Julia Bentz

OPTIMAL STRATEGIES FOR MARINE WILDLIFE TOURISM IN SMALL ISLANDS

A dissertation submitted to fulfill
the requirements for the degree of
Doctor of Philosophy in Economics

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Publications in dissertation

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Resumo (in Portuguese)

O arquipélago dos Açores é um destino emergente para o turismo de observação de vida marinha, oferecendo a possibilidade de mergulho com espécies emblemáticas, nomeadamente o tubarão azul e jamanta, e de observação de uma elevada diversidade de espécies de cetáceos. Este estudo explora as dimensões socias da observação de cetáceos e do mergulho, procurando contribuir para o desenvolvimento de estratégias de gestão sustentável destas actividades. Compreender e explorar a variabilidade existente nas atitudes e perfis dos consumidores destes produtos turísticos pode ajudar os decisores e operadores locais a avaliar o potencial de desenvolvimento futuro deste mercado, bem como a desenhar melhores práticas e políticas de gestão. A investigação sobre estas temáticas, prevendo o comportamento dos utilizadores recreativos e de possíveis quebras na qualidade do destino turístico, pode contribuir significativamente para a melhoria das medidas de gestão. Este estudo aplica métodos de investigação qualitativos e quantitativos, avaliando os dados obtidos através de modelos conceptuais de turismo de observação de vida selvagem marinha. O modelo de Duffus e Dearden (1990) relativo às actividades recreativas não consumistas, orientadas para a vida selvagem constitui o principal quadro conceptual desta investigação.

As entrevistas estruturadas aos actores locais e especialistas permitiram identificar os principais pontos fortes e fracos e os problemas das actividades de mergulho e observação de cetáceos nos Açores. Os resultados identificaram como principais problemas a ausência de uma estratégia regional para o turismo de observação de vida marinha, o incumprimento, por parte dos operadores, das regulamentações existentes para a observação de cetáceos, a diminuição de observações de tubarões, a sua pesca não controlada, os conflitos entre operadores turísticos e pescadores e a ausência de gestão efectiva das áreas marinhas protegidas. O mergulho com tubarões azuis é uma componente importante do produto turístico açoriano. No entanto, os conflitos com os usos tradicionais de consumo são claramente identificados neste estudo. Revela-se que o mergulho com tubarões nos Açores constitui um forte argumento a favor da conservação destas espécies a nível regional, resultado da crescente atenção internacional e do maior retorno económico desta actividade quando comparado com o resultante da pesca de tubarões. Um inquérito por questionário foi administrado aos observadores de cetáceos e aos mergulhadores, no sentido de explorar a sua especialização, motivação, percepção de congestionamento e satisfação. Os resultados podem contribuir para a gestão sustentável destas actividades de diversas formas. Em primeiro lugar, verifica-se que os mergulhadores são bastantes especializados e altamente motivados pela presença de tubarões, jamantas e pelos ambientes subaquáticos pristinos e não congestionados. Esta constatação sustenta intervenções de gestão que apostam em mergulhadores especializados (por exemplo, através da limitação dos níveis de utilização), uma vez que estes utilizadores tendem a gerar maior retorno económico e menor impacte ambiental. Em segundo lugar, os níveis médios de congestionamento foram considerados aceitáveis em ambas as actividades embora tenham sido registados níveis críticos em algumas ilhas, o que sugere a necessidade de fazer cumprir as regulamentações existentes relativas à observação de cetáceos e de limitar o número de mergulhadores em cada local. Em terceiro lugar, as respostas apresentam diferenças entre ilhas no que respeita ao congestionamento e à especialização, sugerindo a

necessidade de diferentes esquemas de gestão dentro do arquipélago. O relativo isolamento de diversas ilhas é uma vantagem neste aspecto. As ilhas mais remotas poderiam ser reservadas a especialistas. Na ausência de uma gestão adequada é provável que os mergulhadores especializados sejam substituídos por utilizadores generalistas, com os potenciais impactes ambientais e sociais negativos implícitos. Em quarto lugar, os respondentes atribuem grande importância a práticas 'amigas do ambiente', destacando a necessidade de melhorias nesta área, tais como a disponibilização de programas de interpretação e o cumprimento das regulamentações existentes relativas à observação de cetáceos.

Por último, a falta de um plano integrado de gestão com uma estratégia de marketing coerente, pode conduzir ao desenvolvimento insustentável e por eventualmente ao declínio destas actividades. Esta investigação produziu indicadores sociais que fornecem contributos para uma estratégia de gestão do turismo de observação de vida marinha, que tem o potencial de promover a satisfação do visitante e o desenvolvimento sustentável das actividades.

Palavras-chave: *gestão sustentável; observação de cetáceos; mergulho; especialização recreativa; congestionamento percepcionado; satisfação do utilizador.*

Abstract

The Azores archipelago is an emerging marine wildlife tourism destination featuring diving with large iconic species including blue sharks and manta rays and whale watching with a high diversity of cetacean species. This study explores human dimensions of whale watching and diving as an input for sustainable management strategies for these activities. Understanding and exploring the variability in attitudes and profiles of marine wildlife users can help decision makers and local operators assess the potential for future development of this market as well as design better management practices and policies. Research on these subjects has the potential to enhance management through predicting the behavior of recreationists and forecasting possible quality declines of a destination. This study applies both qualitative and quantitative research methods and evaluates the obtained data with the help of conceptual marine wildlife tourism models. Duffus and Dearden's (1990) model of *non-consumptive wildlife-oriented recreation* provides the main conceptual framework for this research.

Structured interviews with local stakeholders and experts identified main strengths, weaknesses and problems of diving and whale watching in the Azores. Main problems were considered to be the absence of a regional marine wildlife tourism strategy, disregard of the existing whale watching regulations by the operators, the decline of shark sightings, the unmanaged shark fisheries, the conflicts among operators and with fishers, and the lack of well managed marine protected areas. Diving with blue sharks is an important component of the Azorean tourism product. However, the conflicts with the traditional consumptive uses are clearly identified by this study. This study revealed that shark diving in the Azores has become a strong argument in favor of regional shark conservation due to increasing international attention and the provision of higher economic returns than shark fishing. A questionnaire survey administered to whale watchers and divers explored participants' specialization, motivations, *perceived crowding* and satisfaction. Results provide input for sustainable management of the activities in several ways: Firstly, the diving clientele are quite specialized and highly motivated by the presence of sharks, manta rays and uncrowded, undamaged underwater environments. This finding strengthens management interventions focusing on specialized divers (e.g. though limiting use levels) as these users generally result in higher economic returns and lower environmental impacts. Secondly, average crowding levels were acceptable in both activities but critical levels were measured in certain islands, suggesting the need to enforce the compliance with existing whale watching regulations and limiting diver numbers per site. Thirdly, responses differed among different islands in terms of crowding and specialization suggesting a need for different management schemes within the archipelago. The relative remoteness of several islands is an advantage in this regard. More remote islands could be reserved for the specialists. Without adequate management, it is likely that specialist divers will be displaced by generalist users with the implicit potential negative environmental and social impacts. Fourthly, respondents place great importance on environmental-friendly practices, highlighting the need for improvement in this regard, such as the provision of interpretation and the enforcement of existing whale watching regulations.

Finally, lack of an integrated management plan with a coherent marketing strategy, can lead to unsustainable development and ultimately to a decline of the activities. This research produced social indicators providing input for a marine wildlife tourism management strategy which have the potential to enhance visitor satisfaction and sustainable development of the activities.

Key words: *sustainable management; whale watching; diving; recreation specialization; perceived crowding; user satisfaction.*

Chapter 1

INTRODUCTION

The 'oasis theory' was to help me to understand that the ocean, huge as it may be when measured at human scale, is a very thin layer of water covering most of our planet—a very small world in fact—extremely fragile and at our mercy. (Cousteau, 1985:12)

The oceans are not anymore a vast and endless resource as formerly imagined. Yet, they are still one of the least protected, least studied and most inadequately managed ecosystems (Ban *et al.*, 2014). The *Millennium Ecosystem Assessment* (Hassan *et al.*, 2005), as well as other global and regional assessments of the marine environment, confirm that biodiversity in the world's oceans and coastal areas continues to decline as a consequence of uncoordinated and unsustainable human activities.

Small islands are particularly affected by the loss of biodiversity (Cambers *et al.*, 2001). Islands are considered biodiversity hotspots due to the fact that they host high numbers of endemic species on small areas (Hassan *et al.*, 2005; Deidun, 2010). However drivers such as habitat destruction, invasive alien species, pollution, over-exploitation of species, and climate change represent a threat to fragile island ecosystems and have the potential to compromise the sustainable development of small islands which depends largely on natural resources (Mimura *et al.*, 2007). Characteristics such as isolation, smallness, limited natural and human resources constitute an additional challenge for economic development of small islands. Tourism is often one of the most important economic activities due to the natural and cultural assets found in small islands which constitute major attractions for tourists (Tisdell & Wilson, 2012).

Introduction

Coastal and marine tourism has grown substantially over the past decades (Higham & Lück, 2008). Activities such as whale watching and diving play an important role in this accelerated growth. Whale watching began in the 1960's in San Diego, California as small commercial enterprise and during the 1990s grew into a global phenomenon (Hoyt, 2001). In 2008 whale watching tours were carried out in 119 countries worldwide, involving 13 million whale watchers per year and generating around $2.1 billion in total expenditures during. The growth of the whale watching industry over the past decade even exceeded global tourism growth rates (O'Connor, 2009). Dive tourism is also one of the fastest growing tourism activities (Musa & Dimmock, 2012). According to the *Professional Association of Diving Instructors* (PADI) there were 22 million certified divers in 2013, with an average of 900 thousand new divers certified each year (PADI, 2014).

Both, whale watching and diving can be considered marine wildlife tourism activities. According to Masters (1998:6) marine wildlife tourism includes "any tourist activity with the primary purpose of watching, studying or enjoying marine wildlife" such as marine wildlife watching holidays, wildlife boat trips in marine or estuarine areas, guided island or coastal walks, observing marine life from land viewpoints, visiting marine or coastal nature reserves, diving, snorkelling, and visiting marine wildlife visitor centres and marine aquaria. Marine mammals are key species for marine wildlife tourism. The most popular species are dolphins, whales and porpoises, dugong and manatee, seals and sea lions. Other popular marine species of tourist interest are whale sharks and other shark species, fish and rays, sea turtles and penguins, albatross, and other sea birds (Zeppel & Moloin, 2008).

It is important to ensure that any tourism activities targeting marine wildlife is developed in a sustainable manner both from a social and biological perspective. Effective management is required to ensure that economic benefits are realized while protecting the natural assets on which the tourism is based (Duffus & Dearden, 1990; Bennett *et al*., 2003). Properly managed, marine wildlife tourism has the potential to promote sustainable economic development while protecting nature. It has been used to support the integration of biodiversity conservation going hand in hand with socio-economic development in islands and elsewhere (Roman *et al.*, 2007). Sustainable development of a marine wildlife tourism activity also means stability of a community's culture, social order and social structure and reasonable employment income, stability of commodity prices and equality of working opportunities in the community (McCool, 1995). It also means that potential biological impacts of tourism activities on the marine species and its critical habitat are managed and kept to a minimum.

Many research studied have investigated the potential environmental impacts caused by marine wildlife activities such as injury, stress, disruption of feeding, mating and migratory behaviors of marine species, pollution, tour boat anchoring, and trampling on corals (e.g. Bejder *et al.*, 2006; Dearden *et al.*, 2007a; Duffus, 1996; Erbe, 2002; Lusseau, 2004, Lusseau *et al.*, 2009, Magalhães *et al.*, Roman *et al.*, 2007; Thurstan *et al.*, 2012; Yasué & Dearden, 2006). But for sustainable development of marine wildlife tourism maintaining the quality of the recreation experience for tourists is also essential. The recognition of the complexity of factors influencing such an experience has led to a growing number of studies on users' personality, attitude, motivations, preferences,

satisfaction and perceptions (e.g. Andersen & Miller, 2006; Christensen *et al.*, 2009; Dearden *et al.*, 2006; Higham & Carr, 2003; Musa *et al.*, 2011; Ong & Musa, 2012; Orams, 2000; Thapa, *et al.*, 2006; Valentine *et al.*, 2004). Understanding and exploring the variability in attitudes and profiles of marine wildlife users can help decision makers and local operators assess the potential for future development of this market as well as design better management practices and policies. Research on these subjects has the potential to enhance management through predicting the behavior of recreationists (Anderson & Loomis, 2011) and forecasting possible quality declines of a destination (Coghlan, 2012; Dearden *et al.*, 2007a; Uyarra *et al.*, 2009).

1. Conceptual framework

Duffus and Dearden's (1990) model of *non-consumptive wildlife-oriented recreation* provides orientation for the design of optimal management interventions for managers, researchers and tour operators who seek to derive sustainable benefits that wildlife tourism can bring supporting conservation and economic growth (Catlin *et al.*, 2011). This framework identifies three dimensions of a wildlife tourism interaction: the wildlife tourist, the focal species and its habitat; and the historical relationships between them. Wildlife tourism industries are considered to change, both on the user and on the site level. As the site changes, the type of user it attracts changes and vice versa. Initially a wildlife tourism activity attracts more explorative users, designated as wildlife specialists who are knowledgeable and skilled and require minimal infrastructure and interpretative material. The impact on the environment is generally minimal due to the increased awareness and small number of these users. As the popularity of the site increases, the proportion of generalists also increases. Generalists require more facility development and interpretative material. As generalists appear in greater numbers, they place greater pressure on the natural environments. In order to meet the demands of generalists, the tourism activity develops its infrastructure, leading to the decline of specialists who seek out other, less developed activities (Duffus & Dearden, 1990).

To explain the change both the site and the user undergo, Duffus and Dearden (1990) integrated three tourism models in their framework (Fig. 1):

Butler's *tourism area life-cycle* model (Butler, 1980) which proposes that tourism areas undergo a predictable cycle change over time, beginning with the stage of discovery followed by a period of exponential growth leading to a period of consolidation. Then, depending on various factors, tourism can decline, stagnate or grow further.

Bryans' *leisure specialization continuum* (Bryan, 1977) divided recreationists according to their knowledge and investment in the activity into specialists and generalists. Specialists are more exploratory users who are typically knowledgeable and skilled about the activity and the destination, and require minimal infrastructure or interpretation in order to achieve an enjoyable wildlife interaction experience. For generalists, the activity is not a central life interest and they invest less in its pursuit, both in terms of money and effort. Generalists require greater facility

development and more interpretation and without adequate management interventions. Duffus and Dearden (1990) suggest that as a destination progresses through the life cycle stages it attracts different types of tourists. Initially it will attract explorative users (wildlife specialists) and as popularity increases, so does the number of generalist wildlife tourists who require greater facility development. Without adequate management intervention, generalists put greater pressure on the natural environment.

Limits of acceptable change (Stankey *et al.*, 1984) is similar to the concept of carrying capacity that tries to assess the number of recreationists that an area can sustain without sustaining ecological damage or impairing the recreation experience. However researchers started to realise that it is not only the numbers of visitors that create impacts but also other factors, such as their behaviour. In response the approach to managing impacts changed to setting targets for the amount of change allowed in particular settings and developing monitoring to assess these changes. This is the *limits of acceptable change* approach and is now used widely in management of recreation settings (e.g. Dinsdale & Harriott 2004; Manning, 2011; Roman *et al.*, 2007; Shafer & Inglis 2000; Sorice *et al.*, 2003). Based on *limits of acceptable change* management interventions are designed in both social and environmental realms. Appropriate limits must be determined to meet the objectives through the establishment of indicators, standards and monitoring programmes. Different standards can be set in different areas through zoning.
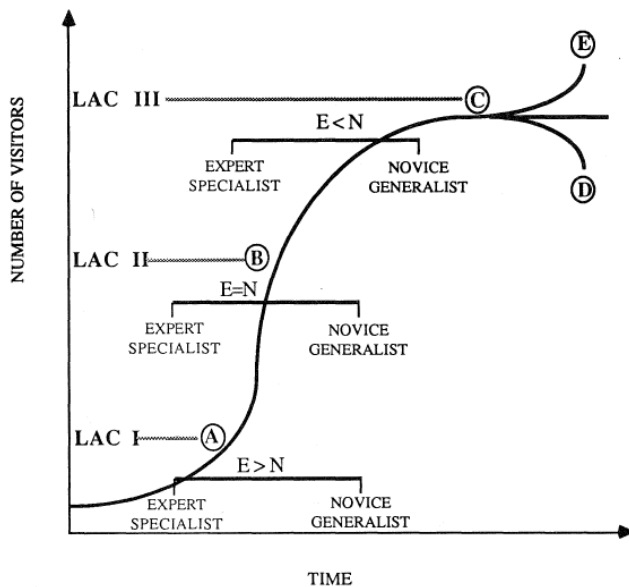
Figure 1. Duffus and Dearden's (1990) marine wildlife tourism framework

Several other theorists provided models to analyse the dynamics of wildlife tourism encounters and to enhance management. For instance Orams (1996) published a wildlife tourism model which focused on classifying the different management alternatives - physical, regulatory, economic, and

educational. In particular, he supported the potential of interpretation to enrich and control human-wildlife interactions.

Reynolds and Braithwaite (2001) published a conceptual framework for wildlife tourism, using a systems framework to categorise the major elements of wildlife tourism: the product, favourable conditions, motivations of participants, quality factors of the experience, and impacts on the wildlife. The focus of this framework is on categorising wildlife tourism rather than on the temporal change and the management, making it a more descriptive model which fails to provide a forecast on development, change, and sustainability of a wildlife tourism activity (Catlin *et al.*, 2011).

Butler and Waldbrook (1991) adapted the *recreation operation spectrum* visitor planning framework to a tourism context and conceptualised a *tourism opportunity spectrum*. They also used Bryan's *recreation specialization continuum* and Butler's (1980) *tourism area life cycle* to explain the shift from specialist to generalist visitors as a destination becomes more popular. The use of similar elements of theory to those of Duffus and Dearden (1990) for explaining and managing a tourism development demonstrates the value of looking at wildlife tourism from both a temporal and a user context (Catlin *et al.*, 2011).

Duffus and Dearden's (1990) approach to wildlife tourism continues after 20 years to provide a "reliable and robust framework" for predicting and managing change in a wildlife system (Catlin *et al.*, 2011). Although longitudinal studies are still limited, some studies (Catlin & Jones, 2010; Higham, 1998; Higham & Bejder, 2008; Peake, 2011) found that the model of Duffus and Dearden (1990) predicted the evolution of wildlife tourism activities. However there have been developments since 1990 which suggest modifications of the model.

Butler's (1980) *tourism area life-cycle* model has become one of the most written cited concepts in tourism research. Modifications have been suggested regarding the unit entity, instead of using visitor numbers as originally proposed, depending on the characteristics and context of the industry. When available, visitor numbers are still an appropriate variable to estimate the stage of industry growth. Where wildlife encounters require a viewing platform (such as a boat), then the number and size of the platforms is also an appropriate measure (Dearden *et al.*, 2007b; Sorice *et al.*, 2006) unless access is restricted, for instance through conservation regulation, then, participant numbers are still relevant (Catlin *et al.*, 2011).

Bryans' *leisure specialization continuum* has also been applied to numerous case studies. The variables he used to position users along a continuum were commitment, preferences for activity settings, skills, and equipment ownership. Duffus and Dearden (1990) argued that some of these variables, such as equipment, may not be as relevant and instead added knowledge of the target species and its environment and involvement in conservation initiative to describe expertise in a wildlife tourism context. Lemelin *et al.* (2008) argue that consensus on the indicators defining specialisation has not been reached, possibly due to the largely open way in which Bryan's paradigm was originally formulated, which allows many different interpretations. Nonetheless, a number of recurrent themes have emerged from studies applying Bryan's model which are consistent with

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Duffus and Dearden (1990) proving that specialization relates to the stage of development of a wildlife tourism industry (Catlin *et al.*, 2010; Catlin & Jones, 2010; Jones *et al.*, 2009; Lemelin *et al.*, 2008; Malcom & Duffus, 2008; Manfredo & Larson, 1993). However, even with the application of general themes identified by Duffus and Dearden (1990), the type of specialisation index employed may vary between specific situations.

Stankey *et al.*'s *limits of acceptable change* framework (1984) has been used to monitor nature-based tourism activities (e.g. Dinsdale & Harriott, 2004; Shafer & Inglis, 2000; Sorice *et al.*, 2003; Roman *et al.*, 2007) by identifying maximum use levels and placing emphasis on positive planning and management anticipating over-use. The importance of external regulation to maintain the sustainable development of a wildlife tourism industry has been documented by several studies (Dearden *et al.*, 2006; Sorice *et al.*, 2006). However an overregulation by management interventions can place extra financial and bureaucratic burdens on commercial operations and has the potential to undermine the progress of greater environmental protection as the operators may become less able to comply with the regulations (Catlin *et al.*, 2011). Developing adaptive, integrative and site-specific management, avoiding potential overregulation is important for a successful implementation.

Considering the possible modification of some input variables and the influence of external factors, Duffus and Dearden's (1990) model has the potential to provide a framework that can guide the design of optimal management interventions for managers, operators or researchers who seek to derive sustainable benefits that wildlife tourism can bring in the form of support for conservation and economic growth (Catlin *et al.*, 2011). This framework provides the main conceptual model for this research. The specific objectives are discussed in the next section.

2. Research questions and objectives

The goal of this thesis is to understand how social science dimensions of whale watching and diving experiences can lead to more successful and sustainable industries based on research in a case study of the Azores. The objectives and related questions specified to fulfill this goal are as follows:

Objective 1: To investigate the **strengths, weaknesses** and **conflicts** associated with whale watching and diving in the Azores perceived by local stakeholders and experts. The research questions associated with strengths, weaknesses and conflicts are:

- What are the main strengths, weaknesses and conflicts of the whale watching activity in the Azores?
- What are the main strengths, weaknesses and conflicts of the diving (with sharks) activity in the Azores?

Objective 2: To explore **user specialization** of divers and whale watchers in the Azores. *Recreation specialization* can be related to the different experiences, skills and interests of participants in a given activity. Thus if user specialization can be assessed for a given site, it can provide input for

sustainable management and satisfactory tourist experiences. Research questions associated with this objective are:

- Is tourist specialization evident in whale watching and diving tourism industry in the Azores? If so, does tourist specialization coincide with previous experience, different motivations, and setting preferences?
- Are there different levels of specialization in the five islands Santa Maria, São Miguel, Graciosa, Pico and Faial?
- Which conclusions can be drawn from levels of specialization for the classification of the islands according to the stages of Duffus and Dearden's (1990) *wildlife tourism model*?
- How should industries be managed to meet participants' expectations and to develop sustainably?

Objective 3: To examine **motivations** of divers through segmenting participants according to the attributed importance of motivational setting preferences. Identifying different tourist types is a tool to assist more effective planning and management of tourism activities. The specific research questions related to motivations are:

- What are the main motivations to go diving in the Azores?
- What are the main diver types in the Azores?
- How do they differ in age, gender, origin, income and specialization?
- Based on the above information, how can the diving industry in the Azores be managed more sustainably?

Objective 4: To use Stankey *et al.*'s (1985) *limits of acceptable change* and Jacksons (1965) s*ocial norm curves* to explore **perceived crowding** of whale watchers and divers in the Azores. Specific research questions are:

- Do reported encounters of divers in the water and whale watching vessels exceed participants' norm?
- If so, in how many cases?
- How many divers in the water at a dive spot make participants in the Azores feel crowded?
- How many whale watching vessels near a group of cetaceans make participants feel crowded?
- Does *perceived crowding* affect overall satisfaction of tour participants?
- Is specialization related to *perceived crowding*?
- Is crowding equally distributed among the different islands Santa Maria, São Miguel, Graciosa, Pico and Faial?
- Based on the above information, how can the industries be managed more sustainably?

Objective 5: To explore **satisfaction** of tourists participating in whale watching tours in the Azores comparing expectation and satisfaction scores and investigating satisfaction only. Understanding

tourist satisfaction with the experiences is a key component to the successful management of a tourism industry. Specific research questions are:

- Does the whale watching tourism industry meet tourists' expectations and needs in terms of environmental and tour features?
- Are there specific areas of the experience that need to be addressed?
- Are whale watching tourists in the Azores overall satisfied?
- Which tour factors and demographic variables contribute to overall whale watching satisfaction?
- Based on the above information, how can the industries be managed more sustainably?

3. Methodology

3.1. Case study

The Azores archipelago is situated in the Atlantic Ocean about 1,500 kilometres from Lisbon and 3,900 kilometres from the east coast of North America and consists of nine islands with a total area of 2,333 km^2 of emerged land. The climate is humid with minor annual temperature variations. Situated in an isolated region of the North Atlantic, the Azores still possess pre-glacial flora of the European continent, namely the Laurel forest. This habitat is home to several endemic species, such as the Azores bullfinch (*Pyrrhula azorica*), an endangered species with a population of about 250 individuals, which is included in the IUCN Red List (Gil, 2005; Petit and Prudent, 2008).

The Azorean economy is primarily based on agriculture, especially milk production and fishing (Petit and Prudent, 2008). Tourism started growing in the mid-1990s and is becoming an important economic sector. Coastal recreational activities are major tourist attractions with some of the main activities being sailing, yachting, boat tour, cruise tourism, scuba diving, whale and dolphin watching, swimming with dolphins, sport fishing and hiking (Calado *et al.*, 2011).

