals from that group. Sperm whales live for around 60-70 years, so some of these animals re-sighted in the Azores have been recorded for almost half of their lives.

We have been collaborating with two whale watching companies that operate out of São Miguel, as well as one of the companies from the south of Pico for the last couple of years. Several matches exist between the catalogues from the other whale watching companies, indicating that there is some movement of the animals around the archipelago, although most animals have been observed in only one area. The two groups of islands are only 125 nm apart, so it is not surprising that there is movement between the two areas.

In 2011 a collaboration commenced with SECAC (Sociedade para el Estudio de los Cetaceos en el Archipelago Canario, www.cetaceos.org), a research organisation in the Canary Islands. This collaboration has already provided 13 matches for females between the areas. A few of these animals have been sighted in the Azores, seen in the Canary Islands and returned to the Azores. This shows that some female sperm whales undertake at least a limited migration. One of those individuals, "1019", a whale identified in 1988 was first observed with a calf in 2010. She was photographed in the Canaries with the calf in the winter of 2010/2011 and returned to the Azores with the calf in the summer of 2011. She was again seen in the Canaries winter of 2011/2012 and in 2012 she was back in the Azores, with her calf, which was starting to make independent dives on its own.

As of 2013, the calf, now a juvenile, has not been seen. The calf was not seen in 2015 or 2016 either, suggesting that it has not survived independently. The movements of these female sperm whales was presented at the Society for Marine Mammalogy Conference in San Francisco in December 2015, with help from the Friends of Biosphere Expeditions (Fig. 2.4e, Steiner et al. 2015).

During one of the expedition shore days, when bad weather conditions prevented the expedition from going to sea and the time was used to catalogue and analyse ID photos, a new match was made between Madeira and São Miguel. The female whale had also been seen in the Canary Islands (Steiner et al. 2015), confirming movement along the mid-Atlantic ridge between the three archipelagos. Unfortunately, there is not a lot of effort on photographing sperm whales in either of these other archipelagos to cement this theory.

In 2009 a PhD by Ricardo Antunes (Antunes 2009) was completed at St. Andrews University, using the Azores photo-ID database of individuals from 1987 to 2007. This was used to analyse the social structure of sperm whale groups found in the Azores, looking at long-term relationships between individuals and patterns of residency around the archipelago. He showed that there are differences between the groups of sperm whales observed here to those in the Pacific. The groups of animals we observe in the Azores are more stable and associations of individuals last for a much longer period of time than they do in the Pacific. This is most likely due to food availability in the different areas. In addition, information on the difference in group sizes between the Atlantic (Azores/Caribbean) and the Pacific has been linked to a lack of orca predation in the Atlantic. The larger groups in the Pacific provide protection to individuals from orca attacks (Whitehead et al. 2011).

Conclusion and outlook

The expedition and its annual reports since 2004 (see www.biosphere-expeditions.org/reports) show the value of long-term studies on cetaceans. There should be some new publications arising from the author's work on sperm whales in the next year or so. Initial work has started on using the matching information between islands to work out how often groups of sperm whales move between the central and eastern groups of islands.

In conclusion, this expedition was a success for the twelfth year. Sightings were good and encounters with baleen and sperm whales kept us occupied collecting data. More sperm whales than baleen whales were observed and there were quite a few dolphin sightings. The weather conditions during this year's expedition were excellent. Re-sighting individual sperm whales from previous years continues to show the value of the Europhlukes matching programme alongside digital cameras. We are able to identify individuals sighted on the day they are seen, rather than waiting until the end of the summer to do the matching manually. This is also a very satisfying way to end a day's work of observations!

At the time of writing, there were not enough people to run the 2017 expedition, which had to be cancelled as a result, for the first time since 2004. This shows how critical the support from citizen scientist is to provide labour and funding for projects such as this.

The 2018 Expedition should:

- continue the photo-ID work on the various species
- make an effort at matching some of the fin whales and false killer whales found during the expedition to confirm if the fin whales visit in multiple years and if the false killer whales are resident like the bottlenose & Risso's dolphins
- put more effort into the trash survey, as part of the POPA programme, which began in 2016. Marine litter is already a huge problem, with micro plastics finding their way into the fish we eat.

Thank you to all expedition members for your assistance.

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

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3.1. Introduction

The Biosphere Expeditions research project took place between 4 April and 5 May 2016 in Faial Island (Azores, Portugal). Onboard of the vessel Phyceter, several participants had the opportunity to collect some information on marine life of the Azores. During the expedition period, members of Biosphere Expeditions recorded the occurrence of several marine species such baleen and toothed whales, dolphins and several species of seabirds (see figures below). The information recorded during the expedition will be processed and included in the database of the POPA (Azores Fisheries Observer Program).