Whale watching and as scuba diving are the main marine wildlife tourism activities, as the Azores offer good conditions for watching oceanic species close to the shoreline. The archipelago presents around 28 cetacean species, a considerable diversity of marine mammals (ICES, 2010). Whale watching is reported by 12.5% of tourists as the main motivation to visit the Azores (Serviço Regional de Estatística dos Açores, 2007) and is a quickly growing marine wildlife industry. According to Hoyt (2001) 9500 people went to see whales in the waters of the Azores in 2001. Twelve years later, in 2013, 59519 whale watchers were counted (Regional Directorate for Tourism, 2014). Whale watching takes place around the islands São Miguel, Terceira, Pico and Faial with 26 operators offering their services. Most whale watching operators also offer swimming with dolphins. In the present study the three islands Faial, Pico and São Miguel were selected as case studies. These islands comprise 98.09% of whale watchers in the Azores. In Pico and Faial islands numbers of tourists in general and also of whale watching clients are lower. There, most operators use rigid hull inflatable boats for twelve passengers. São Miguel island has more tourists as well as

whale watchers. There are also medium-sized cabin-boats with hard-bottom and open deck that can take up to 80 people.

Diving in the Azores has been described by various national and international diving magazines such as X-RAY Magazine, National Geographic, African Diver and Portugal Dive. Despite the fact that it has become a major tourist attraction in the Azores, there exists only limited data about the number of divers. The Regional Directorate for Air and Maritime Transport estimates around 4000 divers in the Azores in 2011. Nevertheless diving with blue sharks, an emerging subsector of the diving industry was calculated to involve approximately 7000 divers in 2011 (Bentz *et al.*, 2014; Regional Directorate for Air and Maritime Transport, 2013). Forty-five diving operators are registered on the Regional Tourism Portal (http://www.visitazores.com/pt-pt/experience-the-azores/scuba). Some of them offer also various other outdoor activities (whale watching, big game fishing or hiking). The islands São Miguel, Pico, Faial, Santa Maria and Graciosa were selected as case study islands. Pico, Faial, Santa Maria and São Miguel are the islands with the highest official numbers of divers in the region, comprising 88.80% of the divers. Santa Maria, Pico and Faial attract divers due to the possibility to see blue sharks and manta rays in some dive spots further away from the shores for more experienced divers. São Miguel and Graciosa are destinations which offer a variety of costal dive spots for all levels of experience.

The Azores are an emerging marine wildlife tourism destination but so far research has focused primarily on habits, social behavior and distribution of marine mammals (Oliveira da Cruz, 2008; Doksæter, 2008; Vieira & Brito, 2009), their conservation (Silva *et al.*, 2012), impacts of tourism on marine mammals (Visser *et al.*, 2011; Magalhães *et al.*, 2002; Neves-Graca, 2004) interactions with local communities and fisheries (Hernandez-Milian *et al.*, 2008; Silva *et al.*, 2011; Neves-Graça, 2004).

Little research emphasis has been placed on human dimensions of marine wildlife tourism. Qualitative research involving regional stakeholders to identify management gaps is still limited (Neves-Graça, 2004). Also quantitative research on wildlife tourism users' perception is limited in the Azores. Only few studies have addressed the whale watching experience itself (e.g. expectations and satisfaction) (Oliveira, 2005; Sequeira *et al,.* 2009) and studies on divers' perceptions are lacking.

In order to understand human dimensions of whale watching and diving as an input to developing more sustainable management of these activities, Duffus and Dearden's (1990) framework was applied to the case study Azores. Several adaptations were undertaken for the application to this case study. Due to limited data on marine wildlife experiences in the case study, a two-step methodology applied was. As a first step, local stakeholders and experts were interviewed to develop an understanding of main strengths, weaknesses and problems of the marine wildlife activities. As a second step a questionnaire survey was applied, exploring participants' perceptions regarding several aspects of the marine wildlife tour.

3.2. Qualitative analysis

Stakeholders and experts were interviewed to assess their perceptions on strengths, weaknesses and problems of whale watching and diving in the Azores. They were selected based on either their direct involvement in the activity, as an operator or representative from the regional government, or based on their expertise in the field of shark and cetacean ecology or marine wildlife tourism. A snowball technique was used to contact stakeholders from the following groups: diving and whale watching operators, regional Azorean government agencies, maritime police, fisheries associations, University of the Azores, and professional divers. At least one representative was interviewed for each group mentioned. Within the group of operators, representatives from four different islands (Pico, Faial, São Miguel, and Santa Maria Island) were interviewed. Twenty-five structured interviews were conducted during the summer of 2012 based on open-ended questions (Briggs, 1986). The interviews were constructed with formulated topics, using a written questionnaire as a guide. The topics covered the strengths, weaknesses, and problems or conflicts of the shark diving and whale watching activity in the Azores. To foster a comfortable, non-intimidating exchange between the interviewer and respondents, interviews were conducted in an informal, conversational manner (Kvale, 1996). Interviews were conducted orally, with some note taking, and responses were recorded immediately post-interview and later on grouped and summarized. Conducting semi-structured interviews is a direct method of obtaining community input during the data gathering phase. It is useful for investigating behaviors, opinions and emotions and for collecting a diversity of experiences (Valentine *et al*., 2010: 112). The choice of the experts and stakeholders interviewed was conditioned by the physical characteristics of the territory (islands) where traveling by airplane demands a high effort in terms of time and financial resources.

3.3. Quantitative analysis

Two self-administered questionnaires were applied as data collection instruments, consisting of twenty-two (for whale watching) and twenty-three (for diving) mainly closed-ended questions organized in five sections addressing motivations, user specialization, perceived impacts, satisfaction, and demographics. Questionnaires for whale watching tour participants were distributed on São Miguel, Pico and Faial from May to August 2013, the main whale watching season. Questionnaires for divers were distributed on São Miguel, Pico, Faial, Graciosa and Santa Maria from June to September 2013. Tourists were selected randomly as they returned from their tour. The researchers distributed the questionnaires and stayed nearby is case of questions and collected the completed questionnaires. In total 435 divers and 466 whale watchers responded to the questionnaires.

Motivations

Different motivations among wildlife users can be associated with specific behaviors, perceptions, and levels of skill and knowledge (Lucrezi *et al*., 2013). Users' motivations to participate in an

activity can give information on centrality of the activity in the user's life and also on its specialization.

In the present research the emphasis is on the *pull factors*, focusing on what attracts users to the case study. Previous research on motivations for marine wildlife tourism has shown the critical importance of biophysical setting conditions (Edney, 2012; Lucrezi *et al*., 2013; Orams, 2000; Shafer & Inglis, 2000). For divers, water clarity, underwater rock formations and the quality and diversity of fish communities have been shown to be important (Roman *et al*., 2007; Tschapka & Kern, 2013) as well as large iconic marine species such as sharks and manta rays (Anderson *et al*., 2011; Gallagher & Hammerschlag, 2011). For whale watchers it was shown to be important to encounter whales, be close to the animals, to see other wildlife, to socialize as well as to enjoy scenery and tranquility (Orams, 2000; Malcom, 2003; Mustika *et al*., 2013; Valentine *et al*., 2004). Other important factors in both activities include the interest in learning more about marine life and climate change, and the importance of operator commitment to the environment and these features were introduced into the survey instrument of the present study (Moscardo, 1998; Lück, 2003).

Specialization

In order to assess in which stage a destination or activity is residing according to Duffus and Dearden's (1990) framework, determining the specialization of the users is one possible indicator. Several studies suggest that increased specialization minimizes participant impacts, increases pro-environmental behavior and attitudes, correlates positively with environmental awareness, refines perceptions on environmental impacts, and is accompanied by growing support for management interventions (Dearden *et al*., 2007a; Leujak & Ormond, 2007; Malcom, 2003; Musa *et al*., 2011; Ong & Musa, 2012). In other studies, more specialized participants did not differ from less specialized ones in the way they interacted with the environment (Camp & Fraser, 2012; Di Franco *et al*., 2009), nor in their commitment to rules and codes of conduct (Anderson and Loomis, 2011) or in their support for management measures (Edney, 2012; Sorice *et al*., 2009).

In this research the method of a single-item self-classification measure of specialization is adopted. It reduces respondent's burden and constitutes an effective measure for categorizing wildlife tourists (Needham *et al.*, 2009; Sorice *et al*., 2009). Respondents could choose between four categories describing combinations of various dimensions of specialization taking into account the multidimensional nature of specialization, which is composed of a behavioral component, a cognitive component and an affective component. Four whale watcher types are presented: *new whale watcher, passionate new whale watcher, active whale watcher, committed whale watcher*, each including previous participation and experience (behavioral components), knowledge about whales and dolphins (cognitive dimension) and centrality in participants' lives (affective attachment and commitment).

Likewise, four diver types were proposed: *new diver, casual diver, active diver, committed diver*, which included previous participation, diving experience and the possessed equipment (behavioral

components), skill level and diving certificates (cognitive dimension) and centrality to lifestyle and enduring involvement (affective attachment and commitment).

Perceived crowding and socially acceptable conditions

The *limits of acceptable change* framework and user norms provide an integrated approach to assess the *minimum acceptable conditions* that indicate when conditions become unacceptable. Norms can provide a basis for defining indicators and standards of quality. *Perceived crowding* is an important criterion in assessing tourist satisfaction with the social setting features of a tourism destination and *limits of acceptable change* (Manning & Valliere, 2001; Dearden *et al*., 2007a; Lankford *et al*., 2008; Vaske & Shelby, 2008).

In this research *perceived crowding* is studied with the help of Jackson's (1965) *social norm curves*, which describe norms as evaluative standards using a graph to evaluate acceptance of impacts associated with user experiences. The tolerance for encounters with whale watching boats and with other divers at a dive spot as well as *perceived crowding* is explored, defining *minimum acceptable conditions* of encounters for satisfactory experiences for both activities. This assessment helps to define standards of quality for wildlife tourism and contributes to a more sustainable management of the activities.

Satisfaction

Satisfaction has become a primary measure of the quality of visitor's experience. In this research it was studied from two different angles. *Importance-performance analysis* was performed to assess satisfaction compared to expectations (Martilla & James, 1977). This approach has been used frequently to investigate satisfaction in recreation settings with some application to nature tourism settings (Coghlan, 2012; Tonge & Moore, 2007; Tonge *et al*., 2011, Ziegler *et al*., 2012).

Additionally, a *performance-only perspective* was applied to measure satisfaction without considering expectations. This technique has been recommended for measuring tourist satisfaction with the scenic qualities and environmental features (Kosak, 2001; Pearce, 2006). Clarity of the task for the respondent and higher reliability of results are considered advantages of this strategy. This approach permits exploration the relationships between various factors and overall satisfaction and its contribution to satisfaction.

The application of both models permits different perspectives on the concept of customer satisfaction as well as a critical analysis of both approaches.

4. Thesis structure

This thesis is organized into eight chapters and two appendices. The content of each of the chapters and appendices are outlined as follows:

Chapter 2 examines perceived strengths, weaknesses and conflicts associated with the whale watching activity by local stakeholders and experts. Semi-structured interviews were used to identify critical knowledge gaps and areas where management should focus on to support sustainability of the activity.

Chapter 3 examines perceived strengths, weaknesses and conflicts of diving with sharks by local stakeholders and experts. Semi-structured interviews were used to identify critical knowledge gaps and areas where management should focus on to support sustainability of the activity.

Chapter 4 examines the concept of specialization with respect to diving and whale watching. Geographical variation in specialization levels in several different islands is identified. Suggestions are made to improve management and ensure its long-term sustainability of the activities.

Chapter 5 examines different diver types based on motivational preferences. *principal component analysis* and *cluster analysis* were used to classify and identify user types. This chapter explores diver motivations in relationship to demographic variables and specialization. Suggestions are made to improve management and ensure its long-term sustainability of the activity.

Chapter 6 examines the concept of *perceived crowding* within diving and whale watching. Social norms were used to assess limit of socially acceptable numbers of divers and whale watching boats. Suggestions are made to improve management and ensure its long-term sustainability of the activity

Chapter 7 examines satisfaction among whale watching tour participants. Importance Performance Analysis was used to detect gaps between expectations and satisfaction. Performance-only perspective was applied and factors contributing to overall satisfaction were identified. Suggestions are made to improve management and ensure its long-term sustainability of the activity

Chapter 8 provides an overview of the major findings from the Chapters 2 through 7, as well as recommendations for the management of the industry and gaps in knowledge that should be addressed in future research.

Appendix I contains a copy of the questionnaire provided to whale watching tour participants on São Miguel, Pico and Faial.

Appendix II contains a copy of the questionnaire provided to dive tour participants on São Miguel, Santa Maria, Graciosa, Pico and Faial.

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Chapter 2

STRATEGIES FOR MARINE WILDLIFE TOURISM IN SMALL ISLANDS – THE CASE OF THE AZORES

Abstract

Small islands typically exhibit characteristics like isolation, smallness, limited natural and human resources, which limit their capacity to embrace development. Marine wildlife tourism can combine the apparently conflicting goals of development and conservation. It has a potential to provide significant benefits to local communities and ecosystems, when it is carefully managed. The Azorean islands have a great potential for marine wildlife tourism, given highly diverse marine ecosystems and various types of resident and migrating cetaceans. Several marine wildlife tourism activities are taking place though lacking effective management. Whale watching and other marine wildlife tourism activities such as scuba diving have an increasingly important role within the tourism sector, as the Azores offer good conditions for watching oceanic species close to the shoreline. Recently shark-watching demonstrated potential for a new marine wildlife tourism activity. Managing these new emerging activities is required. There is no island or regional-wide strategy for marine wildlife tourism in the Azores, assessing its potentials and impacts and making recommendations on how it can be developed in a sustainable manner. The goal of this project is to contribute to the sustainable development of small island economies through developing guidelines that will ensure marine wildlife tourism as a mechanism to conserve nature while supplementing local livelihoods. A specific objective is to develop a conceptual model of marine wildlife tourism for small islands that can be integrated in regional planning instruments and apply the model to a specific case study, in order to recommend the optimal development strategies and necessary management interventions for marine wildlife tourism development in the Azores. As a first approach, experts and stakeholders

of the whale watching industry were interviewed in order to develop an understanding about their interests and perceived problems of the activity in the Azores. The results showed various management gaps. The opinions of the interviewees differed especially upon the management of the activity and its current sustainability. It proved the necessity for further research to assess the effectiveness of management policies using an integrated approach that incorporates both social and biological aspects of this and other marine wildlife tourism industries. The authors suggest multidisciplinary, participatory approach for effective co-management, providing a holistic view of the problem and forming the basis for adaptive management and thus the long-term sustainability for the activity.

Key words: *marine wildlife tourism; whale watching; qualitative analysis; sustainable management*.

1. Introduction

Marine wildlife tourism experiences are relatively recent developments. Viewing whales in the wild, for example, originally dates back to the early 1950s, but only since the 1980s commercial whale watching together with other forms of non-consumptive wildlife-based marine tourism, such as scuba diving, started growing significantly (Hoyt, 2000). Wildlife tourism (marine) and ecotourism are often used as synonymous terms. Indeed many (marine) wildlife tourism activities could be described as ecotourism, in the sense that they share many of the defining principles, such as, being essentially nature-based, managed according to the principles of sustainable development, benefiting local communities and providing resources for conservation. However, many marine wildlife tourism operators do not adopt these principles (Garrod, 2008) raising the question of whether or not this industry is truly sustainable in the long-term. Sustainability within marine wildlife tourism can be defined as "tourism which is developed and maintained in an area in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well-being of other activities and processes" (Butler, 1993). It is important to ensure that tourism activities targeting marine wildlife are managed in a sustainable manner both from a social and biological perspective (Ziegler *et al*., 2012). Social impacts include influences on tourist satisfactions, through *perceived crowding*, for example while local communities may face a loss of social cohesion. Potential biological impacts of tourism activities include effects on the marine species themselves (e.g. changes in behaviour and/or health) and their habitat (e.g. key feeding and/or breeding areas).

Marine wildlife tourism activities in the Azores include scuba diving and whale watching. Whale watching has an increasingly important role within the Azorean tourism sector as the islands offer good conditions for watching various cetacean species close to the shoreline. (Magalhães *et al*., 2002; Ressurreição, 2011). This article explores the management processes of whale watching in the Azores. In addition to a literature review, semi-structured interviews with stakeholders and experts were conducted and analysed in order to detect management gaps.

1.1. Marine wildlife tourism in the Azores – the case of whale watching

The Azores archipelago is situated in the centre of the Atlantic Ocean about 1,500 kilometres from Lisbon and 3,900 kilometres from the east coast of North America. The archipelago consists of nine islands with a total area of 2,333 km^2 of emerged land (Fig. 2). It has a very humid oceanic climate with minor annual variations. Mount Pico, on the island of the same name, with 2,352 metres of altitude is the highest mountain in Portugal. The Azorean economy is primarily based on agriculture, especially milk production, which provides around 25% of the Portuguese milk. Fishing brings in revenues of about 26 million Euro for the region each year, with 10 thousand tonnes of fish extracted from an exclusive economic zone of about a million km2 (Petit & Prudent, 2008).
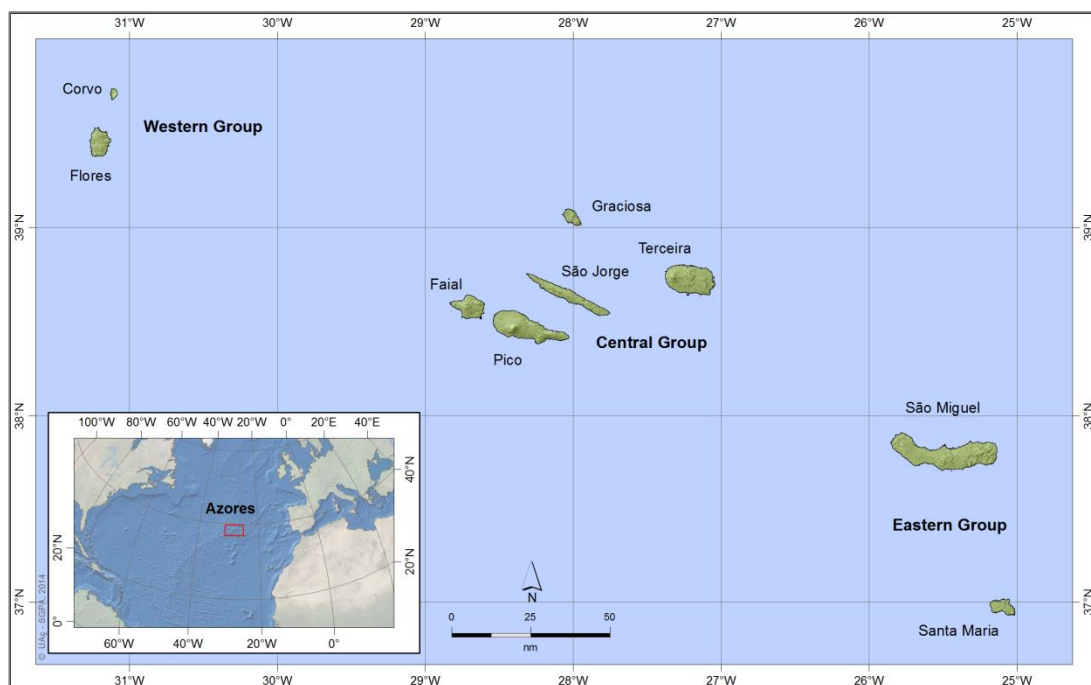
Figure 2. Azores geographic location (source: Centre of Geographic Information Systems, University of the Azores)

Tourism in the Azores only started growing in the mid 1990s. Coastal recreational activities are major tourist attraction, even if sandy beaches are not very common forms in the archipelago. Some of the main activities include sailing, yachting, boat tours, cruise tourism, scuba diving, whale watching, swimming with dolphins, sport fishing and hiking (Calado *et al.*, 2011). Whale watching and other marine wildlife activities are a growing tourism branch, as the Azores offer good conditions for watching oceanic species close to the shoreline. The Azores archipelago presents a great diversity of cetacean species, with seasonal frequency fluctuations. Twenty-five cetacean species can be observed in the Azores close to the shoreline. Resident populations of common

dolphins, bottlenose dolphins and sperm whales can be spotted all year long. Migratory species such as blue whales and sei whales can be spotted in certain seasons of the year.

This great variety of species, together with good conditions for observing the animals make the Azores a privileged area for whale watching in the summer months (Magalhães *et al.*, 2002). In 2010 the archipelago was rated as one of the top ten whale watching destinations by *The Telegraph*. (Regional Directorate for Tourism, 2012). The whale watching operators use a technique from the former Azorean whale hunting tradition to find the whales. Land based lookouts (Portuguese: "vigias") scan the sea with binoculars in search for cetaceans and provide information to the whale watching vessels. Via radio they communicate the approximate number of animals and location to the boat captains (Neves-Graça, 2004). As a result of this technique, the percentage of zero sightings in the Azores is low, ranging between 1% and 5% (Sequeira *et al.*, 2009). Whale watching takes place mainly around the islands São Miguel, Terceira, Pico, Faial and São Jorge. In the islands Flores and Corvo, transportation vessels offer whale watching trips on a irregular basis. Twenty-three operators have active whale watching permits to offer trips in these islands (Table 1) (Portal of the Regional Directorate of Tourism, 2012). On Faial island there are four whale watching operators in the city of Horta. The operators also provide other activities such as diving. On Pico island are five whale watching companies in the villages Madalena, Lajes and Santo Amaro. The first and oldest whale watching company, "Espaco Talassa", has been operating since 1989.

Table 1. Whale watching operators in the Azores and boats per island and zone

Zone	Island / Area	Number of operators	Number of boats	Limit of boats per zone
A	Faial	4		
	Pico	5	18	Max. 20
	São Jorge	0		
B	São Miguel	7	24	Max. 25
	Santa Maria	0		
C	Terceira	6		
	Graciosa	2	10	No limit
	Flores	0		
	Corvo	0		
Z	Exclusive Economic Zone outside the territorial sea		1	No limit

The other four whale watching operators offer diving as well as whale watching trips. On São Miguel island, whale watching is offered in Vila Franca do Campo and Ponta Delgada on the southern coast by seven operators. Some of them offer also diving tours, jeep safaris and hiking tours. On Terceira island, whale watching is offered in the cities Angra do Heroísmo and Praia da Vitória by 6 operators. The operators offer also boat trips and fishing. On Graciosa island there are two operators for whale watching and other maritime activities such as diving and fishing. Most operators in the Azores offer two trips per day, one in the morning one in the afternoon. An average whale watching trip lasts three hours and costs between 40 and 59 Euros. Most operators of whale

watching use long rigid hull inflatable boats for twelve passengers, and on São Miguel island and Faial there are also medium-sized cabin-boats with hard-bottom and open deck that can take up to 80 people. Most of the whale watching operators in the Azores also offer swimming with dolphins (Regional Directorate for Tourism, 2012; Sequeira *et al.*, 2009).

Permits for whale watching are provided by the Regional Directorate for Tourism. In zone A, which comprises the islands Faial, Pico and São Jorge, a maximum number of twenty-five vessels are permitted. Zone B, which includes the islands São Miguel and Santa Maria allows twenty vessels. Zone C, which includes the islands Terceira, Graciosa, Flores and Corvo and zone Z, which comprises the Azorean Exclusive Economic Zone outside the territorial sea (12 nautical miles) have no limit for whale watching permit numbers.

Whale watching in the Azores is regulated by a number of law decrees and rulings. The approach to cetaceans must follow rules, regarding minimum distances as well as the direction, speed and time spent near the animals. The distances vary with the situation but must not be less than 50 meters. The approach must be done from behind, leaving a free zone in front of the animals of at least 180 degree, by only one boat at time. Other boats may be in the vicinity, but not closer than 200 meters. Each boat can stay a maximum thirty minutes with the same animal or group. Aircraft are not allowed to fly under 300 meters above the cetaceans for observation. The minimum distance to whales with calves is 100 meters. No scuba diving is allowed with cetaceans, and snorkelling is allowed only with certain dolphins. Observation from submersibles, sub aquatic scooters, kayaks, boards, jet-skis and similar platforms is not permitted, nor is night viewing. Companies dedicated to whale watching must apply for a permit. Natural photographers and researchers can apply for a special permit if their work needs exceptions to the rules, such as for diving with cetaceans (Law Decree Number 9/99/A; Law Decree Number 10/2003/A; Ruling Number 5/2004).

Previous research on marine wildlife tourism in the Azores has focused primarily on habits, social behaviour and distribution of marine mammals (Oliveira da Cruz, 2008, Doksæter, 2008; Vieria & Brito, 2009), their conservation (Silva *et al.*, 2012) impacts of tourism on the animals (Magalhães *et al.*, 2002; Neves-Graça, 2004; Visser *et al.,* 2011,) and on interactions with local communities and fisheries (Neves-Graça, 2004; Hernandez-Milian *et al.,* 2008; Silva *et al.,* 2011). Little emphasis has been placed on the efficient management of the activities or the tourism experience itself (e.g. expectations, needs, satisfaction) (Oliveira, 2005; Sequeira *et al.* 2009; Silva *et al.*, 2012). There has been no attempt to assess the effectiveness of management policies using an integrated approach that incorporates both social and biological aspects of the industry. Yet such a multidisciplinary approach is essential for effective wildlife tourism management, as it provides a holistic view of the problem and forms the basis for adaptive management and thus the long-term sustainability of a given activity.

2. Methods

As a first approach, stakeholders and experts were interviewed in order to develop an understanding of their interests and their perceived problems of whale watching in the Azores. Nineteen semi-structured interviews were conducted during the summer season of 2012. Conducting semi-structured interviews is a direct method of obtaining community input during the data gathering phase (DENR *et al.*, 2001). It is useful for investigating behaviours, opinions and emotions and for collecting a diversity of experiences (Valentine *et al.*, 2010). From each of the five different stakeholder groups – whale watching operators, Regional Azorean Government, Maritime Police, fisheries associations, University of the Azores – at least one representative was interviewed. Within the group of operators, representatives from three different islands (Pico island, Faial island and São Miguel island) were interviewed. The choice of the experts and stakeholders interviewed was conditioned by the physical characteristics of the territory (islands) where traveling by airplane demands a high effort in terms of time and financial resources. The questions asked had three main axes: the strengths, the weaknesses and the problems or conflicts of the whale watching activity. During the interviews, notes were taken and after the interview, the answers were grouped and summarized.

3. Results

The interviews accentuated several main themes (Table 2). One examined the overall context for marine wildlife tourism in the Azores. Named as a strength was the fact, that the Azores are a nature tourism destination, described as exotic with pristine natural environments which allow many activities on land and sea. Weaknesses included that the Azores were not a well-known tourism destination that flights were costly and therefore there was no mass tourism. The tourism infrastructure was classified as weak. The strong seasonality was also seen as a weakness with reduced tourist numbers in the winter months, mainly because of frequent rain. The remoteness of the archipelago was considered a weakness. The economic crisis in continental Portugal was referred to as a problem as well as the perceived absence of a clearly defined tourism strategy for the Azores.

The "conditions for the activity" were seen entirely as strengths, namely the diversity and density of cetacean species, the existence of resident groups of dolphins and sperm whales as well as the migratory species (baleen whales) in the spring. The South coast of Pico was considered a hot spot for whales due to various reasons (nutrient richness, sea depth) with a very high certainty (ca. 98%) to see whales. This area is protected from north winds through the mountain of Pico, which makes it easier to detect whales.

Table 2. Grouped answers of stakeholders and experts

Strengths	Weaknesses	Conflicts
	1. Tourism context:	
Nature: Azores is a nature tourism destination. Pristine natural environments allow many activities on land and sea. Remoteness is exotic;	Remoteness: Azores is not a well-known tourism destination; Flights are costly; No mass tourism; Planning: Weak tourism infrastructure; Promotion of tourism is limited to Europe; Absence of a clear tourism course; Climate: Instability, rainy seasons; Reduced tourist numbers in winter.	Economic crisis in southern Europe (Portugal mainland, Spain) where many visitors in the Azores come from.
	2. Conditions for the activity:	
Observed species: 24 cetaceans in the region of 88 existing. Diversity and density of cetacean species; Resident groups of sperm whale and groups of bottlenose dolphins; Baleen whales in the spring; Hot spot: South coast of Pico.	Seasonality of the activity; Difficulty to hire skilled staff for short period of time.	Licenses: Cost of licenses; Limited cooperation between the operators.
	3. Activity performance:	
Vessels: Use of mostly small boats (12 passengers); small boats for a more adventurous tourist and catamaran (ca. 80 passengers), for generalist tourist.	Planning: Lack of infrastructure (Pico island); Lack of support for activity from the government; New passenger terminal; loss of uniqueness and simplicity (Pico island); Lack of WW association.	Swimming with dolphins: change of behaviour; safety of customers; Competition: First boat has observation priority: competition to arrive first; Conflicts between companies
	4. Techniques for the activity:	
Vigias: Use of "vigias" provides a high success rate and less gasoline is spent; Sometimes 6-7 species per tour; Many operators share the "vigias".	Vigias: Absence of network of "vigias"; Unequal sharing of "vigias".	Vigias: Conflicts between "vigias".
	5. Environmental Education:	
Attitudes change: Environmental education can change attitudes towards marine conservation; Staff: Biologists are good guides.	Quality between the environmental education varies between the operators.	
	6. Regulation and Management:	
Legislation: whale watching is well regulated. Existence of legislation that permits the government to control the activity and prevent unsustainable growth; Inspection: Operators follow the rules; New inspections on board.	Legislation was copied from another place; distances need to be adapted; Legislation the same for all cetaceans. Inspection: Whale watching operators do not like the inspection on board; Disrespectful behavior towards cetaceans by operators; Lack of inspection; Lack of resources of the maritime police for inspection;	Inspections on board by armed maritime policemen intimidate customers; Cooperation: Lack of whale watching association: conflicts between operators. It is difficult to get people to work co-operatively; Management: Government does not use its power to regulate/ manage the activity.

Table 2. *Cont.*

Strengths	Weaknesses	Conflicts
	7. Sustainability of the activity:	
Sustainability: Economic and social sustainability assured. WW in the Azores is a good example for the protection of species through tourism.	Environmental impacts: Ecological footprint of the activity; Number of licenses with potential to grow; Adaptation of the first law decree to bigger boats, more licenses; Sightings: Unpredictability; Viability: Agencies and commissioners keep a big share of the tickets.	Fishing: Fishermen see dolphins as responsible for reduced fish catches; Viability: Difficult to make business viable; Diving with whales for professionals: Increasing requests.

Another set of answers was grouped under the topic "activity performance". Positive was seen the use of mostly small boats (twelve passengers) for the whale watching activity, but also the existence of a bigger catamaran (for circa eighty passengers). This way the tourism product was diversified providing small boats for a more adventurous tourists and the catamaran, which was more directed to mass tourism. As a weakness was considered the lack of a whale watching association, lack of support for the operators by the Regional Government and the lack of infrastructure (harbour and gas station) on Pico islands.

Criticized also was the construction of a new, modern passenger terminal on Pico island leading to the loss of uniqueness and simplicity which tourists were seeking in this island. The practice of swimming with dolphins was considered a conflict because it may lead to behaviour changes of the animals. Additionally was mentioned, that the safety of customers could not be guaranteed. The overall conflicts between the operators were seen as a problem. As the first boat arriving at the animals has observation priority, operators compete to arrive first.

Answers relating to the "techniques" used to detect whales and dolphins were grouped as such. The use of land-based lookouts ("vigias") was considered a strength because it provided a high success rate, saved gasoline and permitted the observation of various species per tour (sometimes six to seven species). Positive was seen also that many operators shared the "vigias". Some operators also use hydrophones, allowing them to detect whales in foggy weather at four to five miles distance. As a weakness was considered the absence of a network of "vigias", where all operators would share the costs of the "vigias" and would profit in return from a higher surveillance area covered. Some operators mentioned, that for those "vigias", which were shared, cost and profit were not equally distributed.

Answers related to "environmental education" were entirely positive. The opportunity to create awareness for marine conservation through provision of information before, during and after a whale watching trip was appreciated as a main strength. Often biologists are in charge of this duty, which was considered a strength.

Regarding "regulation and management" of the activity, opinions differed significantly. On the one hand, whale watching management was characterized as well regulated and the operators who follow the rules as responsible. The existence of a legislation, that permitted the government to

control the activity and prevent unsustainable growth, was also seen as positive. New in 2012 should be inspections by the maritime police on the whale watching boats. This innovation was seen as positive. On the other hand, some operators were characterized as irresponsible and not following the rules. Disrespectful behaviour towards cetaceans by operators (distances and speed) was considered a weakness, as well as the lack of inspection. Another weakness was also, that the legislation had been copied from elsewhere and distances had not been adapted to the Azores. It was criticized, that the legislation was equal for all kinds of cetaceans (dolphins and whales) with respect to minimum distances. Whale watching operators were against the on board inspection by the maritime police because they carried a fire weapon. Because of the refusal of the operators this new measure was not implemented yet. Another weakness was the lack of resources of the maritime police to conduct the inspection on board. The inspections on board by armed maritime policemen were also seen as a conflict, because they might intimidate customers. Other conflicts included the absence of a whale watching association and the conflicts amongst operators making it difficult to bring different parties together to discuss and improve management strategies. Another perceived conflict was the lack of willingness of the Regional Government to use its power as provided through the legislation to regulate the activity.

4.   Discussion and Conclusion

The nineteen stakeholders and experts agreed upon some subjects but disagreed on others. They agreed on the positive conditions in the Azores for whale watching and on the positive effect of environmental education. However, they disagreed on a number of topics. The remoteness of the islands was seen as positive (exotic) by some and negative by others, who would prefer higher numbers of tourists and saw the remoteness as obstacle to achieving this. In the same way, the tourism infrastructure was classified as weak (namely the absence of swimming pools in many hotels) by some stakeholders, whereas others regretted the construction of a modern passenger terminal on Pico island, which would take away the uniqueness and simplicity that tourists would seek. These arguments reflect the discourse about island tourism amongst several scientists. Several authors have accentuated the constraints and weaknesses of small islands such as remoteness, isolation, smallness, making planning and management in small islands challenging in scientific and technical terms (Calado *et al.*, 2007). It is also argued that island economies are dependent on a small range of export goods and economic performance can be seriously disrupted by income and taste changes in major overseas markets as well as by actions of competitors (McElroy, 2000). Additionally, a large number of small islands are situated in the global "biodiversity hotspots", regions with very rich biodiversity. Having developed in an isolated and relatively protected manner, island ecosystems are especially vulnerable to changes in the environment, and especially to exotic species, against which they have no resistance (Petit & Prudent, 2008). Small islands are also considered vulnerable to the effects of climate change, sea-level rise and extreme events (Mimura *et al.*, 2007). However, small islands also have great potential in some fields (Scheyvens & Momsen, 2008).

For example the smallness and the isolation suggest that islands can offer exciting tourist products. Isolation is often considered a limiting factor for trading products, but for tourism, it can be a benefit because it makes the destination more attractive and exotic. Butler (1993: 71) referred to it as the 'Robinson Crusoe factor', meaning that tropical islands embody the holiday aspirations of Western consumers, as they are associated with romance and adventure. In fact, islands are among the most visited tourist destinations in the world and the demand is growing (World Tourism Organization, 2001). These arguments indicate the need to agree upon a region wide tourism strategy in the Azores, as mentioned by one stakeholder.

Another topic of disagreement was about the performance of whale watching, its management and ultimately its sustainability. Stakeholders disagreed about whether operators follow the rules about minimum distances, speed and maximum observation period or not. Inspections on board by the maritime police are an attempt to solve this problem, but the implementation has been met with a refusal of the operators and a lack of financial resources of the maritime police. A perceived problem was also the lack of a whale watching association, due to the conflicts between the operators. To solve problems and to improve whale watching management was seen as a difficult task because of the unwillingness of the operators to work together. Regarding the sustainability of the activity opinions differed, too. For some the activity was no longer sustainable and management needs to be adjusted. More research is required to assess the effectiveness of management policies using an integrated approach that incorporates both social and biological aspects of the industry.

Acknowledgments

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Chapter 3

SHARK DIVING IN THE AZORES: CHALLENGE AND OPPORTUNITY

Abstract

Many shark species are highly endangered. The main cause of mortality is fishing. Shark tourism is growing worldwide and has the potential to provide incentive-based conservation for some shark species but fishing remains a major challenge. In the Azores, sharks are still relatively abundant and a shark tourism industry has developed over the last few years. This article reports on the current status of shark diving, conflicts with fishing, dive industry management, and the potential future sustainability of shark diving in the Azores. Interviews with industry stakeholders show a rapidly emerging conflict with fisheries that threatens the future sustainability of the shark-diving industry. To facilitate the sustainable development of shark watching, partnerships among operators, local fishers, and the government are essential.

Key words: *Shark diving; sustainable management; fishing; marine wildlife tourism; ecotourism; conflicts.*

1. Introduction

Large and charismatic species such as whales, big cats, and sharks draw significant attention from tourists (Gallagher & Hammerschlag, 2011). Diving and snorkeling with sharks is a growing market within wildlife tourism (Camhi *et al*., 2009; Catlin & Jones, 2010; Dearden *et al*., 2008; Morgan, 2010). To some extent this growth can be attributed to the change of attitudes towards sharks. From "humans need protection from sharks" in the early 1970s, attitudes shifted to "not all sharks

are dangerous" (mid-1970s until mid-1980s) and "how to feed, photograph, and swim with sharks" (mid-1980s until beginning of 1990s) to "sharks need protection from humans" (early 1990s until now) when divers started to help protect sharks (Dearden *et al*., 2008). With this shift in attitudes, the popularity of shark watching has grown to be a tourist activity with estimated 500,000–590,000 people paying to dive with sharks in the wild every year (Cisneros-Montemayor *et al*., 2012; Topelko & Dearden, 2005). Gallagher and Hammerschlag (2011) identified 376 shark ecotour operations across 83 locations and 8 geographic regions. The growing shark-watching industry is of special interest to conservationists because sharks are facing high pressure from fisheries, particularly due to the value of their fins (Magnussen *et al*., 2007). "Globally, 32% percent of all pelagic sharks and rays are threatened (6% endangered and 26% vulnerable). A further 24% are considered to be close to meeting the criteria for a threatened category, being assessed as near threatened, 19% are assessed as least concern, and 25% are considered data deficient" (Camhi *et al*., 2009). Recently the plenary of the *Convention in International Trade in endangered Species of Wild Fauna and Flora* (CITES) accepted recommendations to list five species of highly traded sharks under the CITES Appendices, which represents an important step to reduce international trade in sharks and rays (CITES, 2013). The economic value of shark watching has provided an incentive to protect sharks and their habitats in several countries, including the Maldives, Bahamas, Palau, the Philippines, and the US (Gallagher & Hammerschlag, 2011; Topelko & Dearden, 2005).

Marine wildlife tourism, such as shark diving, is characterized as "any tourist activity with the primary purpose of watching, studying or enjoying marine wildlife" (Masters, 1998) and is a potential tool for conservation due to its ability to raise awareness, educate tourists and enhance local economic benefits (Cater & Cater, 2008; Dearden *et al*., 2007; Duffus & Dearden, 1993; Wilson & Tisdell, 2003; Zeppel & Muloin, 2008;). Sustainability in the context of marine wildlife tourism is "tourism which is developed and maintained in an area in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well-being of other activities and processes" (Butler, 1993, p. 29). Sustainable management of shark watching avoids long-term negative environmental and social impacts. Potential environmental impacts include injury, stress, disruption of feeding patterns and mating behaviors, and changes to migratory pathways of sharks (Martin, 2007; Mau, 2008; Quiros, 2006), and also indirect impacts such as pollution, tour boat anchoring, and trampling on corals (Dearden *et al*., 2007; Orams, 1999; Roman, *et al.*, 2007). Social impacts include influences on tourist satisfaction and local communities. *Perceived crowding*, through high number of boats or divers, has a direct impact on the quality of visitor experience. Impacts on local communities include, for example, the loss of social cohesion (Bell, 2010; Ziegler *et al.*, 2012).

The Azores archipelago, situated on the mid- Atlantic ridge, consists of nine small islands (Fig. 3). The Islands' economy is primarily based on agriculture and fishing (Petit and Prudent, 2008). The tourism industry started growing in the mid-1990s. Coastal recreational activities are a major tourist attraction. Main activities include sailing, boat tour, cruise tourism, hiking, whale and dolphin watching, sport fishing, and scuba diving (Calado *et al*., 2011). Activities such as scuba diving and

whale watching play an important role within the tourism sector, as the Azores offer good conditions for watching oceanic species close to the shoreline (Magalhães *et al*., 2002) and recently shark diving has started to grow rapidly. However, the lack of proper management of shark fishing within the area, and of shark diving itself, raises questions about the long-term sustainability of the activity. This article assesses the current status of shark diving, threats to sustainability, current management, and future management needs of shark diving in the Azores. Local stakeholders were interviewed to assess diving with sharks from various perspectives and to suggest management interventions to promote sustainable shark diving tourism in the Azores.
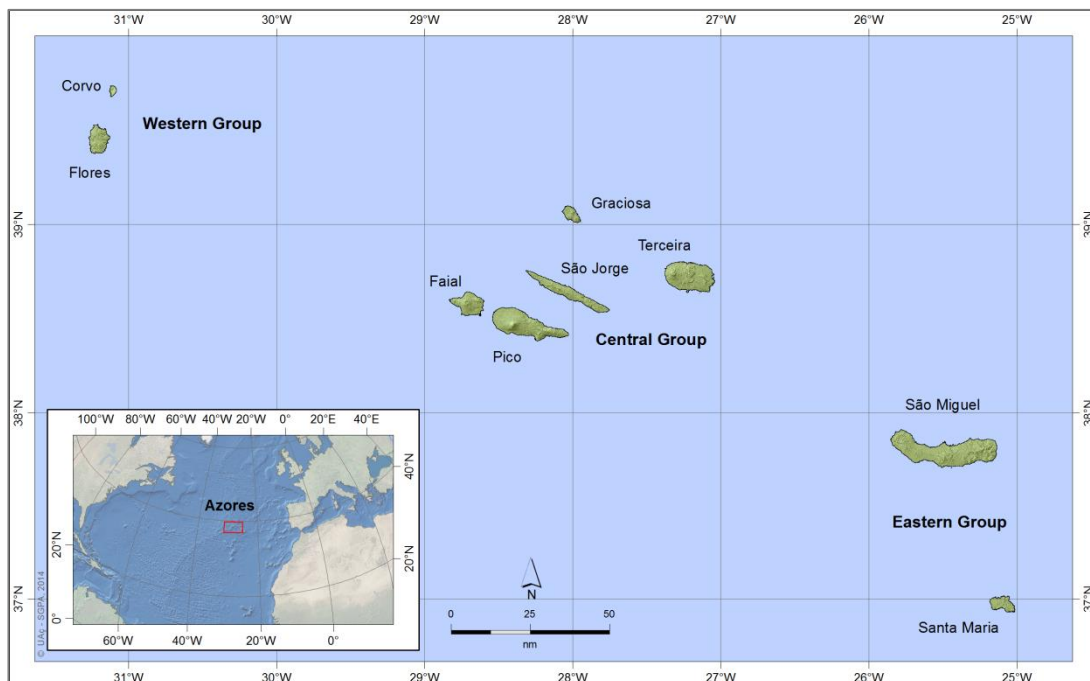
Figure 3. Azores geographic location (source: Centre of Geographic Information Systems, University of the Azores)

2. Shark Diving in the Azores

Shark diving is a relatively new marine wildlife tourism activity in the Azores. According to local diving operators, the shark species that have demonstrated the highest observation potential in the archipelago are blue sharks (*Prionace glauca*), followed by shortfin mako (*Isurus oxyrinchus*), and occasionally whale sharks (*Rhincodon typus*). Diving with blue sharks has become a tourist attraction in the islands Pico, Faial, and Santa Maria. Whale sharks have recently started to provide snorkeling opportunities near the island of Santa Maria (Calado *et al*., 2011).

2.1. Snorkeling with whale sharks

Whale sharks are being increasingly seen around the Azores, especially around the island of Santa Maria. Santa Maria is the most southern Azorean island with the warmest water temperatures. Three diving operators have now started to offer whale shark watching to tourists. To observe whale sharks, the operators cooperate with the local fishers, who inform them when they see a whale shark. According to the staff of the dive centers, whale sharks are often accompanied by schools of tuna fish (*Thunnus albacares*) because supposedly tuna can take advantage of the sharks' shadows (Reis, 2009; Sa, 2008). The fishers inform the divers when they spot a whale shark, because they profit from the presence of snorkelers. The whale sharks, curious animals by nature, seem to be intrigued by the snorkelers and therefore often stay on the surface, which allows the fishers to separate the tuna from the shark and catch them before they follow the whale shark to deeper waters (Sa, 2008). One reason why whale sharks have been spotted more frequently in recent years might be the increasing water temperature (Calado *et al*., 2011). However, the number of whale sharks seen varies greatly from year to year and, as such, the species is not a reliable focal species for marine wildlife tourism.

2.2. Diving with blue sharks

Diving with blue and shortfin mako sharks is a fast growing industry in the Azores. According to the Azorean dive operators, the opportunity to see blue sharks has brought increasing numbers of tourists to the Azores. The waters around the islands are the only reliable place in Europe to see these animals in their natural habitat. Since 2011, the activity has demonstrated strong growth and there are now eight operators in the Azores. Operators, especially on Pico and Faial Islands, stated that from July to August they had more requests for shark diving than they could provide exceeding the number of whale-watching tourists, a long-established marine wildlife tourism activity in the Azores. In 2011, the operators estimated that 7,000 people dove with blue sharks, contributing directly about 1.5 million Euro to the local economy. For 2013 they expected twice as much blue shark divers. Each shark dive costs around 165 Euro, which makes this activity a profitable marine wildlife tourism activity for the Azorean operators. The blue shark is mainly observed around the marine protected area "Formigas" and a seamount named "70 Bank," both around 24 nautical miles northeast of Santa Maria. Other popular locations include "Condor Seamount," a temporary fishing closure area, which is located about 20 nautical miles southwest of Faial as well as on the "Azores Bank," a seamount about 22 nautical miles southwest of Pico Island. To lure the sharks, operators use chum buckets, perforated plastic buckets that contain a mixture of blood, tuna, and cut sardines, which are towed across the water to attract the sharks. Mostly, divers do not directly interact with the sharks but hold on to weighted lines to avoid being carried away by the currents.

2.3. Management

2.3.1. Managing shark fisheries

There are many ways in which fisheries, including shark fisheries, can be managed. However, in the Atlantic Ocean shark fishing is virtually unregulated. Catch limits are rare on the national level and virtually nonexistent at the international level. The blue shark is considered "near threatened" by the *Shark Specialist Group* of the *International Union for Conservation of Nature* (Camhi *et al*., 2009) and several authors report significant declines of this shark in the Atlantic Ocean (Aires-da-Silva *et al.*, 2008a; Baum *et al*., 2003, Camhi *et al*., 2009). Although the blue shark is globally distributed in the pelagic zone, it is also the shark taken in the greatest numbers as by-catch or target species in pelagic fisheries (Camhi *et al*., 2009). The *Food and Agricultural Organization* (FAO) of the *United Nations* (2009) reported that in 2007 there were 35.706 tonnes of blue shark caught in the Atlantic Ocean, making this species by far the most caught elasmobranch species in that ocean basin. Seventy-nine percent of the total biomass of blue shark caught worldwide is from the Atlantic Ocean, with Spain and Portugal being the main countries involved (FAO, 2009).The total volume of Portuguese fish catches is decreasing, yet the biomass of shark catches is increasing (FAO, 2009). Increasing demand for shark meat is also affecting shark retention rates. This shift towards full resource utilization has been observed in the Spanish and Portuguese longline fisheries targeting swordfish (Aires-da-Silva *et al*., 2008b). The market for fins, combined with an increasing market for shark meat, has created an incentive to retain caught sharks that were previously being released alive. (Herndon *et al.*, 2010; Pham *et al*., 2013). Shark catches in the Azores have multiplied recently (Table 3). In 2010 there were 16.17 tonnes of blue shark were landed in Azorean harbors, by 2012 this had risen to 292.30 tonnes despite the low price of EUR 0.63/kg (Lotaçor, 2013). In pelagic longline fisheries, shark by-catch can make up more than a quarter of the total catch (Abercrombie *et al.*, 2005). High levels of shark by-catch have been recorded in the Azores in pelagic longline fisheries that target swordfish (*Xiphias gladius*). Estimates suggest that the actual amount of blue sharks caught is 18–40 times higher than the amount reported in the local statistics (Pham *et al*., 2013). Managing shark fishing on a regional Azorean level is limited through the European amendments of Western Waters Regulation (EC 1954/2003), which reduce national fishing management rights on the current 200-nautical mile exclusive economic zone around the Azores to either 50 or 100 nautical miles, respectively, and open the waters between 50 or 100 and 200 nautical miles to the European demersal and deep-sea fishing fleet without any preconditions (European Union, 2003).

Table 3.Shark landings and price per kg in the Azores

	2010	2011	2012
Shark landings (tonnes)	16.17	129.77	292.30
Price per kg (EUR)	0.26	0.29	0.63
Total value (EUR)	**4204.20**	**37633.30**	**184149**

Source: Lotacor, 2013

A small group of activists has started an initiative to protect sharks in the Azorean exclusive economic zone. In an online petition (Link: http://www.peticaopublica.com/PeticaoVer. aspx?pi=sharkaz) the signers promote the ban of shark fishing in the Azorean exclusive economic zone and the ban of shark and ray landings throughout Azorean harbors. They further propose that the longline fishery targeting swordfish should be prohibited between October and May, when the by-catch rate of shark species exceeds the swordfish landings.

2.3.2.   Managing shark diving

In 2012 the regional government of the Azores published a voluntary code of conduct for diving with sharks and rays, which was developed between two regional secretaries (Tourism and Ocean), four operators, and the University of the Azores. The code is available on the online portal of the Regional   Government (http://servicos.srrn.azores.gov.pt/doit/servicos.asp?id_dep=10andid_form=93).   The   code   of conduct is divided into five sections: activity preparation, human safety, wellbeing of the animal, attitude, and miscellaneous concerns. The section on activity preparation provides recommendation regarding the necessary expertise of the dive masters and the responsibility of the operators to evaluate the experience and preparedness of the clients for shark diving. The number of divers should be limited to four plus one dive master at one time. The code forbids feeding and touching sharks, and defines the type of chumming allowed to lure sharks and the minimum approach distance to a shark. Strategies to maintain a shark's interest towards the divers are allowed. Recommendations on the equipment of the divers, the dive master, and the boat are presented. Flash photography is not permitted. Shark diving is only allowed during daytime. Between boats a distance of 100 m shall be kept, except if other arrangements are made between operators. Clients could hurt the sharks. Noises should be avoided. If the animals demonstrate signs of disturbance, the divers should leave the water. Dives with animals displaying reproductive activity are not permitted. The attitude of the operators towards the activity, the clients, and the animals should be respectful. Neither smoking nor the consumption of alcohol is permitted on board the boat. Discharging any type of waste into the ocean is prohibited. The final section of the regulations provides for inspection of the activity by the government. Operators also agree to collect data regarding the dive site, observed species, number of animals, sex, behavior, and size of the animals and undertake photo identification, when possible. The data are collected online by the regional government, and can be accessed by the operators, the University of the Azores, as well as other renowned scientific institutions. The operators also agree to prepare an annual report on the number of dives, clients, animals observed, weaknesses of the activity, and proposals for improvement (http://servicos.srrn.azores.gov.pt/doit/servicos.asp?id_dep=10andid_form=93).