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). POPA is also responsible for the “Friend of the Sea” tuna fishery certification and since 2016 is coordinating the Azores observer team of the ICCAT Atlantic Ocean Tropical Tuna Tagging Programme.

3.2. Results

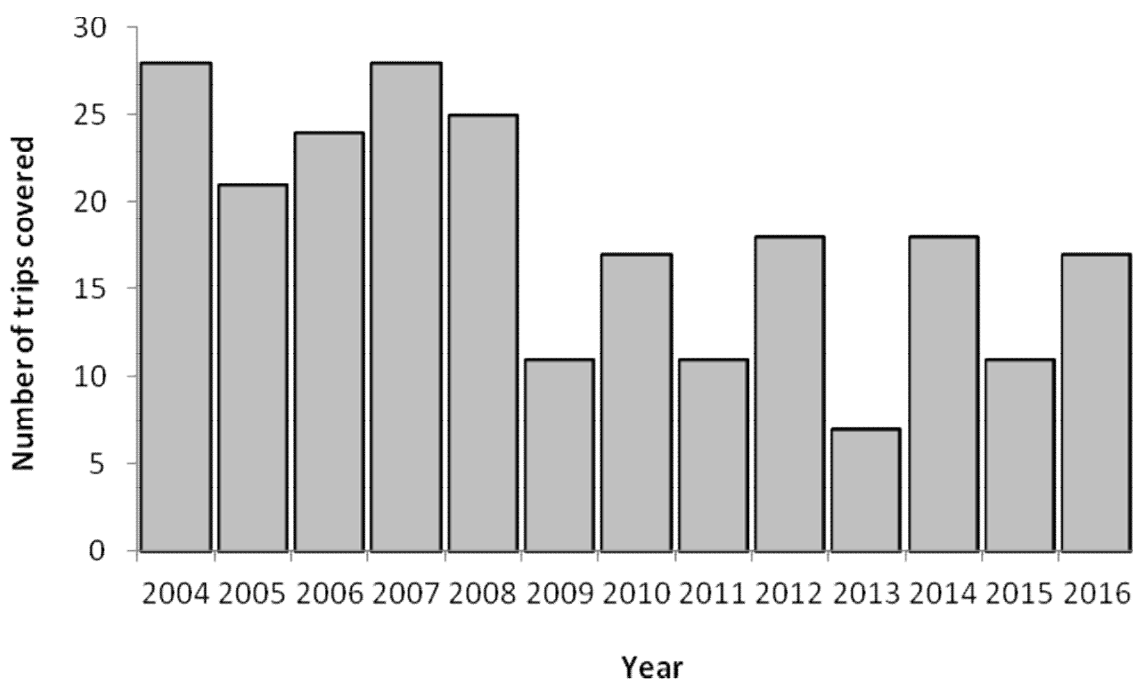


Figure 3.2a. Trip coverage 2004-2016.

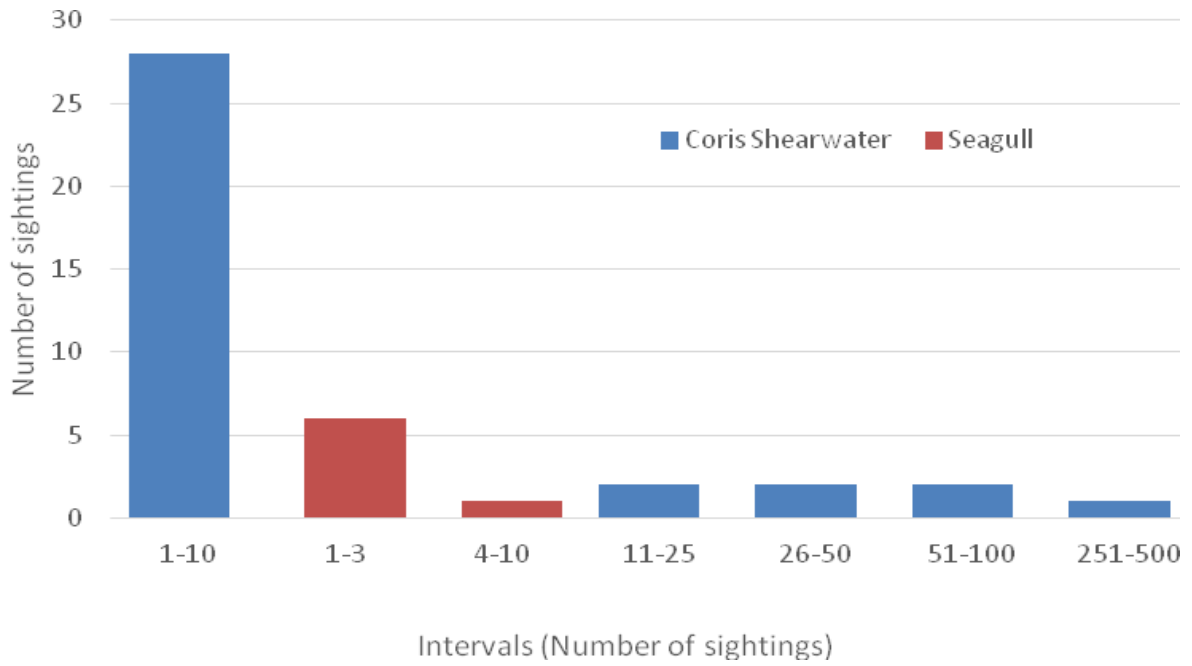


Figure 3.2b. Species of seabirds observed in 2016.