3.   Methods

Shark diving stakeholders were interviewed to develop an understanding of their interests and perceived problems facing shark diving in the Azores. Stakeholders were selected based on either

their direct involvement in the activity, as an operator or representative from the regional government, or based on their expertise in the field of shark ecology or marine wildlife tourism. A snowball technique was used to contact stakeholders from the following groups: diving operators, regional Azorean government agencies, maritime police, fisheries associations, University of the Azores, and professional divers. At least one representative was interviewed for each group mentioned. Within the group of operators, representatives from four different islands (Pico, Faial, São Miguel, and Santa Maria island) were interviewed. Twenty structured interviews were conducted during the summer of 2012 based on a series of open ended questions (Briggs, 1986). The interviews were constructed with formulated topics, using a written questionnaire as a guide. The topics covered the strengths, weaknesses, and problems or conflicts of have to sign an acknowledgement of responsibility prior to the dive. For the sake of the animals' well-being divers should not carry any instruments that potentially the shark diving activity in the Azores. To foster a comfortable, non-intimidating exchange between the interview team and respondents, interviews were conducted in an informal, conversational manner (Kvale, 1996). Interviews were conducted orally, with some note taking, and responses were recorded immediately post interview and later on grouped and summarized (Table 4).

4.   Results and Discussion

4.1. Conditions for shark diving in the Azores

Stakeholders considered it a strength that the Azores are probably the best place in Europe to see blue sharks in their natural habitat. Human safety was not seen with concern, as blue sharks are considered a non-harmful shark species (Ritter, 2012). Despite this, divers have to sign an acknowledgement of responsibility before the dive (Table 4). The potential for shark diving is very strong in places such as the *Azores Bank* and *Condor Seamount*, southwest of the island of Faial. Condor is closed to certain types of fishing because of an ongoing research project. The probability of seeing blue sharks (and occasionally shortfin mako sharks) is very high. Conflicts with other activities are less frequent than elsewhere because it is closed for other activities. However, the designation is voluntary and temporary. Shark diving will strengthen the prolongation of the temporary status with potential classification as a formal marine protected area in the future. Shark diving often attracts more highly specialized divers who are often the most desirable clientele for both conservation and economic purposes (see Dearden *et al.*, 2006). However, they also offer a smaller market than the mass dive market, something that was seen as a potential weakness by some stakeholders. Other possible weaknesses included the relative inexperience of the dive masters due to the newness of the activity. To overcome this initial unpreparedness, in 2010 a workshop was organized by one of the operators and lead by one of the authors (E.R.) to teach the respective dive guides proper procedure, safety, and rescue techniques, as well as the basics in shark–human interaction. Several stakeholders felt that the future of shark diving was at risk due to increasing shark fishing. With the "Western Water Agreement," the Azorean government lost part of the fisheries management rights over its exclusive economic zone, allowing European fleets to

fish in its maritime space. This had led to a large increase in shark catch. The absence of a moratorium for the protection of sharks in the Azores was considered a problem. High by-catch rates of sharks and targeted catch are a severe problem due to the late sexual maturity and low reproductive capacity of blue sharks. Blue sharks reach sexual maturity relatively early (5–6 years), and have up to 100 pups, whereas most other species do not carry more than 10–12 pups (Compagno, 1984). However, prohibition of shark fishing in the Azores also had some strong opponents among the interviewees, who felt that it would hinder the swordfish fishery.

4.2. Shark diving activities

There was also disagreement among interviewees regarding some of the practices used in shark diving. For some, chumming was rated as positive, a feasible technique with reliable results. For others it was seen as a problem, because it could attract sharks closer to the shoreline with possible detrimental effects on bathers and coastal habitats. However, considering the distance between the seamounts where most dives occur and the shoreline this fear does not appear to be realistic. Some interviewees also mentioned that sharks could start to associate food with divers and become more aggressive; however, there is no evidence in the literature of this ever occurring (Ritter, 2012). Similarly, some interviewees felt that chumming might attract more aggressive species of sharks to the area, such as great white sharks (*Carcharodon carcharias*), requiring increased dive infrastructure, such as dive cages. Again this seems highly unlikely. Some of the interviewed stakeholders feared that an attack could potentially affect the whole Azorean tourism industry and consequently the question of responsibility would arise. However, Neff and Yang (2013) suggest that, against common expectations, shark bites do not always produce negative emotional responses toward sharks or governments, and attitudes toward sharks may be independent of the occurrence of shark bite incidents. Raising awareness of the inherent risks was considered an important part of the educational experience, particularly where more accident-prone species are involved (Neff & Yang, 2013). According to the Internet portal Shark Attack (2013), the number of registered shark attacks that occurred during a shark dive is very low. Some 116 attacks have occurred during regular scuba diving, dating back to 1955, but only three attacks have occurred during a shark dive. No blue shark has ever been involved in a shark diving-related incident (Shark Research Institute, 2013). These facts suggest that diving with blue sharks does not represent a threat to human safety. However, there is still limited research on recreational diving with blue sharks. The practice of chumming is also a controversial subject. Generally there exist concerns about changes in behavior and that sharks will come to associate humans and boats with food (Dobson, 2008). South Australia, for example, restricted the number of days per year when white sharks can be lured with food as a direct response to a recent study on the effects of this practice (Bruce & Bradford, 2011). However, the way of attracting sharks in the Azores limits the association between chum and divers because no shark is actually fed. Furthermore, the conditioning of sharks and a related increase in unpredictability of a shark's behavior has never been established (Ritter, 2012).

Table 4. Interview summary on shark diving in the Azores

Strengths	Weaknesses	Conflicts
Conditions for the shark diving activity:		
Certainty: very high certainty at *Condor Seamount* and *Azores Bank* (Pico and Faial island). Observed species: blue shark, shortfin mako shark. Type of divers: highly specialized, come on purpose to dive with sharks. Uniqueness: Azores is the only place where you can dive with sharks in Europe; Presence of whale sharks (mainly Santa Maria);	Type of divers: Not every diver can go, only more experienced. Protection of sharks: depends on the EU. Western Water Agreement allows European community fleet to fish within the Azorean exclusive economic zone. Fishing: Long-line fisheries are targeted to shark species for fins and meat. Infrastructure: Lack of infrastructure for dive operators on Pico island: harbor. Expertise: Inexperienced dive masters, new activity;	Protection of sharks: Absence of moratorium or sanctuary for the protection of sharks. Fishing: To prohibit shark fishing would handicap swordfish fisheries, an important traditional activity. Competition in tourism sector: Loss of whale watching clients. Human safety: a potential attack could affect the whole tourism industry; question of responsibility no solved
Techniques of the activity:		
Chumming: Reliable technique.	Chumming: effects unknown	Chumming: sharks may start to associate food with divers and become more aggressive. Safety: Divers should dive in a cage. More aggressive sharks can appear. Sharks are attracted closer to the shoreline with effects in coastal ecosystems and safety risk for bathers
Environmental awareness:		
Image change: sharks are no longer seen as bad species. Promotion of shark protection: Initiative for protection of sharks in the Azores. Promotion of protected area: shark diving promotes protection of Condor Seamount in the future	Expertise: Politicians do not see a problem in the large by-catch of shark species and in directed shark fishing Limited data: Economic dimension of shark diving is not known yet	
Regulation and Management:		
Code of conduct: elaborated in collaboration with university and operators and in the line with international experiences	Protection: Absence of shark sanctuary Fishing: Management of shark fishing in the hands of European Union	Legislation: Elaboration of a law decree for diving with sharks. Fishing: blue shark unavoidable by-catch species of swordfish. Limited data: Absence of detailed data about fish catches of shark species
Sustainability of the activity:		
Economic viability: Diving with sharks and rays is the most rentable activity of some companies; 2012 very high demand Cooperation with fishers: whale sharks swim with tuna schools; tuna fishers inform diving centers.	Instability: Snorkeling with whale sharks is offered with caution, instable activity (Santa Maria)	Sightings: Decline of blue shark in Santa Maria. Less sharks per dive. Activity at risk. Finning. Fishing: Small-scale Azorean fisheries are not a threat for sharks but the industrial fishing industry, which targets shark species (Portuguese continental fleet, Spanish fleet).

4.3. Environmental awareness

Increased environmental awareness is one possible benefit to shark diving (Topelko & Dearden, 2005) and respondents felt sharks had benefited from an improved image associated with shark diving. Shark diving has promoted the protection of sharks in the past within the waters surrounding the Azores, such as the voluntary fisheries closure around *Condor Seamount*. However, given the scale of the European shark fish catches in the Azorean waters, this may make only a very modest contribution to shark conservation. Additionally, the economic dimension of diving with sharks has yet to be established because dive operators only recently agreed on registering client numbers.

4.4. Regulation and management

Comments about regulation and management varied significantly among the stakeholders. All agreed that the development of the "code of conduct" for shark diving is a positive step to regulate the activity. However, the absence of a shark sanctuary was considered a weakness as was the fact that its effectiveness would depend on fisheries' directives from the European Union. In terms of industry sustainability, the high demand for shark diving since 2011 was noted, making the activity the most popular for some operators, even exceeding whale watching, which had been established much longer. The cooperation between Santa Maria island operators and fishers, who informed the dive centers when they saw a whale shark, was also seen as a sound partnership for the future.

4.5. Sustainability of the activity

The steep decline of blue shark sightings in Santa Maria (from 100% certainty of seeing to 20% within a time period of 2 years), attributed to increased shark fishing activity, has put the activity at risk on this island. There is a very real possibility that these declines will continue throughout the Azores if the shark fishery is not regulated. The Azorean small-scale fishery was not considered a threat for the sharks but the industrial fishing of sharks. Without management interventions for the fishery, shark diving faces a very uncertain future in the Azores.

5.   Conclusion and Recommendations

The Azores is an emerging marine wildlife tourism destination with globally significant viewing opportunities (Calado *et al.*, 2011). Shark diving is an important component of this industry and is attracting increasing numbers of tourists. However, future sustainability faces major challenges, as commonly happens in unmanaged wildlife tourism (Duffus & Dearden, 1990). Appropriate management frameworks are essential for the sustainable development of the shark diving industry and to facilitate a quality experience while minimizing impacts on animals (Topelko & Dearden, 2005). Lessons can be learned from other destinations, such as Australia, which has long experience in shark-based ecotourism. Designing appropriate legal frameworks is a fundamental first step (Techera & Klein, 2013). Legislation can provide necessary controls on the number, qualifications,

and practices of shark dive tourism operators. A system of two licenses proved to be a viable tool in Australia. In Western Australia, tour operators are required to hold one license, which applies to all commercial tour operators and another granting permission to attract sharks. This licensing scheme is aimed at enabling sustainable development of the industry while preventing risks to sharks and avoiding impacts on reserve values. In West Australia, fees collected from licenses at Ningaloo Reef are used to contribute to the costs of implementing the whale shark interaction management program (Techera & Klein, 2013). In Australia, the combination of legally enforceable license conditions and nonbinding codes of conduct has proved to be an appropriate regulatory mix for shark-based ecotourism.

In the Azores a dual license system exists for whale watching, and application to shark diving would constitute an important management tool towards sustainable development of the activity. The development of the code of conduct for shark diving in the Azores was an important first step. Compliance and enforcement depend largely on the licensees themselves. Self-enforcement through industry-based codes of conduct can be achieved in light of the shared interest in maintaining economically viable businesses as well as respect for the animals concerned (Techera & Klein, 2013). In the Azores the code of conduct for shark diving is applicable for all shark species encountered. Elsewhere, codes of conduct are developed for a certain shark species, as human behavior needs to respect and understand certain species-specific characteristics. A species-specific management approach for blue sharks and shortfin mako sharks and another for whale sharks should be considered in the Azores.

Surveillance of the compliance to codes of conduct and legislation was a frequently mentioned problem in the Azores. In Western Australia, government monitoring occurs primarily through vessel patrols by wildlife officers, and covert operations involving undercover officers on tour boats and aerial surveillance (Techera & Klein, 2013). In the Azores, similar measurements are planned for the compliance of whale-watching rules and could be applied to shark diving. Additional elements to minimize negative environmental impacts of diving include, for example, speed limits for motorboats (Thurstan *et al.*, 2012). One strategy for monitoring the effects of non-consumptive activities is the *limits of acceptable change* framework. This framework defines acceptable environmental conditions for sites based upon measurable standards (Diedrich *et al.*, 2011; Roman *et al.,* 2007; Stankey *et al.*, 1984).

Marine wildlife tourism is closely connected to other activities occurring in the sea, such as fisheries. The conflict between the new non consumptive uses and the traditional consumptive uses are clearly identified in the results of this study. In Santa Maria shark sightings have decreased to such an extent that the activity itself is at risk. This decline in the resource base for the industry together with the extreme seasonality of the activity and the uncontrolled increase of marine tourism licenses has led to low economic returns. Management interventions are necessary to improve the future viability of the activity in Santa Maria as well as in Pico and Faial Islands. The demand for shark diving led to a public petition prohibiting the commercialization of shark products in the Azores. This development reflects a global trend, replacing consumptive uses of sharks with non-consumptive recreational activities, promoting their conservation, and promoting public awareness,

as well as creating alternative livelihoods for local fishers (Techera & Klein, 2013). Representatives of the local fishing industry disagree with the petition and a major conflict is developing between fishing and diving centers on marine protected areas and the protection of sharks.

Local fishers are against the establishment of more protected areas whereas divers want more and better managed marine protected areas. Diving centers promote the establishment of managed marine protected areas because fishing activities are limited or prohibited and rarely are there management interventions for non-consumptive activities such as diving (Thurstan *et al*., 2012). There has been little engagement of stakeholder groups, especially fishers, in the establishment of the managed marine protected areas in the Azores. This is a generic problem relating to the lack of information and involvement of the general public and certain stakeholder groups about marine related issues in the Azores (Ressurreição *et al*., 2012). The weak engagement of the fishing communities in planning and management of marine-related issues is perceived as a lack of respect for a long-lasting tradition in Azorean history. Although the Azores' exclusive economic zone is about 1 million km2, the average depth is around 3,000 m and only about 7% of this area is less than 1,500 m deep. Hence, potential fishing grounds are limited and restricted to the narrow belt of shallow water around the islands and to banks and seamounts (Carvalho *et al*., 2011).

Aggravating the small area available for fishing is the replacement of the former artisanal Azorean fisheries by commercial fishing and many fishing areas are intensively fished and the stocks overexploited (Menezes *et al*., 2006; Pinho, 2003). More than 90% of the Azorean fleet is comprised of vessels less than 12m long competing with the large-scale fisheries for limited fish resources (Carvalho *et al*., 2011). The reduced economic significance of small-scale fisheries has led to them being overlooked in the policy arena. Nevertheless, small-scale fisheries have the potential to be a profitable activity for many coastal communities, producing high-value products using environmentally friendly methods and preserving both the resource and the way of life of communities (Carvalho *et al.*, 2011). At the temporary fishing closure area *Condor Seamount*, the involvement of small-scale fisheries in the management has worked well, and is considered a good example of cooperation between the university, the local fishers, the diving operators, and the government. There, the protection status facilitated shark diving and the activity strengthened the continuation of the *Condor Seamount* as a voluntary closure area.

Integrated management of the Azorean fisheries appears to be a necessary step, from both perspectives. Involvement of the local fishers in ocean planning is also a necessary step (Nutters *et al*., 2012). Internationally expressed concerns about the blue shark catches should be taken into account. Carvalho *et al*. (2011) suggest that development strategies for the Azorean fisheries should include more social equity and ecologically sustainable operations by promoting co-management policies and removing environmentally harmful and trade-distorting fisheries subsidies. By-catch reducing devices could be implemented on a regional level. According to local operators, shark watching activity in the Azores is already exceeding the profit made in the shark fisheries. Beyond merely quantifying the tourism versus market value of sharks, shark watching can offer broader advantages (Techera & Klein, 2013). Shark-based ecotourism can provide multiple benefits, including the facilitation of sustainable livelihoods for the local communities. To facilitate the

sustainable development of the shark-watching industry, partnerships among operators, with the local fishers, and the government are essential. The combination of state based and industry regulation contributes to mutual respect. But effort needs to be directed towards strengthening partnerships.

Acknowledgment

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Chapter 4

SPECIALIZATION OF DIVERS AND WHALE WATCHERS IN THE AZORES - IMPLICATIONS FOR SUSTAINABLE MANAGEMENT

Abstract

Effectively managed marine wildlife tourism can provide an incentive-based conservation mechanism for some marine species. Effectiveness varies depending upon the nature of the species involved, orientation of the tourist clientele and stage of development of the industry. This paper assesses client specialization as an input for sustainable management of whale watching and diving in the Azores evaluating the geographical variation in specialization levels, in several different islands. Results show that overall whale watchers are mostly generalists. Divers are more highly specialized. Generalists of both activities are predominant on São Miguel island whereas specialists are mainly encountered on the more remote islands Pico, Faial, Santa Maria and Graciosa. Both whale watching and diving are main reasons for travelling to the Azores. Most whale watchers, in particular specialized ones, attached high importance to the absence of crowding by other boats, to environmental commitment by the operator and to animal-friendly observation. For specialized divers it was important to see sharks and manta rays. Less specialized divers also wished to see manta rays but preferred easy dive conditions. Based on these results suggestions are made to enhance future sustainability of both activities and maintain a high-quality and diverse marine wildlife tourism product.

Key words: *wildlife tourism; visitor attitudes; tourist motivation; tourism management; sustainable tourism; user specialization*.

1. Introduction

Whale watching and scuba diving are marine wildlife tourism markets with the potential to generate economic and environmental benefits to local communities. In Europe, whale watching generated 97 million dollars of revenue in 2008 and an annual growth rate of 7% during the last decade. The Azorean islands with a 15.5% annual growth rate in whale watching are one of the European regions with a higher growth rate contributing to the 23% share of European total revenues generated by whale watching activities in Portugal (O'Connor *et al.,* 2009). Whale watching is reported by 12.5% of tourists as the main motivation to visit the Azores (Serviço Regional de Estatística dos Açores (SREA), 2007). Diving tourism is one of the fastest growing recreation and tourist activities (Musa & Dimmock, 2012). There are 22 million certified divers in 2013, with an average of nine hundred thousand new divers certified each year (Professional Association of Diving Instructors (PADI), 2014). Previous research on diving has concentrated mainly on tropical and coral reef environments (Anderson & Loomis, 2011; Dearden *et al.,* 2006; Lucrezi *et al.,* 2013). The Azorean case is a non-tropical diving destination with large iconic species such as manta rays, sharks and groupers. Understanding and exploring the variability in motivations and attitudes of marine wildlife users can help decision makers and local operators assess the potential for future development of this market as well as design better management practices and policies.

1.1. Specialization in marine wildlife tourism research

Wildlife tourists are not homogenous and differ in terms of their investment in, and knowledge of the activity, or degree of specialization (Bryan, 1977). More specialized participants are typically knowledgeable and skilled about the activity and the destination, and require minimal infrastructure or interpretative materials in order to achieve an enjoyable wildlife experience. Due to their increased awareness of the environment and their smaller numbers, they generally have a smaller impact on the environment and on the focal species (Duffus & Dearden, 1990). Generalists are infrequent participants who do not consider the activity to be a central life interest. They generally do not invest much in equipment or the activity. Specialists are more enthusiastic participants who are committed to the activity and use more sophisticated equipment and approaches (Bryan, 1977; Needham *et al.,* 2007; Scott & Shafer, 2001). Generalists require greater facility development and more interpretation. They place greater pressure on the natural environments, in large part because of their greater numbers. Duffus and Dearden (1990) integrated Bryan's concept of recreational specialization into their framework of non-consumptive wildlife-oriented recreation, which has proven to be valuable for "predicting and managing change in a wildlife tourism system" (Catlin *et al.,* 2011). Integrating Butler's Tourism Area Life-Cycle Model (Butler, 1980) Duffus and Dearden (1990) predicted that, as a destination progresses through the different stages of development - discovery, exponential growth, consolidation and collapse unless management interventions are applied - it attracts different types of tourists. Initially a wildlife tourism activity will attract explorative users who are essentially wildlife specialists. As the popularity of a site increases, so does the proportion of generalist wildlife tourists amongst the visitor population. As a wildlife tourism activity evolves to meet the demands of generalists, specialists are less attracted and seek

out other areas for their activities (Duffus & Dearden, 1990). Effective management of wildlife tourism needs to determine the management goals for a particular site, region and/or species and introduce management interventions to achieve those goals, including the optimal specialization level mix of the participants.

Some studies (e.g. Dearden *et al.,* 2007; Leujak & Ormond, 2007; Luna *et al.,*2009; Malcom, 2003; Musa *et al.,* 2011; Ong & Musa, 2012) suggest that increased specialization minimizes participant impacts, increases pro-environmental behavior and attitudes, correlates positively with environmental awareness, refines perceptions on environmental impacts, and is accompanied by growing support for management interventions. In other studies, more specialized participants did not differ from less specialized ones in the way they interacted with the environment (Camp & Fraser, 2012; Di Franco *et al.,* 2009;), nor in their commitment to rules and codes of conduct (Anderson & Loomis, 2011; Ziegler, 2010) or in their support for management measures (Edney, 2012; Sorice *et al.,* 2007). Recreation specialization has been applied to diving with fewer studies on whale watching (but see Lambert *et al.,* 2010; Malcom, 2003; Peake, 2011). The research reported here compares whale watchers and divers in terms of their specialization levels in the Azores. Such analysis is useful not only from a theoretical point of view on specialization, but also the implications for input into the Wildlife Tourism Model (Duffus & Dearden, 1990) and the sustainability and future optimal strategies for the Azores.

1.2. Case study area

The Azores archipelago, situated on the mid-Atlantic ridge, consists of nine small islands. Coastal recreational activities are a major tourist attraction. Scuba diving and whale watching play an increasingly important role within the tourism sector, as the Azores offer good conditions for watching oceanic species close to the shoreline (Magalhães *et al.*, 2002). Around twenty-five cetacean species can be observed in the waters of the Azores in close distance from the shore (Bentz *et al.*, 2013). Of approximately 364 000 tourists in the Azores in 2012, 14.7% (around 51 000) went whale watching (Regional Directorate for Tourism, 2014).

Despite the fact that diving has become a major attraction for tourists in the Azores, there exists only limited data about the number of divers. Estimations oscillate between 4000 and 7000 divers in 2012 but actual numbers might be higher (Regional Directorate for Air and Maritime Transport, 2014; Bentz *et al.*, 2014). In the whole archipelago 27 diving operators and 24 whale watching operators offer their services. SCUBA diving takes place in all Azorean islands whereas whale watching occurs only around the islands of São Miguel, Terceira, Graciosa, Pico and Faial (Figure 4).

Previous research on marine wildlife tourism in the Azores has concentrated on habits, behavior and distribution of marine mammals and sharks (Doksæter, 2008; Oliveira da Cruz, 2008; Vieria & Brito, 2009), their conservation (Silva *et al.*, 2012), impacts of tourism on cetaceans (Magalhães *et al.*, 2002; Visser *et al.*, 2011), and interactions with local communities and fisheries (Neves-Graça, 2006; Silva *et al.*, 2011). Less emphasis has been placed on the management of the activities or the experience itself, such as expectations, satisfactions and specialization (Oliveira, 2005; Silva *et al.*,

2012). This publication contributes to fill this gap. Assessing the specialization of the users is a valuable input towards assessing the current status of the industry and formulating optimal policy and management prescriptions for long-term sustainability.
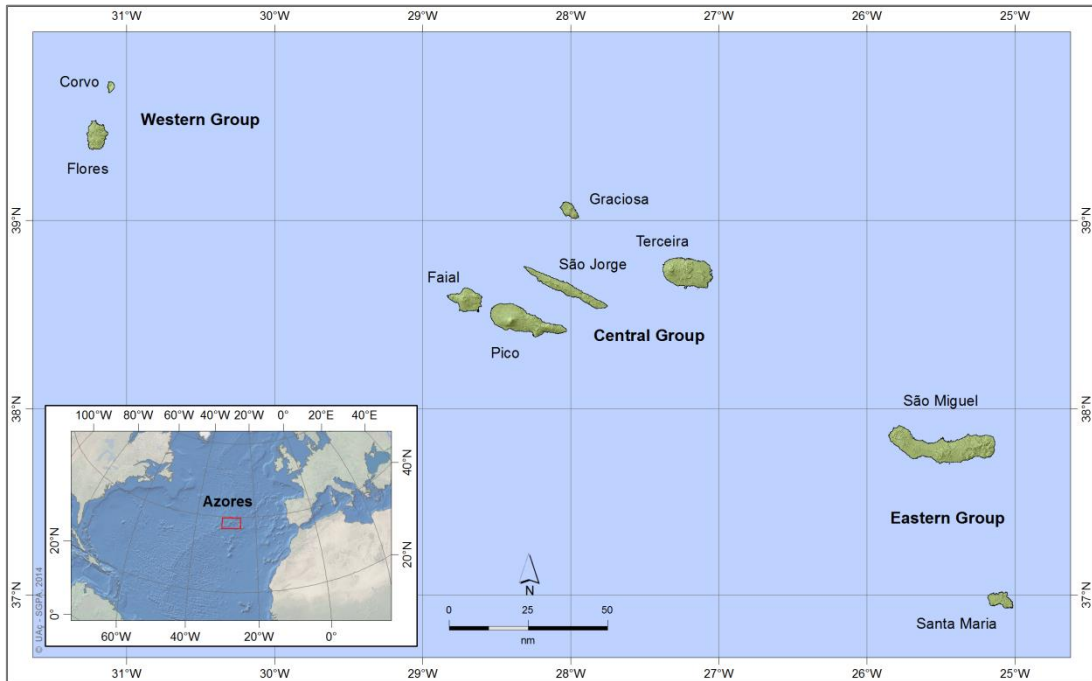
Figure 4. Azores geographic location (source: Centre of Geographic Information Systems, University of the Azores)

2. Methods

Two self-administered questionnaires were applied as the primary data collection instrument. The questionnaires consisted of 23 mainly closed-ended questions addressing various aspects of the diving and whale watching tour including motivations, satisfactions, specialization, impact perception and demographics. The questions were developed through a literature review and refined following a pilot study in the Azores in May 2013. Surveys were provided in Portuguese, English, Spanish and German. Questionnaires for whale watching tour participants were distributed on São Miguel, Pico and Faial from May to August 2013, the main whale watching season. Questionnaires for divers were distributed on São Miguel, Pico, Faial, Graciosa and Santa Maria from June to September 2013. Tourists were selected randomly as they returned from their tour. Most operators facilitated the approach to the tourists by a brief introduction of the researcher and assistants. The researchers distributed the questionnaires and stayed nearby is case of questions and collected the completed questionnaires. In total 435 divers and 466 whale watchers responded to the questionnaires.

Specialization was assessed using a single-item self-classification measure. This approach presents respondents with a few categories describing combinations of various dimensions of specialization in an activity, and then asks respondents to select a category that most accurately describes them even if they do not identify with all criteria in the category (Scott *et al.,* 2005). Recent research with divers (Sorice *et al.,* 2009) and anglers (Needham *et al*., 2009) has found self-classification measures to be effective. This approach also takes into account the multidimensional nature of specialization, which is composed of a behavioral component, a cognitive component and an affective component. Indicators of the behavioral component are equipment, previous participation and experience. Indicators of the cognitive dimension include skill level and knowledge about the activity. Indicators of affective attachment and commitment include centrality to lifestyle and enduring involvement (Needham *et al*., 2009).

For the divers four specialization types were suggested: the new diver, the casual diver, the active diver and the committed diver. For the whale watchers four similar types were used: the new whale watcher, the passionate new whale watcher, the active whale watcher" and the committed whale watcher (Table 5). The type passionate new whale watcher was introduced based on previously conducted expert interviews, which suggested this type (Bentz *et al*., 2013).

Table 5. Specialization types applied in the surveys

New whale watcher: "This is the first time I saw whales and/or dolphins in the wild. I do not know a lot about whales and dolphins. I go whale watching to spend time with my friends/ family or to have a new experience. I do not travel to destinations specifically to see whales."

Passionate new whale watcher: "This is the first time I saw whales and/or dolphins in the wild but I had already some knowledge about whales. The possibility to go whale watching was one reason to come to the Azores or would be an argument in favor of other travel destinations."

Active whale watcher: "I have seen wild whales and dolphins before. Whale watching is an outdoor activity that I appreciate a lot. I have considerable knowledge about these animals and the possibility to go whale watching was an important reason to come to the Azores or would be if I chose another travel destination."

Committed whale watcher: "I have seen wild whales and dolphins many times before and I love to go whale watching. I came to the Azores to see cetaceans (or a certain species that I haven´t seen before) or if I chose other travel destinations this would be the reason. I have extensive knowledge about whales and dolphins and whale watching regulations."

New diver: "I am a new diver. I am getting a certificate/ have limited diving certifications and dive mainly to spend time with my friends/ family or to have a new experience. I do not own any diving equipment and do not travel to destinations specifically to dive."

Casual diver: "Diving is an enjoyable activity that is incidental to other travel and outdoor interests. I have some diving certification but am not highly experienced. I occasionally read diving articles, and own only basic equipment (mask, snorkel, fins)".

Active diver: "Diving is an important outdoor activity in my life. I frequently read articles on diving and own standard diving equipment (BCD, regulator, gauges, computer). I am well certified but my participation in diving is inconsistent".

Committed diver: "Diving is a highly important outdoor activity. I go diving every chance that I get, and invest considerable time and money in having specialized diving experiences. I am highly certified, I own specialized diving gear (underwater camera, video) and am a member of diving organizations or subscribe to diving literature".

3.   Results

3.1. Whale watching

Whale watchers in the Azores are mainly generalists. Most of them (49.32%) categorized themselves as new whale watchers. The second largest number of respondents (29.41%) described themselves as passionate new whale watchers with 18.10% of the respondents describing themselves as active whale watchers. The smallest numbers of respondents (3.16%) chose the option of committed whale watcher. There are significant differences between these different whale watching types in terms of their previous experience, motives, and preferences for setting features (Table 6).

The new whale watchers and passionate new whale watchers had less previous whale watching experience (less whale watching trips in the Azores and elsewhere) than the more specialized active and committed whale watchers (chi square result). For active and committed whale watchers whale watching was the main reason to visit the Azores islands, whereas for new whale watchers and passionate new whale watchers, it was one of several important reasons (chi square). Passionate, active and committed whale watchers gave significantly more importance to the absence of crowding than the generalist type new whale watchers (chi square). Passionate, active and committed whale watchers were also highly concerned about animal-friendly observations and about the commitment to the environment by the operator; new whale watchers attached less importance to this matter (chi square). Different islands attracted tourists with varying levels of specialization. São Miguel had the highest percentage of new whale watchers (58.5%). In the more remote islands the percentage of active and committed whale watchers and of passionate new whale watchers is significantly higher ($\chi2 = 23.711$, df = 3, p = 0.000, Table 7). Pico and Faial, being very close to each other comprise one management zone.

Respondents were asked to indicate their satisfaction with their tour on a 10-point scale (1 being very unsatisfied and 10 being very satisfied). The majority of the respondents were highly satisfied and scored 8 and higher (83.8%). The most frequent score was 9 (36.5%). Only 2.9% of the users scored 5 or lower. The mean satisfaction was 8.47 (sd=1.27). Very high satisfaction levels were showed in all specialization groups with no statistical difference among groups ($\chi2 = 21.514$, df = 24, p = 0.608).

When asked whether they were willing to return to the Azores for whale watching, 65.5% of respondents replied positively. Among the different specialization groups, the *passionate new whale watchers* were the most willing to return (76.2%) followed by *active* (74.7%) and *committed whale watcher*s (72,7%). More generalist users (*new whale watchers*) were less willing to return. Almost half of them (45.3%) were not sure or indicated they would not return. There is a significant correlation between specialization levels and the willingness to return ($\chi^2 = 26.698$, df = 6, p = 0.000), with more specialized groups being more willing to return. These results demonstrate a very high overall satisfaction level among whale watchers in the Azores. There is also a strong correlation

between the level of satisfaction and the willingness to return (χ^2 = 81.630, df = 16, p = 0.000), with more satisfied participants being more willing to return.

Table 6. Motivations, previous experience and selected setting preferences of different whale watching types in the Azores

Variable	Scale	New whale watcher	Passionate new whale watcher	Active whale watcher	Committed whale watcher
Importance of whale watching for decision to visit Azores (p=0.000)	Main reason	9.2%	32.3%	57.1%	57.1%
	One of several reasons	69.1%	59.2%	21.4%	21.4%
	Spontaneous decision	21.7%	8.5%	1.2%	14.3%
	Resident (Azores)			1.2%	4.1%
	Total	100%	100%	100%	100%
Nr. of previous whale watching trips in Azores (p=0.000)	0 trips	96.3%	87.7%	83.8%	50%
	1-2	3.2%	11.5%	6.2%	7.1%
	3-5	0.5%	0.8%	7.5%	7.1%
	6-10			1.2%	28.6%
	More than 10			1.2%	7.1%
	Total	100%	100%	100%	100%
Nr. of previous whale watching trips elsewhere (p=0.000)	0 trips	89.4%	80.8%	20.0%	23.1%
	1-2	10.5%	16.9%	51.2%	38.5%
	3-5		2.3%	22.5%	7.7%
	6-10			5.0%	23.1%
	More than 10			1.2%	7.7%
	Total	100%	100%	100%	100%
Absence of crowding (p=0.000)	Not important	3.7%	2.3%	5%	
	Low importance	6.9%	7.8%	6.2%	7.1%
	Medium importance	50.2%	27.9%	31.2%	7.1%
	Important	28.6%	44.2%	33.8%	35.7%
	Very important	20.6%	17.8%	23.8%	50%
	Total	100%	100%	100%	100%
Commitment to the environment by operator (p=0.000)	Not important	0.5%			
	Low importance				
	Medium importance	13.1%	10.2%	6.4%	7.1%
	Important	54.9%	33.1%	33.3%	18.6%
	Very important	31.5%	56.7%	60.3%	64.3%
	Total	100%	100%	100%	100%
Animal-friendly observation (p=0.000)	Not important	1.4%		1.2%	
	Low importance	0.5%			7.1%
	Medium importance	13.4%	3.1%	3.8%	
	Important	49.8%	22.3%	26.2%	21.4%
	Very important	35%	74.6%	68.8%	71.4%
	Total	100%	100%	100%	100%
Willingness to return (p=0.000)	No	11.8%	2.4%	10%	18.2%
	Yes	54.7%	76.2%	74.7%	72.7%
	Not sure	33.5%	21.4%	15.2%	9.1%
	Total	100%	100%	100%	100%

Table 7. Whale watching specialization per management zone

Specialization	Pico & Faial	São Miguel	Total
New whale watcher	35.6%	58.5%	49.3%
Passionate new whale watcher	35.6%	25.2%	29.4%
Active whale watcher	23.7%	14.3%	18.1%
Committed whale watcher	5.1%	2%	3.2%
Total	100%	100%	100%

3.2. SCUBA diving

Most divers in the Azores are highly specialized. More than a third (36.9%) of the respondents characterized themselves as active divers and 31.1% as committed divers. Only 10.8% classified themselves as new divers and 21.2% as casual divers. The specialization types differed in previous experience, skills and environmental and service preferences (Table 8).

The more specialized types active and committed divers, had travelled to the Azores mainly for the purpose of diving, and had completed more previous dives (chi square). They had also higher certification levels than the generalist diver types (new diver and casual diver). Active and committed divers attached little importance to easy dive conditions but set a high value on seeing blue sharks and manta rays (chi square). For the less specialized divers the opposite was true. There was no correlation between specialization and the absence of crowding by other divers and the commitment of the operator to the environment ($\chi 2$ =9.778, df=12, p=0.635 and $\chi 2$ =6.366, df=12, p=0.897). There is a significant difference ($\chi 2$ = 36.117, df = 12, p = 0.000) in specialization levels between islands. The more remote islands of Pico, Faial, Santa Maria and Graciosa, attract mainly specialized divers for whom diving is the main reason to visit the Azores. São Miguel has the highest percentage of generalist divers (14.6% new divers and 30.5% casual divers) (Table 9).

The majority of divers on Graciosa and Santa Maria (88.9% and 76.3% respectively) indicated that diving was the main purpose to visit those islands. However, the small sample from Gracoisa (N=18) suggests interpreting this result with caution. Also in Pico and Faial most of the respondents indicated that diving was the main reason to visit. São Miguel attracts divers for whom diving was mainly "one of several equally important reasons" to visit the Azores. The correlation between purpose of trip and choice of island was also tested, ($\chi 2$ = 73.237, df = 16, p = 0.000, Table 8) and the hypothesis of no correlation rejected.

Divers were asked to indicate their overall satisfaction on a scale from 1 to 10 (1=very unsatisfied, 10 very satisfied). The majority scored 8 and higher (67.5%) with 8 being the most frequent score (34.2%). Only 5% of the respondents scored 4 or lower. The mean satisfaction value of all specialization groups was 7.79 (sd=1.59). The more experienced divers did not respond significantly different from less experienced ones There was no correlation between specialization and overall satisfaction ($\chi 2$ = 22.910, df = 24, p = 0.525).

Table 8. Motivations, previous experience and selected setting preferences

Variable	Scale	New diver	Casual diver	Active diver	Committed diver
Importance of diving for decision to visit Azores (p=0.000)	Main reason	17%	21.7%	63.1%	68.9%
	One of several reasons	55.3%	59.8%	31.2%	15.6%
	Spontaneous decision	19.7%	13%	0.6%	10.4%
	Resident (Azores)	8.5%	5.4%	5%	5.2%
	Total	100%	100%	100%	100%
Dive course level (PADI system / equivalent) (p=0.000)	Discover	31.9%	4.4%		1.5%
	Open water	61.7%	70%	49.7%	34.1%
	Advanced open water	4.3%	22.2%	19.5%	16.3%
	Rescue		2.2%	15.7%	7.4%
	Dive master	2.1%	1.1%	11.9%	17.8%
	Dive instructor			3.1%	22.9%
	Total	100%	100%	100%	100%
Nr. of previous dives in Azores (p=0.002)	0 dives	83%	76.1%	71.9%	63.7%
	1-5	3.2%	6.5%	6.9%	13.3%
	6-10	0.5%	7.6%	2.5%	1.5%
	11-20		5.4%	4.4%	3.7%
	21-50		1.1%	7.5%	5.2%
	More than 50		3.3%	6.9%	12.6%
	Total	100%	100%	100%	100%
Nr. of previous dive trips elsewhere (p=0.000)	0 trips	72.3%	33.7%	16.2%	18.5%
	1-2	17%	19.6%	19.4%	8.1%
	3-5	6.4%	37%	40%	31.1%
	6-8	2.1%	4.3%	12.5%	10.4%
	9-10		3.3%	9.4%	15.6%
	More than 10	2.1%	2.2%	2.5%	16.3%
	Total	100%	100%	100%	100%
Easy dive conditions (p=0.000)	Not important	2.1%	2.2%	5.7%	13.5%
	Low importance	2.1%	17.6%	24.5%	27.8
	Medium importance	29.8%	46.2%	44.0%	42.1%
	Important	34%	30.8%	18.9%	15%
	Very important	31.9%	3.3%	6.9%	1.5%
	Total	100%	100%	100%	100%
Presence of blue sharks (p=0.000)	Not important	23.9%	14.6%	8.1%	3%
	Low importance	30.4%	19.1%	15.6%	9.1%
	Medium importance	19.6%	33.7%	31.9%	33.3%
	Important	19.6%	21.3%	21.9%	18.2%
	Very important	6.5%	11.2%	22.5%	36.4%
	Total	100%	100%	100%	100%
Presence of manta rays (p=0.000)	Not important	14.9%	10%	3.8%	0.8%
	Low importance	8.5%	10.0%	8.8%	3.8%
	Medium importance	34%	27.8%	18.8%	23.3%
	Important	25.5%	31.1%	33.1%	33.8%
	Very important	17%	21.1%	35.6%	38.3%
	Total	100%	100%	100%	100%
Willingness to return (p=0.02)	No	4.9%	2.3%	4.7%	12.7%
	Yes	78%	67.8%	74%	63.6%
	Not sure	17.1%	29.9%	21.3%	23.7%
	Total	100%	100%	100%	100%

Specialization of divers and whale watchers

Respondents were asked about their willingness to return to the Azores. The majority of the respondents (69.9%) were willing to return, however this differs between specialisation levels. The correlation between willingness to return and specialization was tested, (χ^2 = 14.2191, df = 6, p = 0.027) and the hypothesis of no correlation rejected. More than a third of committed divers (36.4%) would not return or were not sure about it. There is also a significant relationship between the level of satisfaction and the willingness to return (χ^2 = 77.338, df = 16, p = 0.000), with more satisfied respondents showing a greater willingness to return.

Table 9. Diver specialization per island

Specialization	Faial	Pico	Graciosa	São Miguel	Santa Maria	Total
New diver	10.2%	8.6%	16.7%	14.6%	6.6%	10.9%
Casual diver	20.4%	22.1%	0%	30.5%	6.6%	21.1%
Active diver	31.8%	32.1%	55.6%	31.8%	52.6%	36.8%
Committed diver	23.2%	37.1%	27.8%	23.2%	34.2%	31.1%
Total	100%	100%	100%	100%	100%	100%

4. Discussion

Marine wildlife tourism is an important component of the tourist attraction of the Azores with whale watching and scuba diving being the most important activities. There are important differences and some similarities between the clientele for these activities and also geographical differences between the islands. The results demonstrate that users with different specialization levels have differing motivations to participate in the given marine wildlife tourism activities and attach importance to different setting features. In general the results are in the line with Bryan's (1977) and Duffus and Dearden's (1990) assertions, showing that increasing specialization augments sensitivity to crowding and awareness for environmental commitment. However, particularly with whale watchers the different specialization types showed little difference in these attributes. This result raises questions about the generalizability of the specialization concept and applicability to Duffus and Dearden's Wildlife Tourism Model as will be discussed below. Table 10 summarizes the comparison between the two activities.

Travel motivation increases with specialization

Both generalist divers and whale watchers attach medium importance to the activity in the trip decision. For highly specialized divers and whale watchers the activity was very important in the decision to visit the Azores. These results support the assumption of the specialization theory (Bryan, 1977) that generalists are infrequent participants who do not consider the activity to be a central life interest and that specialists are more committed to the activity (Needham *et al.*, 2009).

Previous experience may not be the only reliable predictor for whale watching specialization

Through the self-classification variable specialization in whale watching was measured in knowledge about marine mammals and previous whale watching trips. However, all types of whale watchers

had relatively little previous experience. Even those who classified themselves as active whale watchers had participated mainly in one or two whale watching trips. Malcolm and Duffus (2008) also examined a predominance of less specialized whale watchers in three locations in British Columbia, Canada with more specialized users in the more remote sites. Other researchers have pointed out inherent differences among activities in applicability of segregation by specialization (Needham *et al.,* 2009; Scott & Shafer, 2001; Scott & Thigpen, 2003) and by extension the potential use of specialization as an input variable in the Wildlife Tourism Model. Bryan (1979) believed that activities differed in level of complexity and therefore vary in their level of progression. Some individuals participate infrequently but show evidence of a skill and knowledge and others participate regularly, but exhibit low skill (Scott & Shafer, 2001). Catlin and others (2011) suggest that ultimately the type of specialization measurement employed would vary with the specific situation. As Kuentzel (2001) suggested, instead of progressing to higher levels of specialization as a consequence of greater participation in one activity, participants may instead choose from a growing variety of activities. Some participants may choose to diversify their wildlife activities rather than pursue better experiences in a single activity (Lemelin *et al.*, 2008). This may apply to whale watching. Further research is needed to test different variables associated with specialization and to determine whether whale watchers progress towards specialized levels.

For diving, specialization levels differed significantly in terms of previous experience. This finding supports Bryans' theory and several studies specifically on diving (e.g. Augustine, 2012; Camp & Frazer, 2012; Dearden *et al*., 2006; Lucrezi *et al.*, 2013).

Crowding sensitivity and environmental awareness increase with whale watching specialization

Crowding was more of a problem for more specialized whale watchers but there was no correlation for between crowding and divers' specialization. Bryan (1977) and Duffus and Dearden (1990) suggest that increasing specialization decreases the tolerance for crowding. This was confirmed in several studies (e.g. Inglis *et al.*, 1999) but also the opposite result found by some investigators (e.g. Anderson, 2007) showing that highly specialized divers found a greater number of encounters to be more acceptable. Commitment to the environment by the operator and animal-friendly observation were important for all whale watchers and particularly important for the specialized types. The results support the specialization theory and are in the line with the findings of several studies (e.g. Malcom, 2003; Malcom & Duffus, 2008) suggesting that specialization correlates positively with pro-environmental attitudes and environmental awareness. These results also underline the importance of environmental-friendly practices in whale watching for satisfactory user experiences and thus its sustainability.

High importance of iconic species among specialist divers

Amongst divers there were differences in motivations according to specialization level. Specialized divers attached high importance to see sharks and manta rays. Less specialized divers preferred just manta rays as well as easy dive conditions. Duffus and Dearden (1990) suggest that specialist users are more concentrated on the focal species. On Pico, Faial and Santa Maria shark diving has been a

quickly growing activity but is limited to more experienced divers due to the difficulty of the dive (Bentz *et al*., 2014). Manta dives are more accessible to divers of all levels. The increased costs associated with shark diving on the more isolated islands support specialization theory and the Wildlife Tourism Model which suggest that willingness to spend more money and time increase with specialization (Augustine, 2012; Dearden *et al*., 2006).

Table 10. Comparing key variables and specialization levels

Variables	Whale watching		Diving	
	Low specialization	High specialization	Low specialization	High specialization
Importance of activity in trip decision	Medium	High	Medium	High
Previous experience	None or few	Some	Some	A lot
Absence vessel crowding	Important	Very important		
Commitment to environment	Important/ very important	Very important		
Animal-friendly observation	Important/ very important	Very important		
Easy dive conditions			Important/ very important	Medium/ low importance
Presence of blue sharks			Medium/ low importance	Important/ very important
Presence of manta rays			Important/ very important	Very important
Satisfaction	High	High	High	High
Willingness to return Island	Medium São Miguel, Pico & Faial	High Pico & Faial	High São Miguel, Pico	High Pico, Santa Maria, São Miguel, Graciosa, Faial

Willingness to return weaker among generalist whale watchers

Divers and whale watchers of all levels of specialization were willing to return to the Azores. *New whale watchers* were relatively less willing to return. This contrasts with other findings (e.g. Augustine, 2012; Dearden *et al.*, 2006) where more specialized users are the least willing to return. Willingness to return is an important indicator of industry sustainability. However the overall willingness to return in this study should not encourage complacency regarding the quality of the experience as conditions may deteriorate over time and new competitive markets may emerge. Thirty percent of the whale watchers and twenty-nine percent of the divers were not sure or did not want to repeat their visit. Tourism providers should focus on repeat visits and cultivate a positive image to ensure sustainability of the activity (Topelko, 2007; Tsaur, Lin & Lin, 2006).

Specialization did not affect overall satisfaction

The mean satisfaction results for both diving (7.79) and whale watching (8.47) are similar to scores at renowned marine wildlife destinations such as Thailand (diving: 7.69, Augustine, 2012) and Australia (whale watching: 9.00, Valentine *et al.*, 2004) (diving: 8.49, Coghlan, 2012). High satisfaction levels among recreationists are frequent because people generally choose recreation activities they enjoy and avoid those they do not (self-selection). Users may also change their definitions of a recreation experience to cope with unsatisfactory experiences (product shift) or make the best of a less pleasant situation focusing on positive aspects (rationalizing). Ultimately, dissatisfied users leave the area and so their satisfaction is no longer measured (displacement) (Shelby & Heberlein, 1986). In contrast to other research showing lower satisfaction levels with higher specialization (Augustine, 2012; Dearden *et al.*, 2006, Topelko, 2007) in this case, specialization did not affect satisfaction.

5. Conclusion

The Azores islands are an emerging marine wildlife tourism destination with great potential for continued growth if planned and managed effectively. Marine wildlife tourism elsewhere has often found that unregulated and unplanned growth can lead to undesirable impacts, declining revenue per participant and even decline in visitation (e.g. Dearden *et al.*, 2006; Kontogeorgopoulos, 2004; Peake, 2011). Often the challenge is that as the activity grows in popularity, new participants have less dedication to the activity or species involved and tourism operators seek to maximize the volume of visitors rather than the value of the activity. This, in turn leads to eventual displacement of more discerning clients as their needs become swamped by more generalist clients (Duffus & Dearden, 1990, 1993). The higher-yielding, lower-impact, more discerning specialists go elsewhere. In general, if a location has the resource base to sustain a high-quality product, then management efforts need to be made to ensure that conditions are such that allow that market niche to persist. In some cases that market niche may be the only market niche, in others it may be part of an overall ecotourism opportunity spectrum.

For the Azores there are important differences in terms of clientele and geographical distribution in the two main activities, whale watching and diving. Whale watchers on the whole represent a less specialized clientele, with marine tourism being a weaker motivation for visiting the Azores. Divers are more specialized and come mainly to dive. The activities also have differing geographical distributions with generalists being concentrated on the island of São Miguel and more specialized users, on the more remote islands of Pico, Faial, Santa Maria and Graciosa.

These differences have important implications for the development of a more sustainable marine wildlife sector in the Azores. The findings suggest that whale watching (especially on São Miguel island) is further along the Wildlife Tourism Model trajectory than diving, validated by characteristics such as:

Specialization of divers and whale watchers

- High percentage of less specialized whale watchers
- Medium importance of whale watching for trip decision
- Medium willingness to return.

Despite the lack of a clearly-defined highly specialized whale-watching segment, there is a preponderance of participants concerned about the environmental impacts of the activity and also some sensitivity to crowding. The Azores has already developed whale-watching guidelines with the intent of reducing negative impacts, but these have yet to be fully embraced by the tourist industry. Clearly, for their own sake, this should be a priority.

There may also be the potential to initiate a more specialized and higher yielding whale watching opportunity on the more remote islands to fulfill the needs of specialists. This may also tempt some of the *passionate new whale watchers* to return for a more intense experience. The Azores is fortunate in having the resource-base to potentially build this market, and also the geographical separation between the islands that would assist in preventing a more specialized opportunity being swamped by over-crowding and proliferation of operators.

Diving (especially on Pico, Faial and Graciosa island) appears to be at an earlier stage of the Wildlife Tourism Model based on facts such as:

- Mainly highly specialized and experienced divers
- High importance of diving for trip decision
- High importance for specialized dive experiences (sharks and manta rays)
- Strong willingness to return.

Management direction for diving needs to ensure that the specialist market niche persists as a higher yielding and more distinctive niche. The geographical distinction for this segment on the more remote islands is a distinct advantage in this regard. However the caution made by Dearden et al. (2006) for Thailand is very relevant here. The offshore islands in Thailand, until recently, were relatively protected from generalist divers by the time taken to get there and were mostly the preserve of higher-spending live aboard expeditions with more experienced divers. With the advent of new and faster boats this has changed rapidly over the last decade and now even the most inexperienced divers can access the most fragile reefs for day diving and the industry has become dominated by a mass, low-yielding, high impact clientele with little regard for reef or industry sustainability. The Azores can avoid this fate and the fate of declining whale watching (e.g. Peake 2011) through carefully planned development based upon a sound information base. This article is hopefully one contribution to this development.