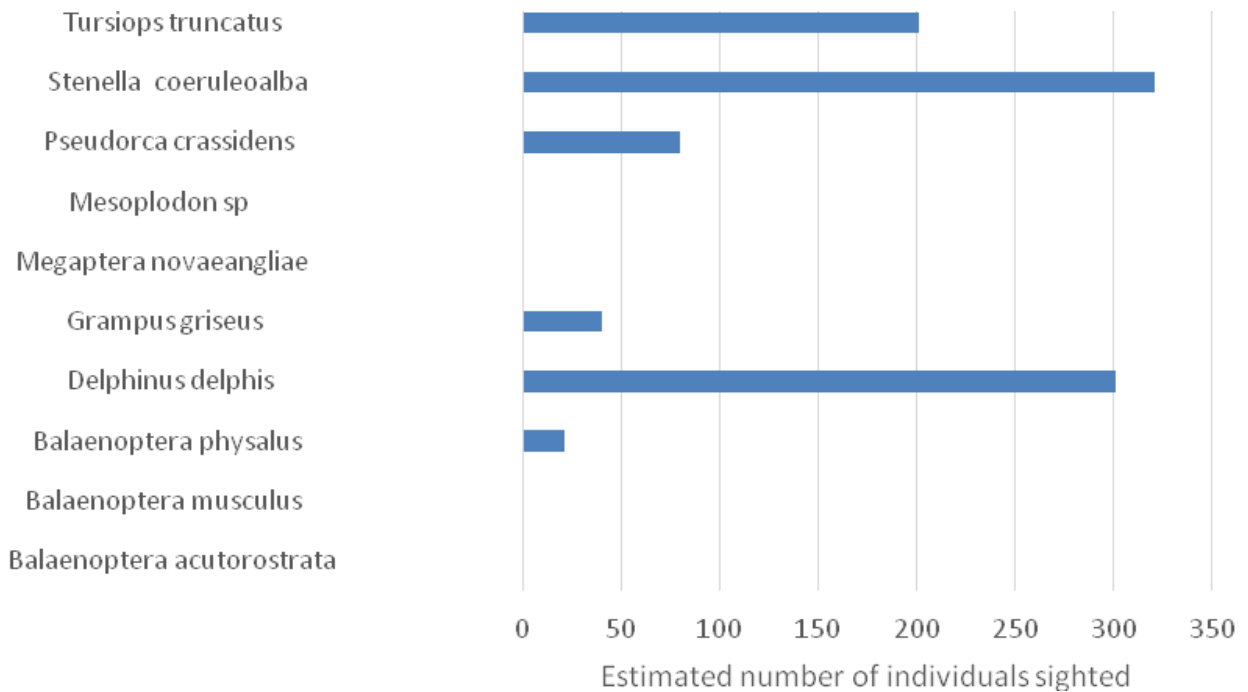


Figure 3.2c. Species of cetaceans observed in 2016.

3.3. Discussion

POPA has proved that accidental capture of cetaceans in the tuna fishery in the Azores is highly insignificant and no records of mortality of cetaceans were ever reported (Silva et al. 2002, Cruz et al. 2016). But the programme has a much wider range than just the “Dolphin safe” topic. In recent years the POPA dataset (which includes data collected by Biosphere Expeditions) has been frequently requested for several research projects regarding the ecology, biology and fisheries of target and associated species. Examples are the inclusion of POPA data in the OBIS-SEAMAP and EMODnet map databases and the papers published regarding information on cetacean distribution into marine protected area design (Silva et al. 2012) and spatial/ temporal distribution and richness of cetaceans in the mid-Atlantic waters around the Azores (Silva et al. 2013, Tobeña et al, 2016). Besides the scientific outputs, the data collected by POPA observers are also available for NGOs, government and to the fishery industry. Recently the ‘Friend of the Sea’ (FoS) Organisation revalidated the eco-certification of three tuna species in Azores based on information collected by POPA.

3.4. Literature cited

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Appendix I: Expedition diary & reports



A multimedia expedition diary is available at <http://biosphereexpeditions.wordpress.com/category/expedition-blogs/azores-2016/>.



All expedition reports, including this and previous Azores expedition reports, are available at www.biosphere-expeditions.org/reports.