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Chapter 5

DIVER MOTIVATION AND SPECIALIZATION AS AN INPUT FOR IMPROVED SCUBA MANAGEMENT

Abstract

This study explores diver motivations in the Azores in relationship to demographic variables and level of specialization, based on a survey of 425 divers in five of the nine islands. Using cluster and principal components analysis, four diver clusters were distinguished: *socializers*, *shark and manta divers, biodiversity seekers* and *explorer divers.* Social aspects of diving were important to both generalists and specialists and the importance of underwater fauna did not increase with specialization. Divers' cultural background affected their motivations. The Azores archipelago, an emerging non-tropical diving destination, featuring diving with large iconic species including sharks and manta rays, has a higher proportion of specialized divers than reported in other diving destinations and may receive divers displaced from increasingly degraded tropical reefs. Findings highlight the importance of understanding diver motivations, developing diver awareness programs at all stages of specialization as well as of an integrated management strategy.

Key words: *Wildlife tourism; tourist motivations; diving; cluster analysis; sustainable management.*

Diver motivation and specialization as input for management

1. Introduction

1.1. The problem

Dive tourism is one of the fastest growing recreation and tourism activities (Musa & Dimmock 2012). According to the Professional Association of Diving Instructors (PADI) there were 22 million certified divers in 2013, with an average of 900 thousand new divers certified each year (PADI, 2014). With growing numbers of divers worldwide there is also an increase in the potential negative impacts of the activity. Potential environmental impacts include injury, stress, disruption of feeding patterns and mating behaviors of marine species (Hawkins *et al.*, 2005; Thurstan *et al.*, 2012) and pollution, tour boat anchoring, and trampling on corals (Dearden *et al.*, 2007a; Roman *et al.*, 2007). Social impacts include influences on tourist satisfaction (e.g. through crowding) and local communities (e.g. cultural erosion or loss of social cohesion). However when properly managed, diving can serve as a potential tool for conservation due to its ability to raise awareness, educate tourists and enhance local economic benefits (Cater & Cater, 2008; Dearden *et al.*, 2007a; Tapsuwan & Asafu-Adjaye, 2008; Zeppel & Muloin, 2008).

Recognition of the complexity of factors influencing the behavior of divers has led to an increasing number of investigations on the human dimensions of diving, including personality, attitude, motivations, preferences, satisfaction, perceptions and norms (e.g. Dearden *et al.,* 2006; Musa *et al.,* 2011; Ong & Musa 2012; Thapa *et al.,* 2006). Research on these subjects has the potential to enhance management through predicting diver behavior (Anderson & Loomis, 2011) and forecasting possible quality declines of a destination (Coghlan, 2012; Dearden *et al.,* 2007a; Uyarra *et al.,* 2009).

Previous research on diving has concentrated mainly on tropical and coral reef environments (Anderson & Loomis 2011; Dearden *et al.,* 2006; Lucrezi *et al.,* 2013). Diving in the Azores, a non-tropical destination, is becoming a major tourism attraction mainly due to the possibility to see large iconic species such as manta rays, sharks, turtles, tunas and groupers. Studies examining the social dimension of diving are still relatively few. This publication examines motivations of divers in five Azorean islands. It clusters participants according to their preferences for environmental and social setting features. Understanding participants' needs and expectations of a recreational activity or site is important for improving management responsiveness. Understanding the social science dimensions of the dive experience will ultimately lead to more successful and sustainable industries.

1.2. Tourist typologies

Identification of different tourist types can be beneficial for planning, managing and marketing of tourism (Hvenegaard, 2002). Information about tourist profiles allows managers to address different motivations, experiences and impacts and to understand which types of tourists are more likely to be found at different stages in the evolution of tourism areas (Duffus & Dearden, 1990). In terms of sustainability, this process is useful to match tourism types to resource capabilities and management interventions. Increased understanding of user attitudes towards various species can also provide valuable information for setting management and conservation priorities.

There are different methods to classify tourists. Bryan (1977) divided recreationists according to their knowledge and investment in the activity into specialists and generalists. Specialists are more exploratory users who are typically knowledgeable and skilled about the activity and the destination, and require minimal infrastructure or interpretation in order to achieve an enjoyable wildlife interaction experience. Due to their increased awareness of the environment and their smaller numbers, they generally have a minimal impact on the environment and on the focal species. For generalists, the activity is not a central life interest and they invest less in its pursuit, both in terms of money and effort. Generalists require greater facility development and more interpretation and without adequate management interventions, they place greater pressure on both the social and the natural environments, in large part because of their greater numbers (Duffus & Dearden, 1990).

Tourists can be also classified based on their motivations. Motivations to scuba dive include viewing and experiencing marine life, challenge, adventure, excitement, learning, stature, social interaction, fun, escape and relaxation (Dearden *et al.,* 2006; Edney, 2012; Meisel-Lusby & Cottrell, 2008). Todd, *et al*. (2002) found six major motivations for scuba diving, namely adventure, learning, escape, social interaction, stature and personal challenge. Not surprisingly a main reason for diving is to observe and explore the underwater environment and associated marine life (Ditton *et al.,* 2002; Edney, 2012; Meyer *et al.,* 2002), and underwater nature and marine life are prime determinants of dive enjoyment (Lucrezi *et al.,* 2013; Shafer & Inglis, 2000). Previous research has shown the critical importance of biophysical setting conditions, including water clarity, underwater rock formations and the quality and diversity of fish communities for divers (Roman *et al.,* 2007; Tschapka & Kern, 2013). Divers are also attracted by large iconic marine species such as sharks and manta rays (Anderson *et al.,* 2011; Gallagher & Hammerschlag, 2011; Lucrezi *et al.,* 2013). Other important factors include interest in learning more about marine life and various social factors.

Different motivations among divers can be associated with specific behaviors, perceptions, and levels of skill and knowledge (Lucrezi *et al.,* 2013). For example, motives linked to specific interest in the environment and social interaction may have a positive correlation with perceived obligations towards the environment (Cottrell & Meisel 2004). Therefor motivational studies help to adjust management strategies in order to strengthen sustainable development of diving.

This article explores motivations for diving in the Azores and has three specific objectives:

1. Understand user motivations to participate in diving;
2. Examine whether motivations are influenced by diver specialization and demographic profiles;
3. Discuss input for sustainable diving management based on motivational clusters.

1.3. Study site

The Azores archipelago, situated in the Northeast Atlantic, consists of nine small islands. The tourism industry started growing in the mid 1990s with coastal recreational activities being a major

tourist attraction. Main activities include sailing, boat tours, cruise tourism, hiking, whale and dolphin watching and scuba diving (Bentz *et al.*, 2013; Calado *et al.*, 2011; Magalhães *et al.*, 2002; Petit & Prudent, 2008). About 28 dive operators offer their services (Fig. 5). Recently diving and shark diving has started to grow rapidly and the Regional Directorate for Air and Maritime Transport estimates around 4000 divers in 2013 (Regional Directorate for Air and Maritime Transport, 2014). However, diving with blue sharks, an emerging subsector of the diving industry in the Azores, was calculated to involve approximately 7000 divers in 2011 (Bentz *et al.*, 2014). These numbers suggest that the assessment of the diving industry made by the regional authorities might be underestimated.
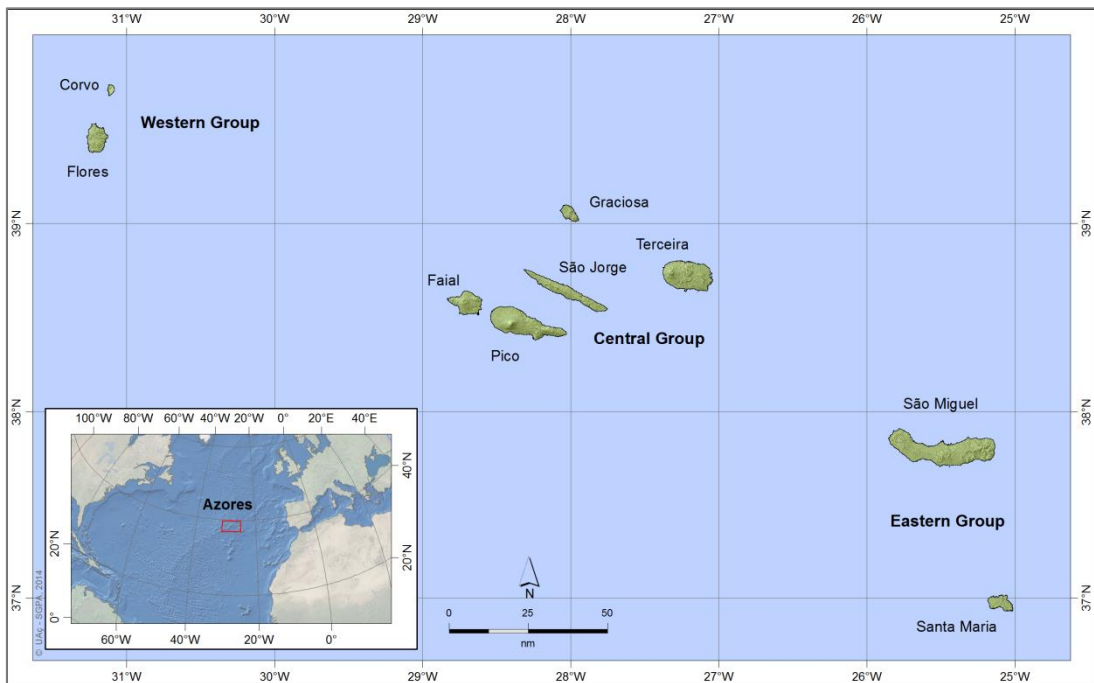
Figure 5. Azores geographic location (Source: Centre of Geographic Information Systems, University of the Azores)

2. Methodology

2.1. Sampling

The survey data presented in this paper were obtained through a survey administered to 435 divers in the Azores. Divers were approached when they returned to the marinas and harbors from their trips. Most operators facilitated the approach to the tourists by a brief introduction of the researchers. The researchers distributed the questionnaires and stayed nearby in case of questions and collected the filled in questionnaires from the respondents. Questionnaires were distributed on the islands São Miguel, Pico, Faial, Graciosa and Santa Maria from June to September 2013. Both

weekdays and weekends were sampled. All diving operators listed on the Webpage of the Regional Government of the Azores (visitazores.com) in Pico, Faial, São Miguel, and Santa Maria one dive operator on Graciosa Island were sampled.

2.2. Questionnaire and data analysis

The questionnaire consisted of twenty-five mainly closed-ended questions addressing various aspects of the diving tour experience including demographics, specialization level, motivations and satisfaction, and impact perceptions. The questions were developed through a literature review and refined following a pilot study in the Azores in May 2013. Surveys were provided in Portuguese, English, Spanish and German. Results from the survey were compiled and analyzed in IBM SPSS Statistics. A *principal component analysis* (PCA) was carried out to identify the motivational dimensions of diving. These procedures generated four components with eigenvalues greater than one. It also produced a consistent component pattern across the sample with almost each variable heavily loaded on one component. *Cluster analysis* is designed to handle large datasets as it provides a segmentation of the participants into subgroups (Roca *et al.,* 2009). This method was chosen to segment the respondents into homogenous subgroups with similar motivations for participating in diving in the Azores. A *hierarchical cluster analysis* was conducted to estimate the number of clusters most appropriate to describe the respondents. The principal component scores were used as clustering variables. Ward's method was selected to minimize the within-cluster differences and to maximize the between-cluster differences (Kibicho, 2008). The agglomeration coefficient was used to evaluate the changes in the coefficient during the hierarchical process. The most noticeable change was detected between the first four clusters. Thus, a four-cluster solution was most efficient. Data was analyzed using a *k-means cluster analysis* in order to identify key user characteristics. Chi-squares tests of homogeneity of proportions for categorical variables showed significant differences ($p < 0,05$) between all clusters.

For group profiling, differences between the four clusters and demographic characteristics and diving specialization were analyzed and tested with chi-square tests. Previous experience and specialization in the activity were measured with a single-item measurement, where respondents were faced with categories describing combinations of various dimensions of the activity, and asked to select a category that most described them. The four specialization types *new diver, casual diver, active diver* and *committed diver* were suggested, based on Augustine (2013). A *new diver* has limited diving certifications, no equipment and participates in diving to spend time with family and friends. A *casual diver* has some certifications, basic equipment and participates in diving incidentally to other outdoor interests. An *active diver* is a well certified diver full certification, owns standard equipment and considers the activity important in his life but practices it on an inconsistent basis. A *committed diver* is highly certified, possesses specialized diving gear, considers diving a highly important outdoor activity and uses every possibility to dive investment considerable time and money. Recent research with SCUBA divers (Sorice *et al.,* 2009) and anglers (Needham *et al.,* 2009) has found the method of self-specialization classification to be effective.

3. Results

3.1. Diver profiles

Two thirds of the sample were male and almost a third (32.4%) was between 26 and 35 years old. Around another third (31%) was between 36 and 45 years old. Older (46-55 years old: 17.6%; >56 years old: 5.5%) and younger participants (<25: 13.4%) were less represented. Most of the divers possessed a university degree (33.3% master; 21.1% bachelor; 8% doctor) or had finished professional school (18%). Fewer finished high school (18%) or had a lower level of education (8.2%). The monthly income of most of the divers was between 2001 and €3500 (22.2%) or between €1001 and €2000 (20.3%). A considerable number of respondents wished not to declare their income (19.2%) or earned more than €3500 per month (>€5000: 9.7%; €3501-€5000: 8.8%). Few earned less than €1000 per month (€500-€1000: 14.1%; <€500: 5.8%). The divers came from Western Europe (51.5%), Southern Europe (37%), Northern Europe (4.4%), Eastern Europe (1.4%), North and South America (4%) and other countries (1.6%). Divers were mainly specialized users with 37% *active divers* and 30.7% *committed divers* and out-numbered the generalist divers (21.4% *casual divers* and 10.8% *new divers*).

The principal component solution explained 61.66% of the total variance; KMO=0.762; Bartlett test of sphericity = 2092.794 (σ = 0,000). All components had at least three items with component loadings greater than 0,500 (Table 11). Based on the loadings within the individual components, the motivational components were labeled as *sharks and manta rays; unpolluted, uncrowded dive sites with underwater formations; social aspects: photos, knowledge, family and friends; visibility, fish abundance and easy diving.*

Table 11 shows that the predominant component was component 1, *sharks and manta rays.* It identifies the importance of the presence of blue sharks and other sharks (such as whale sharks and mako sharks) and manta rays for the decision to go diving in the Azores. The second component, *unpolluted, uncrowded dive sites with underwater formations,* included variables related to the quality of the dive sites such as pristine, undamaged, unpolluted dive sites, underwater formations (arches and caves) and absence of crowding by other divers. The third component, *social aspects: photos, knowledge, family and friends,* was mostly related to social aspects and learning such as knowledge expansion, seeking adventure and to be with family and friends. The fourth component, *visibility, fish abundance and easy diving,* was associated with underwater visibility, variance and abundance of marine life, and easy dive conditions.

The *cluster analysis* resulted in the generation of four clusters, which had 70, 96, 123 and 122 cases comprising the 411 observations (24 missing cases) (Table 12). Chi-square tests were applied to explore whether clusters differed significantly in socio-demographic characteristics. The four clusters differed significantly in specialization (χ^2 = 23.015, df = 9, p =0.006), income (χ^2 = 43.086, df = 18, p =0.001) and region of residence (χ^2 =69.097, df=15, p=0.000). The clusters do not differ significantly in age, gender or education (p>0.05). The clusters were profiled according to their income, region of residence and specialization (Table 13).

Table 11. Principal components of environmental setting features

Indicators	Components			
	Sharks and manta rays	Unpolluted, uncrowded dive sites with underwater formations	Social aspects: photos, knowledge, family and friends	Visibility, fish abundance and easy diving
Presence of other sharks	0.936	0.047	0.058	-0.052
Presence of blue sharks	0.935	0.071	0.035	-0.072
Presence of manta rays	0.798	0.072	0.071	0.181
Photo opportunities	0.402	0.055	0.387	0.315
Pristine undamaged dive sites	0.049	0.808	-0.001	0.216
Unpolluted dive sites	-0.007	0.746	0.017	0.35
Absence of crowding by other divers	0.119	0.678	0.176	-0.025
Underwater formations	0.027	0.575	0.413	0.055
Knowledge expansion	-0.006	0.212	0.755	-0.023
Seeking adventure	0.256	0.107	0.696	0.12
To be with family / friends	-0.035	0.007	0.632	0.176
Visibility	0.129	0.101	0.119	0.783
Variety and abundance of marine life	0.198	0.344	0.009	0.684
Easy dive conditions	-0.229	0.088	0.209	0.611
Explained variance (%)	19.58	15.76	13.17	12.95

Rotation Method: Varimax with Kaiser Normalization.

Table 12. Cluster scores with components extracted through PCA

Components	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Sharks and manta rays	-0.07	0.61	-0.30	-0.13
Unpolluted, uncrowded dive sites	-1.45	-0.04	0.12	0.74
Social aspects	0.19	-1.05	0.59	0.13
Visibility and abundance	-0.42	0.35	0.86	-0.89
Nr. of cases	70	96	123	122

Cluster 1: *The socializers* (n=70)

Social aspects of diving such as seeking adventure, being with family and friends and expanding knowledge were the main motivations for 17% of the sample, categorized as *the socializers.* Like in the other clusters specialized divers constituted the largest group (28.6% active and 30% committed divers). However, compared to other clusters less specialized divers such as *new* and *casual divers*

were more strongly represented in this cluster although they were the smallest group in all clusters. The region of residence was predominantly Western and Southern Europe (59.7% and 34.3%).

Cluster 2: *The shark and manta divers* (n=96)

Almost a quarter of the respondents (23.36%) was mainly interested in seeing sharks and/or manta rays but also gave importance to underwater visibility and abundance and variety of fish. They were categorized as *shark and manta divers*. Less specialized divers were underrepresented possibly due to the difficulty of a shark dive and the prerequisites established by dive centers. Also low-income divers were underrepresented due to the cost of such a dive (around 250€). Divers of this cluster were mainly residents in Western Europe and Southern Europe (56.7% and 33.7%).

Cluster 3: *The biodiversity seekers* (n=123)

Most of the respondents (29.93%) were motivated by the underwater visibility, abundance and variety of fish, and easy dive conditions and thus were labeled as *biodiversity seekers.* Members of this group were also interested in social aspects (such as spending time with family and friends) and unpolluted, pristine and less crowded dive sites. Divers of this cluster were medium-income earners as well as less experienced divers. In this cluster South European divers were the strongest representatives (61.2%). Western Europeans were less represented but still the second largest group (24.8%). This cluster had the highest percentage of North and South Americans of all clusters (7.4%).

Cluster 4: *The explorer divers* (n=122)

The second largest group (29.68%) of the sample paid attention to pristine, undamaged and unpolluted dive sites with underwater rock formations as well as to the absence of crowding with other divers. They were labeled as *explorer divers*. They were also interested in knowledge expansion, in being with family and friends and in seeking adventure. This cluster had the highest number of specialized divers. Divers of this group came mainly from Western Europe (64.5%). Southern Europeans were less represented but still the second largest group (21.5%). This cluster contained the highest percentages of the four clusters of divers from Northern Europe and other countries (6.6% and 4.1%).

Table 13. Profiles of dive clusters

Variable	Response	Socializers	Shark & manta divers	Bio-diversity seekers	Explorer divers	Total n
Income	Under 500€	10.0%	2.1%	7.3%	5.8%	25
	500-1000€	15.7%	13.5%	17.9%	11.6%	60
p=0.001	1001-2000€	14.3%	14.6%	29.3%	19.8%	84
	2001-3500€	22.9%	26.0%	21.1%	19.8%	91
	3500-5000€	1.4%	11.5%	3.3%	14.9%	34
	More than 5000€	10.0%	16.7%	3.3%	9.1%	38
	Not applicable/ prefer not to answer	25.7%	15.6%	17.9%	19.0%	78
	Total	100%	100%	100%	100%	410
Place of residence*	Northern Europe	3%	2.1%	5.8%	6.6%	19
	Southern Europe	34.3%	33.7%	61.2%	21.5%	155
	Western Europe	59.7%	56.8%	24.8%	64.5%	202
p=0.000	Eastern Europe	0%	2.1%	0%	2.5%	5
	North and South America	3%	4.2%	7.4%	0.8%	16
	Other countries	0%	1.1%	0.8%	4.1%	7
	Total	100%	100%	100%	100%	404
Specialization	*New diver*	17.1%	5.2%	17.9%	4.9%	45
	Casual diver	24.3%	19.8%	22.8%	18.0%	86
p=0.006	*Active diver*	28.6%	39.6%	37.4%	40.2%	153
	Committed diver	30.0%	35.4%	22.0%	36.9%	127
	Total	100%	100%	100%	100%	411

*regions according to United Nations Statistics Division – Standard Country and Area Codes Classification (http://millenniumindicators.un.org/unsd/methods/m49/m49regin.htm)

4. Discussion

The relationship between specialization and motivations

Results show that specialization and diving motivations are related. Experienced (*active* and *committed*) divers in the Azores were found mainly in the clusters which were motivated by the possibility to see sharks and manta rays or to appreciate unpolluted, undamaged and uncrowded dive sites with underwater rock formations (such as caves, arches and seamounts). Less specialized divers were more strongly represented in the clusters seeking knowledge expansion, adventure, to be with family and friends, underwater visibility, to see a variety of different marine life and easy dive conditions. Dearden, Bennett, and Rollins (2006) found that more highly specialized divers attached greater importance to underwater fauna and flora, sharks and manta rays, whereas for the less specialized, the social aspects and easy dive conditions were of greater importance. These findings are consistent with the *shark divers* in this study, who are not motivated by the social aspects of diving. However apart from this group, all other clusters gave some importance to social aspects, including the specialized cluster *explorer divers*. This suggests that interest in social aspects

of diving (such as knowledge expansion and spending time with family and friends) is not necessarily limited to generalist divers. Other studies also emphasize the importance of social aspects (Dimmock 2009; Ince and Bowen 2011; Todd, Graefe, and Mann 2002; Tschapka and Kern 2013) and suggest that many people participate in outdoor recreation in family, friendship or other social groups.

Expanding knowledge was also important for both specialized and generalist divers which is inconsistent with Bryan (1977) and Duffus and Dearden (1990) who suggest that specialists require little infrastructure and interpretation. Scott and Shafer (2001) disagreed with that suggestion and argued that the desire to continually develop and refine knowledge should be seen as progression along the *specialization continuum*. The Azorean results regarding knowledge expansion are consistent with this suggestion and underline the importance of providing opportunities for knowledge expansion at all stages of specialization.

The results of this study showed that specialization and motivations to dive are related but some aspects are inconsistent with expectations based on the concept of *recreation specialization* (Bryan 1977). For example the fact that the highly specialized group of *explorer divers* gave no importance to the abundance and diversity of marine life is inconsistent with the findings of Dearden *et al*. (2006). Possibly some of the motivations of specialized divers were not mentioned in the questionnaire of the present study. For instance the presence of smaller and cryptic species, which were found to be important for specialized divers whereas generalists preferred larger species (Dimmock, 2009; Cater & Cater, 2008). It is also possible that there exist different types of specialist divers, a more bio-oriented type and a type which is more interested in the technical aspect of diving. The research instruments being used may not be sufficiently detailed to distinguish amongst these different types of specialists, suggesting the need for a discrete choice approach in future research. Motivations of specialized divers may also vary between diving destinations as they seek different types of experiences and species in their dives.

Cultural background influences motivations to dive

Demographic and cultural factors influence travel decision making (Pou & Alegre, 2002) and tourist satisfaction (Kozak, 2001; Moscardo, 2006; Mustika *et al.,* 2013; Shahrivar, 2012; Turner *et al.,* 2002). In the present study no statistical difference was found between age groups, gender, education level and the motivations to dive, but income and region of residence had an impact. Other studies have shown that nationality influences the structure of destination image (Prayag & Ryan, 2011). Few studies have analyzed travel motivations and cultural differences between European countries. Kozak (2001) found significantly different motivations between British and German visitors in Mallorca and Turkey.

In the present study different diving motivations were found between Southern and Western Europeans. Other regions were less represented and therefore made it difficult to draw statistically-robust conclusions. Although Northern Europeans constitute a major group of tourists visiting the Azores (SREA, 2007), they were underrepresented among divers in this study. It can be argued that

they are not visiting the Azores for the purpose of diving but further research is necessary to draw conclusions. Divers from Southern European in the Azores differed from Western counterparts in their interest in underwater visibility, fish abundance and variability and easy dive conditions. Western Europeans showed main interest in unpolluted, uncrowded dive sites with underwater rock formations; Southerners were less motivated by those features. Both groups gave importance to social aspects. Therefore, it is suggested that motivations to dive can be different for visitors of different nationalities and cultures. Measuring cross-cultural diving motivation is a new subject in the field of tourism and therefore seems worthy of further investigation.

High interest in large iconic species

Several studies have revealed the growing interest among divers in large iconic marine species such as sharks and manta rays (Anderson *et al.,* 2011; Gallagher & Hammerschlag, 2011). Almost a quarter of the surveyed divers (N=96) were assigned to the cluster *shark and manta divers* which reflects the recent growing trend in shark diving, a new marine wildlife tourism activity in the Azores and worldwide phenomenon (Dearden *et al.,* 2007b). This activity has the potential to generate significant employment and income for local communities (Techera & Klein 2013; Topelko & Dearden, 2005; Vianna *et al.,* 2012). However unsustainable management of shark fishing raises questions about the long-term sustainability of the activity in the Azores (Bentz *et al.,* 2014). Many divers visit the Azores expecting to see sharks and manta rays around any of the nine islands due to misleading marketing, which advertises these species for the whole archipelago. However, reliable sightings of these species occur only around two islands (Pico and Faial). Currently these islands are one of the few destinations where diving with blue sharks is offered with a high success rate.

Pristine, unpolluted and uncrowded environments motivate divers

Unpolluted, undamaged, uncrowded and pristine dive sites were strong motivations for highly specialized divers in the Azores. Several internationally renown diving destinations are facing the various impacts of global climate change and of mass tourism including damaged or bleached coral reefs, underwater pollution such as waste and debris (Anthony *et al.,* 2011; Augustine, 2013; Dearden *et al.,* 2007a; Dearden & Manopawitr, 2010; Knowlton & Jackson 2008; Thurstan *et al.,* 2012). The Azores are a new diving destination with different environmental features from most well-known diving destinations. Corals exist only in deeper waters (200-300m), but pollution is marginal and visibility good (Pham *et al.,* 2013). Underwater arches, caves and seamounts and low tourism numbers distinguish this diving destination (Regional Directorate for Tourism, 2014). These results provide evidence for the importance of such diving features and disagree with the general assumption that divers are just want to see underwater fauna and flora.

Implications for management

The results of this research suggest that protecting these features is a necessary pre-requisite for a sustainable diving industry in the future. The lack of an integrated strategy for diving, one of the flagships of the regional tourism industry, can lead to unsustainable development and ultimately to

a decline in diving. While other diving destinations have seen the displacement of highly specialized divers by generalists (Dearden *et al.,* 2006) it appears the Azores are visited by divers of many specialization levels and predominantly by highly specialized divers who are motivated to dive with sharks, manta rays, as well as in undamaged, unpolluted and uncrowded dive sites with underwater formations. The Azores has a higher proportion of specialized divers than reported in several other studies (e.g. Andaman Coast, Thailand: Augustine 2013; Great Barrier Reef, Australia: Pabel & Coghlan, 2011; Florida Keys, USA: Young & Loomis, 2009) and may benefit as a receiving area for divers displaced from increasingly degraded tropical reefs. Given the displacement of more specialized divers from many established sites because of environmental deterioration and over crowding and the likely acceleration of this trend as global climate change increasingly affects the coral reefs that have provided the global diving meccas of the past (Dearden & Manopawitr, 2010), the Azores might be seen as a beneficiary of this trend, a receiving area rather than a displacement area. The Azores are in closer proximity to a major source area for divers in Europe and host diving attractions that might be more resilient to global climate change oceanic impacts in the future. However, for this to occur, there have to management interventions that help maintain these features and attract an appropriate clientele.

Researchers have recommended focusing on more specialized clientele where these exist as they often result in higher economic returns per capita and lower environmental impacts (Baldacchino, 2004; Dearden *et al.,* 2006). For the less specialized divers, the focus should be on limiting potentially damaging diving practices and providing rich experiences to encourage higher specialization. Delivery of effective education programs is again essential in this regard. The potential educational value of marine wildlife tourism activities has been outlined by several studies (e.g. Tisdell & Wilson, 2005; Townsend, 2008). Dearden *et al.* (2007a) demonstrated that diver education increases awareness of potential negative impacts of diving as well as the willingness to participate in monitoring projects. Interpretation programs also have the potential to strengthen the cognitive and moral notion of diver behavior regarding the commitment to rules and codes of conduct (De Groot & Bush, 2010). Studies have shown a growing acceptance by divers for interpretation programs (Dearden *et al.,* 2007a) and research on other marine wildlife activities has shown that participation in interpretation programs result in higher satisfaction levels (e.g. Moscardo *et al.,* 1998). The educational aspects of diving in the Azores could be strengthened through comprehensive briefings with a strong conservation component prior to the trip, an approach commonly used for whale watching tours in the Azores (Bentz *et al.,* 2013).

5. Conclusion

This study explored user motivations to participate in diving and examine the influence of diver specialization and various demographic variables on motivations. Similar to studies elsewhere it found that motivations are related to specialization but some results are inconsistent with Bryan's *specialization continuum* (1977). For example, interest in learning and spending time with family and friends was common to both specialist and generalists. This suggests that interest in social

aspects of diving is not necessarily limited to unspecialized divers and that motivations of specialized divers possibly vary between destinations seeking different experiences and species. The present study found that sharks and manta rays as well as unpolluted, uncrowded dive sites with underwater rock formations were strong motivations for specialized divers. The growing shark watching industry is of special interest to conservationists since sharks are facing high pressure from fisheries (Gallagher & Hammerschlag, 2011). Properly managed, diving can serve as a potential tool for shark conservation due to its ability to raise awareness and provide economic benefits (Kitchen-Wheeler & Stevens, 2011; Topelko & Dearden, 2005; Vianna *et al.,* 2012).

Income and region of residence also had an impact on diving motivations showing significant differences between Western and Southern Europeans. These results suggest that motivations to dive differ for visitors of different nationalities and cultures or the way they interpret scales. Studying cross-cultural diving motivations is worthy of further investigation. This research suggests that monitoring the motivation levels amongst divers can serve as an early warning system for management interventions. Understanding the social science dimensions of the dive experience will ultimately lead to a more sustainable dive industry and hopefully more effective conservation performance.

Most research on diving has been undertaken on coral reefs in the tropics. The continued and rapid decline of many reefs around the world has led some researchers to question the future viability of reef diving as an incentive-based conservation mechanism (e.g. Dearden & Manopawitr, 2010; Augustine *et al.,* 2015). The Azores may benefit as a receiving area for these displaced divers as it is closer to main diver source areas and also its attractions, such as underwater scenery and unpolluted waters, may be more resilient to global climate change effects than coral reefs. Therefore protecting environmental features is a necessary pre-requisite for a sustainable diving industry in the future. The lack of an integrated strategy for diving, one of the flagships of the regional tourism industry, may lead to unsustainable development and ultimately to a decline in diving. A coherent marketing strategy is also essential to avoid unrealistic expectations. Management needs to develop frameworks for diver education and interpretation. Focusing on education of users and raising awareness about conservation issues can strengthen sustainable practices of recreation industries and increase user satisfaction (Dearden *et al.,* 2007a; Zeppel & Muloin, 2008).

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Chapter 6

CROWDING IN MARINE ENVIRONMENTS: DIVERS AND WHALE WATCHERS IN THE AZORES

Abstract

Increasing numbers of visitors in marine environments have resulted in a growing importance of social impact understanding such as crowding. This study examines *perceived crowding* of divers and whale watching tourists in the Azores. Reported encounters and encounter norms for both whale watching boats and divers were studied and *minimum acceptable conditions* for both activities determined. *Perceived crowding* was not correlated to specialization of users and only impacted the overall satisfaction of divers. The satisfaction of whale watchers was not altered through *perceived crowding*. Environmental impacts were not perceived differently by participants reporting different levels of crowding. The five different case study islands showed different levels of crowding. Management interventions to contribute to sustainable and satisfactory marine wildlife experiences include spatial zoning, achieving higher compliance with existing regulations, improved educational and awareness programs and limiting the number of divers at some dive sites.

Key words: *carrying capacity; limits of acceptable change; marine wildlife tourism; diving; whale watching; sustainable management.*

1. Introduction

Marine recreation activities are continuing to increase in many areas around the globe. A number of studies have documented environmental impacts caused by snorkeling, scuba diving, recreational boating and whale watching (Dearden *et al.,* 2007; Diedrich *et al.*, 2011; Meyer *et al.*, 2009; Stockin *et al*., 2008; Thurstan, 2012). These activities can also negatively impact local communities and the tourism experience itself. Key factors which affect the quality of the experience for users include the number and type of other users encountered as well as the expectations and experience of the users themselves (Boyd & Butler, 1996). Noise and crowding are possible social impacts which affect tourism satisfaction. Perception of crowding is therefore one tool for assessing user satisfaction within the social setting features of a tourism destination (Bell *et al.*, 2011; Lankford *et al.*, 2008; Vaske & Shelby, 2008).

Several studies have examined crowding in coastal recreation including scuba diving and whale watching (Avila-Foucat *et al.*, 2013; Bell *et al.*, 2011; Davis & Tisdell, 1995; Inglis *et al*., 1999; Roman *et al*., 2007; Shafer & Inglis, 2000; Szuster *et al.,* 2011). However, none have compared diving and whale watching in one location and sought to understand the factors influencing differences between the activities and differences in spatial assessments of *perceived crowding*. This study examines these questions in the Azores where whale watching and diving are two of the main activities in a rapidly growing coastal tourism economy. The present study examines the tolerance for encounters with other whale watching boats for whale watchers and with other divers at a dive site as well as *perceived crowding* in several islands of the Azores. The study defines a *minimum acceptable condition* of encounters for satisfactory experiences for both activities. This assessment can help to define standards of quality for whale watching and diving in the Azores and contribute to a more sustainable marine tourism sector in the future.

The next section provides an overview of the relevant literature on crowding and presents the specific objectives of the study.

2. Conceptual framework

Concepts of crowding, encounters and norms have received considerable attention in tourism research (Manning, 2007). *Reported encounters* characterize the subjective counts of the number of people or objects that individuals remember observing in a setting (Vaske & Donnelly, 2002). *Perceived crowding* is a negative evaluation of the number of encounters (Shelby & Heberlein, 1986; Vaske & Shelby, 2008). In this case study it reflects the level of dissatisfaction with the number of other boats or divers (M) encountered. The assessment is a value judgment that the number is too many. *Encounter norms* are based on the idea that individuals have personal standards to perceive and evaluate conditions as good or bad (Shelby *et al*., 1996). Norms indicate people's opinions about what conditions should or should not be in a given area or context (Heywood, 1996). Research suggests that when users perceive a setting as crowded, they have compared the conditions with their norms about the conditions they believe should or should not occur in the area

(Vaske & Donnelly, 2002). Research has shown that norms, encounters and crowding are linked. When recreationists reported fewer encounters than their norm, they did not feel crowded, whereas those who encountered more than their norm felt crowded (Bell *et al.*, 2011; Vaske & Donnelly, 2002).

Norms in recreation have been studied with the help of Jackson's (1965) *social norm curves*. This approach describes norms as evaluative standards using a graph to evaluate acceptance of impacts associated with user experiences. Figure 6 illustrates encounters increasing from left to right, and evaluative responses (*perceived crowding*) from positive to negative. The *minimum acceptable condition* indicates the point where the norm curve crosses the neutral line and below this point conditions become less acceptable (crowded). The *norm intensity* represents the importance of an indicator to the respondents. The greater the distance from the neutral line, the higher the intensity. *Crystallization* is the amount of agreement among group members about each condition. It can be determined via the standard deviation among group respondents.
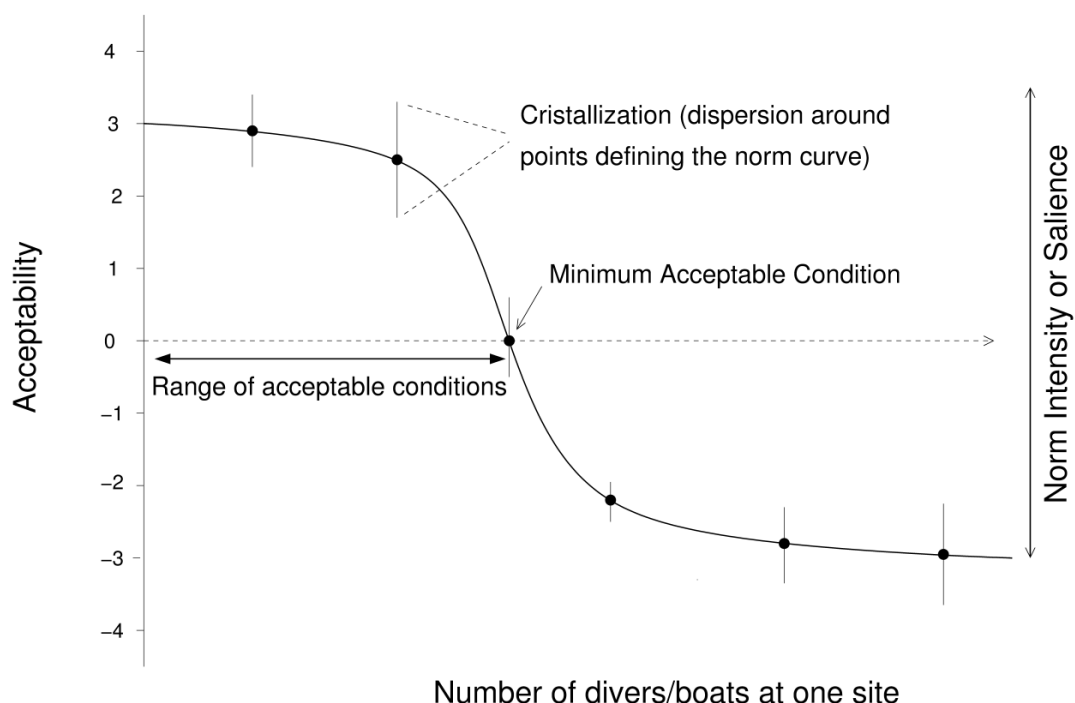
Figure 6. Hypothetical *social norm curve* (modified from Manning *et al.*, 1999)

Norm assessment can be a useful basis to measure indicators and to define standards of quality (Manning, 2011). Standards of quality define the *minimum acceptable condition* of indicator variables or the social carrying capacity. Indicators can be monitored to ensure that standards are maintained, and management interventions can be undertaken if standards are violated. To set standards for an indicator, managers need to determine the point at which experiences deteriorate below an acceptable threshold. This information feeds management schemes such as the *limits of acceptable change* framework (LAC) (Stankey *et al.*, 1984) which has been used to monitor nature-

based tourism activities (e.g., Dinsdale & Harriott 2004; Roman *et al.*, 2007; Shafer & Inglis 2000; Sorice *et al*., 2003,). This approach identifies maximum impact levels and places emphasis on positive planning and management anticipating over-use (Boyd & Butler, 1996). Indicators that are used to assess social LAC include *perceived crowding*, satisfaction, as well as social benefits and economic stability of the activity.

Norms for crowding can vary among groups (Ditton *et al.*, 1992). Bryan (1977) grouped recreationists according to their knowledge and investment in the activity into specialists and generalists. For specialists the activity is a central life interest and involves considerable investment of time, effort and money. They are often the first to discover new areas are more knowledgeable and skilled about the activity, and require minimal infrastructure or interpretation in order to achieve an enjoyable wildlife interaction experience. Due to their increased awareness of the environment and smaller numbers, they generally have a minimal impact on the environment and on the focal species. For generalists, the activity is not a central life interest and they invest less in its pursuit, both in terms of money and effort. Generalists require greater facility development and more interpretation and without adequate management interventions, they place greater pressure on both the social and the natural environments, in large part because of their greater numbers (Duffus & Dearden, 1990).

Several researchers have shown that more specialized users have different perceptions of crowding than less specialized ones (Anderson, 2007; Catlin & Jones, 2010; Leujak & Ormond, 2007). Understanding participants' needs and expectations of a recreational activity is a critical aspect of improving management responsiveness in the face of growing public interest in marine wildlife tourism opportunities.

The current study develops *social norm curves* on crowding in whale watching and diving in the Azores to assess whether *perceived crowding* increases with *reported encounters*. It uses data from five Azorean islands to address six objectives:

1. To examine users' *reported encounters* and *norms* associated with the number of whale watching boats and divers and assess *perceived crowding*.
2. To assess the *minimum acceptable condition* of encounters for satisfactory experiences.
3. To test whether crowded and non-crowded users are equally satisfied with their experience.
4. To explore whether specialist and generalist users feel equally crowded.
5. To test whether crowded and non-crowded users perceive the environmental impacts of the activity equally.
6. To examine whether *perceived crowding* is equal on all islands.

3. Study site

The Azores archipelago, situated in the north-east Atlantic, consists of nine small islands and is an emerging tourism destination for marine-related activities such as sailing, surfing, whale watching and scuba diving (Calado *et al*., 2011). Around twenty-five cetacean species can be observed in the waters of the Azores close to the shore (Bentz *et al*., 2013; Sequeira *et al*., 2009). Whale watching started in 1992, with one operator and 468 tourists in 1993. It has grown to 59 000 tourists in 2013 (Regional Directorate for Tourism, 2014) and is one of the main motivations for tourist to visit the islands (SREA, 2007). Recently the Azores has emerged as a diving destination mainly due to its large iconic species (including groupers, tunas, sharks, manta rays) and its geological underwater formations such as caves, tunnels and seamounts. However data about the number of divers is limited. Estimates oscillate between 4 000 and 7 000 divers in 2012 (Regional Directorate for Air and Maritime Transport, 2014) but actual numbers might be higher. In the archipelago 24 whale watching operators and 27 diving operators offer their services. Scuba diving takes place in all Azorean islands. Whale watching occurs only around the islands of São Miguel, Terceira, Pico and Faial (Figure 7).

Most whale watching operators use rigid hull inflatable boats for twelve to twenty-four passengers, and on São Miguel and Faial there are also medium-sized cabin-boats for up to 80 people. Dive operators also use mainly rigid hull inflatable boats for less than 10 divers and have recently started to use small cabin-boats with hard-bottom and open deck for around 15 divers. These more comfortable boats are used especially for the rapidly growing shark diving activity, where divers have to be taken to more distant dive sites (Bentz *et al*., 2014). Whale watching is regulated by a number of law decrees and rulings and requires a special permit. The approach to cetaceans must follow rules, regarding minimum distances as well as the direction, speed and time spent near the animals. A maximum of three boats at one time is allowed with a group of cetaceans. Other boats may be in the vicinity, but not closer than 500 meters (Law Decree Nr. 9/99/A, Law Decree Nr. 10/2003/A, Ruling Nr. 5/2004).

The legal decrees which regulate diving in the Azores address diver safety, certification and equipment. Diving is permitted in all marine protected areas with few constraints. The Regional Government of the Azores has published a code of conduct for diving with recommendations on how to minimize impact on marine life and the seafloor (Regional Directorate for Tourism, 2013).

Diving with sharks and manta rays is not regulated. The Regional Government published a voluntary code of conduct in 2012, which addresses preparation for the activity, safety, well-being of the animal, diver's attitude, and other concerns. It provides recommendations regarding the preparedness of the clients for shark diving. It also limits the number of divers, forbids feeding and touching sharks, and defines the type of chumming allowed to lure sharks (Regional Government of the Azores, 2012; Bentz *et al*., 2014).
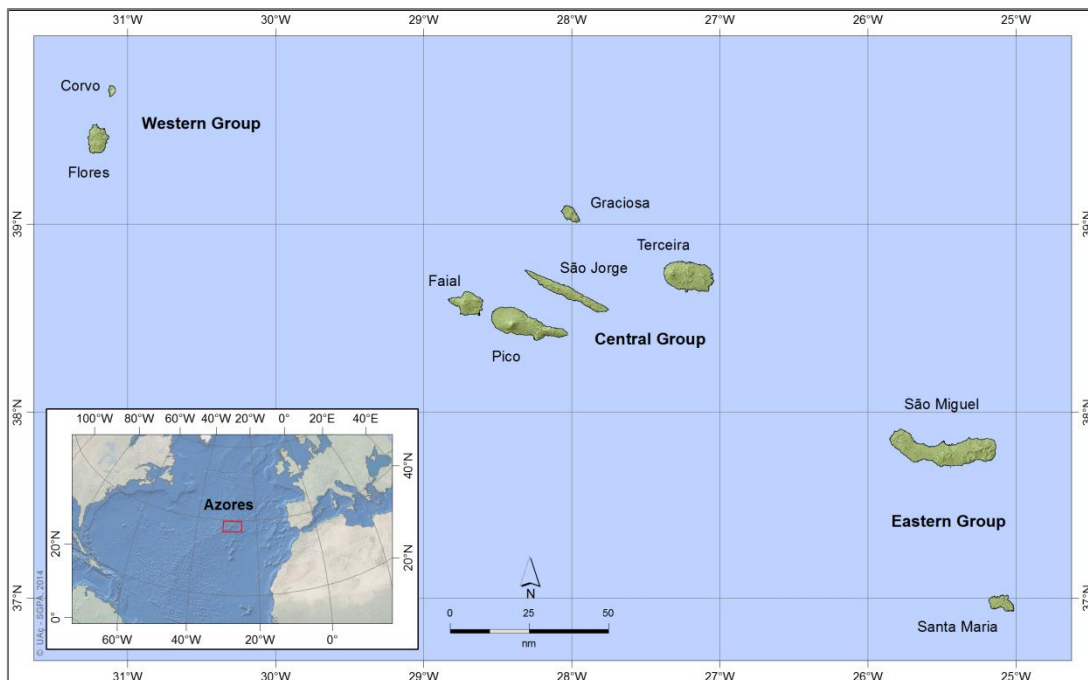
Figure 7. Geographic location of the Azores archipelago location (source: Centre of Geographic Information Systems, University of the Azores)

The strong growth of diving and whale watching in the Azores suggests increasing environmental and social impacts. Previous research has concentrated on environmental impacts of tourism activities in the Azores (Magalhães *et al*., 2002; Visser *et al*., 2011) and on interactions with local communities and fisheries (Silva *et al*., 2011) but little emphasis has been placed on assessing the tourism experience itself (Oliveira, 2005; Sequeira *et al*., 2009). There has been no assessment of management policies associated with the number of whale watching boats allowed. For diving, there is no limit for the maximum number of divers at a dive site and no studies about crowding in the Azores. Such an evaluation is necessary to limit environmental impacts and to provide satisfactory tourism experiences. Assessing divers' and whale watchers' tolerances for encounters with other divers and whale watching boats provides a basis for establishing indicators and defining standards of quality. Thus, it contributes to adaptive management and the long-term sustainability of the activities.

4. Methodology

4.1. Data collection and questionnaire design

Two self-administered questionnaires were applied as the primary data collection instrument. They consisted of 23 mainly closed-ended questions addressing various aspects including motivations and satisfaction, specialization, impact perception and demographics. The questions were developed

through a literature review and refined following a pilot study in the Azores in May 2013. Questionnaires were provided in Portuguese, English, Spanish and German. Questionnaires for whale watching tour participants were distributed on São Miguel, Pico and Faial Island from May to August 2013, which represents the main whale watching season. Questionnaires for divers were distributed on São Miguel, Pico, Faial, Graciosa and Santa Maria from June to September 2013. Tourists were selected opportunistically as they descended from the boats returning from the tours. Most operators facilitated the approach to the tourists by a brief introduction of the researcher and her assistants. The researchers distributed the questionnaires and stayed nearby in case of questions and collected the completed questionnaires. In total, 435 divers and 466 whale watchers responded to the questionnaires.

4.2. Data analysis

The concept of crowding was studied from various angles. Participants were asked whether the absence of crowding (by other divers or whale watching boats) was important for their decision to take part in the activity in the Azores. Respondents could rate their answer on a five-point Likert scale (between 1 = 'not at all important' and 5 = 'very important'). Whale watchers were asked how many whale watching boats they had observed with a group of cetaceans (*reported encounters*) and how many they considered appropriate (*encounter norms*). Divers were asked to indicate the number of divers they had witnessed at the dive site (*reported encounters*) and the number they thought would be right (*encounter norms*). In order to determine *perceived crowding* of tour participants, *reported encounters* were subtracted from *encounter norms*. A negative value indicates that encounters exceed the participant's norm and thus it was assumed that he or she felt crowded (Vaske & Donnelly, 2002). A positive value or zero indicates that encounters were less than, or equal to, the participant's norm and thus they did not feel crowded with the number of boats or divers present.

Crowded and not-crowded participants were examined regarding their overall satisfaction, specialization, perception of environmental impacts and their geographical distribution among the different islands. Overall satisfaction was measured on a 10-point scale with 1 being very unsatisfied and 10 being very satisfied. Specialization was assessed using a single-item, self-classification measure. This approach presents respondents with a few categories describing combinations of various dimensions of specialization in an activity, and then asks respondents to select a category that most accurately describes them even if they do not identify with all criteria in the category. For the divers four specialization types were suggested: the *new diver*, the *casual diver*, the *active diver* and the *committed diver*. For the whale watching questionnaire four similar types were used: the *new whale watcher*, the *passionate new whale watcher*, the *active whale watcher* and the *committed whale watcher*. The approach of self-classification takes into account the multidimensional nature of specialization, which is composed of a behavioral component, a cognitive component and an affective component. The different components of specialization included previous participation, experience and equipment as well as marine mammal knowledge or diving certificates. The participants' perceived environmental impact of both activities was

measured through a set of questions. Participants were asked to indicate their perception of impact on specific environmental aspects, on a four-point scale ranging from 1 "strongly disagree" to 4 "strongly agree". Data analysis was performed using statistical computing language R (R Core Team, 2014). Bivariate kernel densities were estimated through kernel smoothing (Duong, 2013) which computes Gaussian kernels. This technique is particularly useful to explore and visualize cloud distributions of *social norm curves*. All software used is Free and Open Source (FOSS).

5. Results

5.1. Diving

There were more male (65.7%) than female divers, mainly between 26 and 45 years old (63.2%). The majority were residents in Europe (9.6% Azorean divers, 15.4% from remaining Portugal, 68.5% from other European countries).

The absence of crowding by other divers was either an "important" or "very important" reason for the decision to go diving in the Azores for more than half (64.2%) of the divers. The *reported encounters* of divers at a dive spot varied between 1 and 28 divers (mean=7.66; sd=3.88). The divers' proposal for the appropriate number encounters ranged between 0 and 20 (*encounter norm*) (mean= 7.75; sd=3.93)(Fig. 8). Nearly a third of the divers (28.5%) proposed a smaller number than they had witnessed. Based on the findings of Vaske and Donnelly (2002) it can be assumed that they felt crowded.
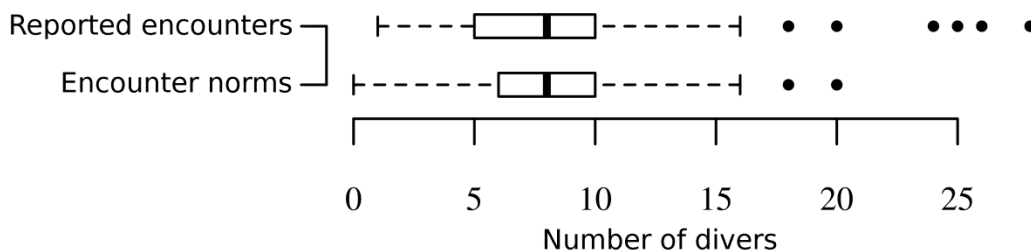
Figure 8. Range of responses regarding reported encounters and encounter norms (diving)

The relationship between *reported encounters* and *perceived crowding* (acceptability of encounters) of respondents can provide useful information for setting acceptable use levels using crowding as a criterion. Divers feel more crowded as encounters increase (Fig 9). Figure 9 presents a graphical representation of this relationship. Starting from a simple scatterplot, the estimation of a density kernel, as implemented in Duong (2014), allows the visualization of the spread of responses. Setting encounter norms, N, - represented by perceived acceptability - as a function of reported encounters, R (reported number of divers or boats), the estimate of a linear relationship allows the estimation of the *minimum acceptable condition*.

Formally:

$$N = \alpha_0 + \alpha_1 R + \epsilon$$

here $\hat{\alpha}_1$ represents the estimated *minimum acceptable condition* and ϵ the error term. The regression line constitutes an approximation to the *social norm curve*. It crosses the neutral line at 7.8165 divers indicating that when exceeding this number, divers feel increasingly crowded. This value represents the *minimum acceptable condition* for satisfactory diving experiences and provides a basis for setting standards of quality for diving in the Azores.
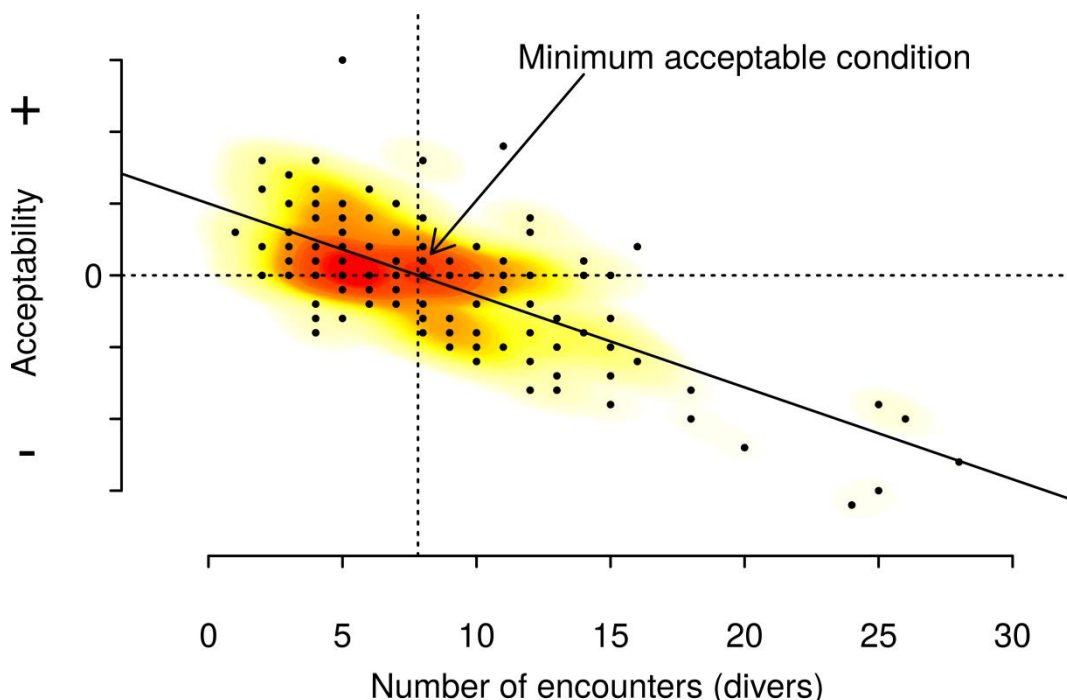
Figure 9. Acceptability of number of divers in the Azores

The satisfaction of users was measured on a 10-point scale (1 = very unsatisfied; 10 = very satisfied). The majority of divers scored 8 and higher (67.5%) with 8 being the most frequent score (34.2%) and with 7.79 being the mean value (sd=1.59). Divers who felt crowded tended to be less satisfied indicating a mean score of 7.37. *Perceived crowding* accounted for -5.4% of variance in satisfaction. The correlation between *perceived crowding* and overall satisfaction was tested using one-way ANOVA, (F=7.891; p=0.005).

There was no significant difference between the responses of crowded and not-crowded divers to the questions on the environmental impacts of diving. Experience and specialization can affect the perception of crowding. This is the case in the present study. Crowded divers were predominantly more experienced (40.2% active divers, 36.4% committed divers, 17.8% casual divers, 5.6% new divers). Not-crowded users showed lower percentages of specialist divers and higher percentages of unexperienced ones (37.7% active divers, 28% committed divers, 22.4% casual divers, 11.9% new

divers). There is a significant relationship between the level of specialization and the *perceived crowding*, confirmed by an independent samples t-test (Levene's test F = 5.030; p= 0.025), with more specialized respondents showing less tolerance for crowding (t=-2,312; p=0.021).

The geographical distribution of crowded divers results showed that responses varied between islands. On the islands Santa Maria and Faial more divers felt crowded (40.6% and 40.8%), whereas on São Miguel, Pico, and Graciosa Islands less participants felt crowded (19.5%; 29.3%; 18.8%). The correlation between island and *perceived crowding* was also tested, (χ^2 =13,629; df=4; p=0.009) and the hypothesis of no correlation rejected.

5.2. Whale watching

The number of male and female respondents was almost equal (50.4% male). Most of them were between 26 and 35 years old (32.2%) and between 46 and 55 years old (22.8%). Their place of residence was predominantly Europe (2.6% Azores, 11.8% remaining Portugal, 78.5% other European countries).

Half of the surveyed whale watchers (50.3%) reported that the absence of crowding by other boats was either of "high importance" or of "very high importance" for the decision to go whale watching in the Azores. The *reported encounters* of whale watching boats ranged from 0 to 8 with 2.69 being the mean value (sd=1.32). The norm of participants varied between 0 and maximum 5 with a mean value of 2.37 (sd=1.04) (Fig. 10). More than a third (35.8%) indicated a smaller number of boats as appropriate than they had observed and thus felt crowded.
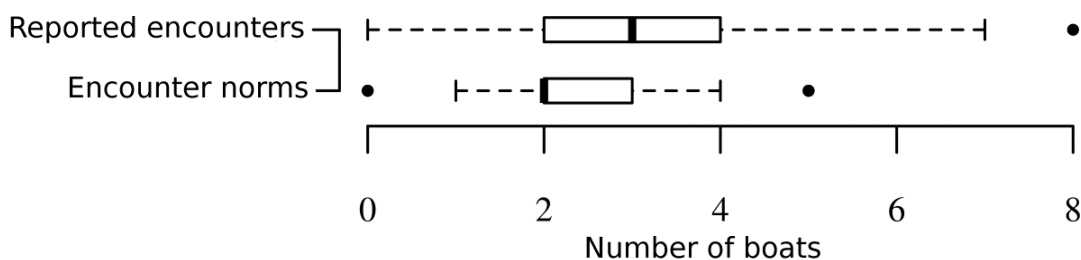
Figure 10. Reported encounters and encounter norms for whale watching boats

The relationship between *reported encounters* of boats and *perceived crowding* (negative acceptability) shows, that respondents feel more crowded as encounters increase (Fig. 11). When exceeding 2.18 boats, evaluations become increasingly negative. This value represents the *minimum acceptable condition* for whale watching boats in the Azores.
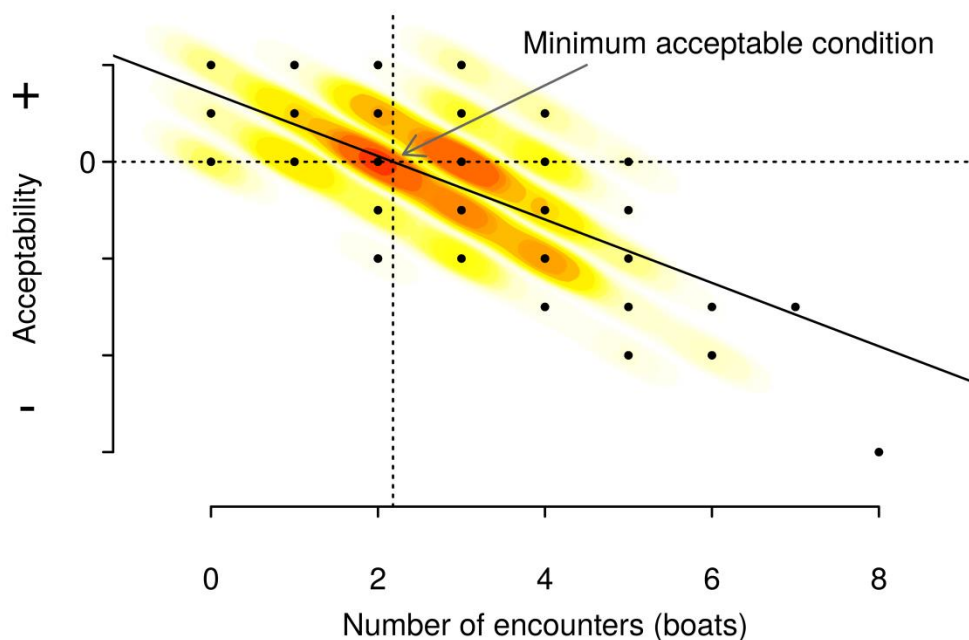
Figure 11. Acceptability of number of whale watching boats in the Azores

On the contrary to diving there is no significant relationship between general satisfaction and vessel crowding (ANOVA: F=0.382; p=0.537). The mean satisfaction value of crowded whale watchers did no differ significantly from not-crowded observers (8.478 and 8.410).

Crowded and not-crowded whale watchers also did not respond differently to the questions on environmental impacts of the activity. There was no correlation between *perceived crowding* and negative impact on whales and on other marine life (X^2=6,357; df=3; p=0.095 and X^2=5,797; df=3; p=0.122).

The relationship between user specialization and *perceived crowding* showed that crowded whale watchers were predominantly inexperienced (50% *new whale watchers*, 31.7% *passionate new whale watchers*, 13.5% *active whale watchers*, 4.6% *committed whale watchers*). In comparison, the respondents who did not feel crowded showed higher proportions among the medium specialized users (36.7% *passionate new whale watchers*, 34.9% *new whale watchers*, 25.2 *active whale watchers*, 3.2% *committed whale watchers*). The t-test results assuming equal variances between groups (Levene's test F = 0.958; p= 0.328) indicate a significant relationship between *perceived crowding* and level of specialization (t=2,467; p=0.014).

The geographical distribution of crowded whale watchers showed that crowded users concentrated mainly on Faial Island, with almost half of the respondents (45.1%) feeling crowded. On Pico and São Miguel 37.8% and 19.8% of the whale watchers wished to see less boats. There is a significant relationship between the island and *perceived crowding* (X^2=7,717; df=2; p=0.021).

6. Discussion

Expected absence of crowding important for destination choice

For a large proportion of the respondents the absence of crowding was important for their decision to participate in diving or whale watching in the Azores. The archipelago is not a mass tourism destination. Due to its year-around mild, but frequently rainy climate, the typical sun-sea-and-sand-tourism is not the main tourism form. Rather, the Azores attract tourists who go hiking, sailing, whale-watching and diving (SREA, 2007). The fact that the absence of crowding was important for the respondents suggests that they may have chosen the Azores because they expected an uncrowded atmosphere, along with other destination attributes. This question may need further research to make reliable conclusions. Nevertheless the results of this study suggest the importance of maintaining a low-crowding environment in order to guarantee high-quality and satisfactory recreation experiences.
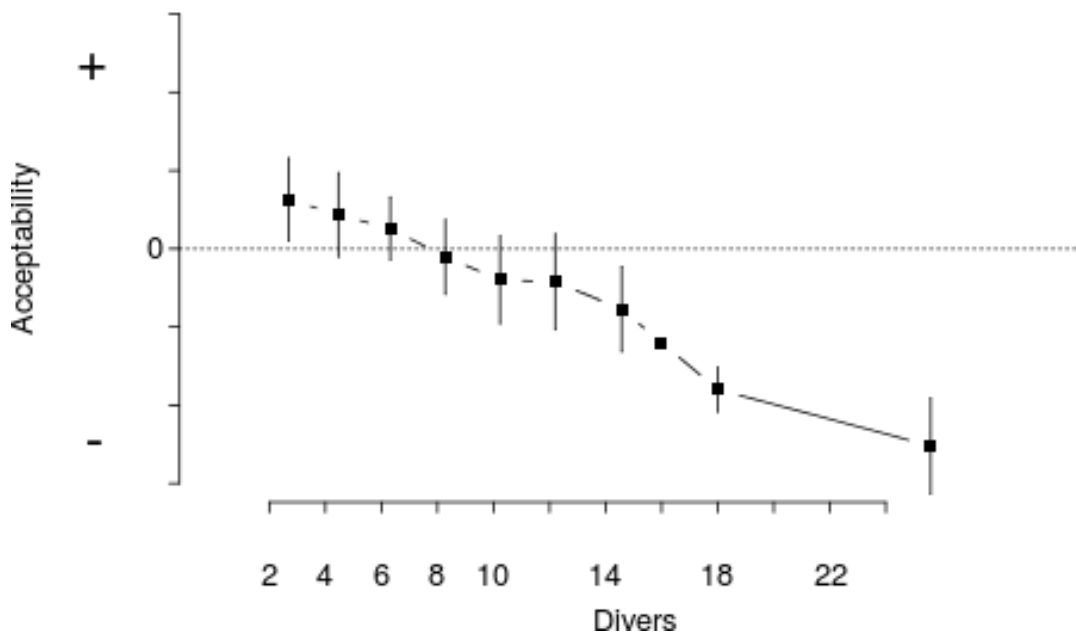
Figure 12. *Social norm curve* for number of divers in the Azores

Eight divers per site are socially acceptable

The assessed *minimum acceptable conditions* constitute an orientation for operators and managers and can provide the basis for determining social indicators and standards of quality. The *social norm curve* shows in a simplified way that when the number of divers exceeded eight, respondents demonstrated increasing preference for less divers and satisfaction decreased (Figure 12). These findings have implications for management. Currently there is no limit for divers per dive site in the Azores and the 28 observed divers at one dive site suggest that a limit should be considered.

Reported encounters of whale watching boats indicate potential law infractions

The reported encounters of whale watching boats exceeded in 21.6% of the cases the limit of three boats. This may be a sign of disregard of the regional legislation. The *social norm curve*, obtained with the mean values of 2, 4, 6 and 8 boats emphasizes the sharp decline of the curve below the neutral line, indicating that when exceeding 3 boats, acceptability decreases (Figure 13). Respondents proposed a mean of 2.37 boats, which is close to the maximum number of boats defined by the law. Similar results were obtained in a study in Banderas Bay, Mexico (Avila-Foucat *et al.,* 2013). Assessment of the sustainable number of boats with a group of cetaceans also requires information on biological indicators.
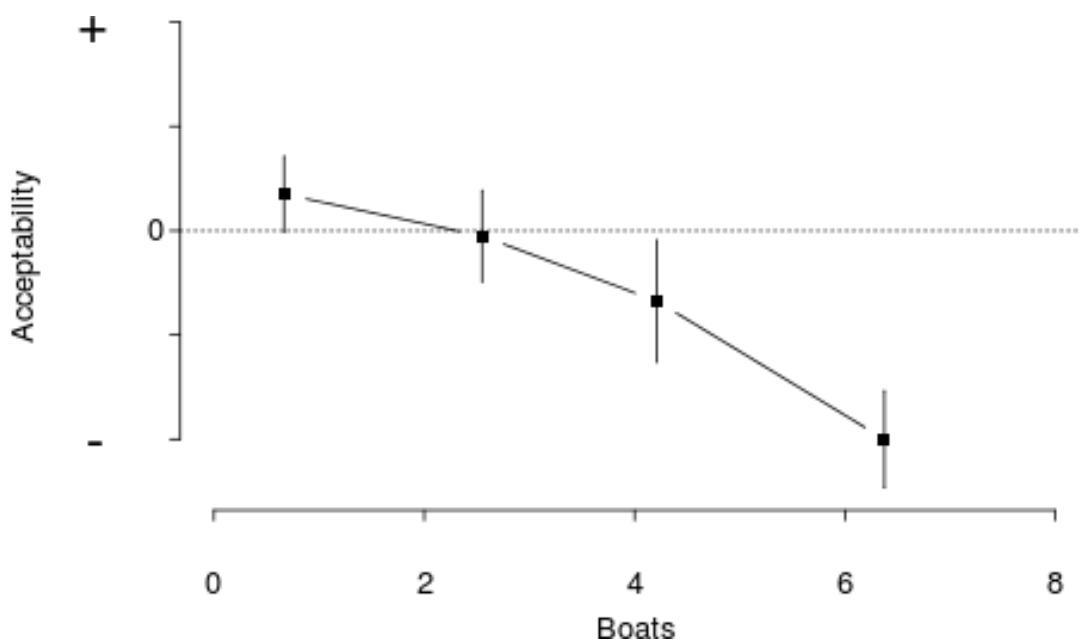
Figure 13. *Social norm curve* for number of boat encounters in whale watching in the Azores

Satisfaction reduced among crowded divers but not among crowded whale watchers

Crowded divers were less satisfied (-5.4%) with their dive. In whale watching, satisfaction was nearly equal (-0.8%) for crowded and not crowded respondents (Table 14). Several authors suggest that *perceived crowding* may affect overall satisfaction but is only one of many variables to do so (Manning, 2011; Shelby & Heberlein, 1986). High satisfaction levels, regardless of use level occur frequently because people generally choose recreation activities they enjoy and avoid those they do not. Feelings of *perceived crowding* can result in displacement of some users (so their satisfaction is not measured) or adoption of coping mechanisms. Users may change their definitions of recreation experiences to cope with excessive encounters. The correlation between *perceived crowding* and satisfaction may not be evident as satisfaction is a broad psychological construct and there exist

multiple sources of satisfaction. Recreationists sometimes make the best of even a bad situation focusing on positive aspects (Shelby & Heberlein, 1986).

Specialization increases crowding of divers but not of whale watchers

Research suggests that specialized divers tend to feel more crowded than less specialized (Catlin & Jones, 2006; Leujak & Ormond, 2007). This applies also to the divers in the Azores. The more experienced, specialized divers showed less tolerance for encounters with other divers. These results suggest the need to limit the access to certain dive sites and specialized dives in order to provide satisfactory experiences for the more highly specialized diving clientele that visits the Azores.

For the whale watching activity this relationship was not evident. The least specialized *new whale watchers* were less tolerant to increasing encounters. Possibly they had a different idea of what the activity might be like. Research has shown that people's standards and expectations are sometimes more important than the actual contacts, explaining 25 percent of the variation in *perceived crowding* (Shelby & Heberlein, 1986). The effect of expectations and preferences can have implications for management, suggesting that managers can reduce *perceived crowding* by making user expectations more realistic (Shelby & Heberlein, 1986). Accurate information about the number of boats met on a typical whale watching trip in the Azores would allow users to adjust their expectations or select a setting more to their liking. Both would reduce feelings of crowdedness among users.

Unacceptable levels of crowding being approached

Shelby and Heberlein (1986) suggest that if fewer than one third of the respondents feel crowded, the area is probably below social carrying capacity. This applies to the overall results of perceived crowding in diving (28.5%) but does not take into account higher levels on the islands Santa Maria and Faial (around 40%) or at specific dive sites, which might be reaching unsatisfactory states without management interventions. For whale watching, altogether 35.8% of the respondents felt crowded with significantly higher levels in Faial Island (45.1%). Shelby and Heberlein (1986) suggest that for areas falling between one-third and two-thirds, no clear judgment can be made and more data should be collected. Vaske and Shelby (2008) recommend that when 36–50% of users feel crowded, it can be characterized "low normal" meaning that displacement and crowding problems are unlikely to exist. Nevertheless, it has been shown that *perceived crowding* can influence the intention to return to a destination (Avila-Foucat *et al*., 2013) and crowding issues should be addressed in an early stage.

Crowding did not increase perceived environmental impacts

Studies on perceived environmental conditions and impacts have assisted conservation and diving management. *Perceived crowding* by divers can help to establish limits regarding sustainable use of dive sites (Leujak & Ormond, 2007; Roman *et al*., 2007). In the present study, crowding did not

affect the perceived environmental impacts of either diving or whale watching. Some research suggests that divers understand the gravity of diving impacts (Anderson & Loomis, 2011; Lucrezi *et al*., 2013) whereas other studies show that divers were unable to determine their impacts or rate damage correctly, suggesting the need to implement better visitor regulations and education (Dearden *et al*., 2007; Main & Dearden, 2007). The need for the latter may apply also to the present case study, where there are limited regulations for diving. As a result people may not be aware of the potential impacts on different marine species. Environmental briefings and education programs have been recommended as a management strategy to increase ecological knowledge among divers and prevent the degradation of environmental conditions (Luna *et al*., 2009; Thapa *et al*., 2005). Also in whale watching, participants are largely unaware of the potential negative impacts on the focal species and marine environment, which highlights the need for improved environmental education. Environmental briefings presently taking place before whale watching tours of most Azorean operators may not be sufficient to educate visitors.

Some islands are more affected by crowding

Results showed that some islands are more affected by crowding than others. Santa Maria, and Faial demonstrate higher levels of crowding whereas São Miguel, Pico and Graciosa show lower levels. Santa Maria and Faial are among the islands which have attracted attention among divers due to the occurrence of blue sharks, mako sharks, whale sharks and manta rays. Shark diving, an emerging subsector of the diving industry in the Azores, involved approximately 7000 divers in 2011 (Bentz *et al*., 2014). The results of this study suggest the potential for over-crowding and the need to intervene and limit divers per site in these islands to avoid future unsustainability in both social and environmental realm. Spatial zoning of diving, especially with reference to specialization has been discussed by Dearden *et al*. (2006).

Whale watching was more affected by crowding in Faial Island. Pico and Faial comprise one management zone and operators from Pico can go to the coast of Faial to observe whales and vice versa. Although theses operators theoretically possess a large observation area which includes the coastline of three islands (Pico, Faial and São Jorge) the actual observation area depends on the location of the look-outs on land who spot the whales with binoculars. Also the more stable weather conditions on the south coast and the available port infrastructure have influenced the distribution of whale watching. While in Pico operators are distributed on two opposite points of the island, in Faial all operators concentrate in the city of Horta. Dividing the management zone of Pico and Faial as well as a better distribution of look-outs are possible management interventions to mitigate crowding.

Perceived crowding in diving could be reduced by providing guidelines for spacing between dive groups. Temporal zoning could also limit the number of divers that users encounter. These approaches allow managers to reduce crowding while maintaining overall visitation rates (Needham *et al.,* 2011). Development and implementation of such management strategies should be supported by a broader planning process such as LAC involving local and regional stakeholders.

Integrating normative research into these planning approaches provides the opportunity to benefit users and coastal communities and support equitable sharing of marine resources.

Table 14. Comparison of activities, results and potential management interventions

Study objectives	Variable	Results: Diving	Results: Whale watching	Management proposal
	Importance of absence of crowding for destination choice	Important or very important for 64.2% of respondents	Important or very important for 50.3% of respondents	Address crowding issues in management of both activities
1st objective	*Reported encounters*	Range: 1-28 divers Mean: 7.66 (sd=3.88)	Range: 1-8 boats Mean: 2.69 (sd=1.32)	**Diving:** consider limit; collect more data **Whale watching**: control compliance to law; collect more data
	Encounter norm	Range: 0-20 divers Mean: 7.75 (sd=3.93)	Range: 0-5 boats Mean: 2.37 (sd=1.04)	
	Perceived crowding	28.5% of respondents	35.8% of respondents	
2nd objective	*Minimum acceptable condition*	7.8165 divers	2.18 boats	**Diving:** consider to limit divers **Whale watching:** control compliance to law
3rd objective	Effect of crowding on satisfaction	-5.40% of variance	-0.80% of variance	Diving: Consider limit divers per site
4th objective	Effect of *specialization* on *perceived crowding*	Specialized divers feel more crowded	*New whale watchers* and highly specialized feel more crowded	**Diving:** limit access to specialized dives **Whale watching:** adapt briefing to avoid wrong expectations
5th objective	Perceived negative environmental impact	No effect	No effect	**Diving & whale watching**: strengthen participants' education
6th objective	Geographical distribution of *perceived crowding*	Crowded: Santa Maria, Faial Less crowded: São Miguel, Graciosa	Crowded: Faial Less crowded: São Miguel, Pico	**Diving:** temporal/ spatial zoning, spacing between groups in Santa Maria & Faial **Whale watching:** spatial zoning; distribute look outs; control maximum numbers of boats

7. Conclusion

The Azores are an emerging marine wildlife tourism destination with diving and whale watching being the main activities. To facilitate continued development of a sustainable industry it is essential that visitors have satisfactory experiences. Crowding is a main aspect of the recreation experience

that can lead to unsatisfactory experiences, especially in destinations such as the Azores that offer alternative kinds of tourist attractions based on outdoor activities. Overall, crowding is still not a limiting factor at most sites in the Azores for diving and whale watching. However, there are some sites where crowding is becoming more important and management interventions are more effective if introduced before rather than after a chronic problem develops. Management interventions suggested here include limiting the number of divers per site and enforcing existing whale watching regulations together with improved environmental education of both user groups to reduce environmental impacts. The results obtained in this study can contribute to a more sustainable management approach for diving and whale watching in the Azores. To apply a planning process such as the LAC framework, the obtained social indicators *perceived crowding*, *minimum acceptable condition* and satisfaction have to be complemented with data regarding economic stability of the activity as well as with biological indicators which measure the impact the industry on the target species and on its environment, including changes in population numbers of the focal species, reproductive capacity, animal fatalities, demonstrated changes in the behavior and water quality (Duffus & Dearden, 1990; Higham *et al.*, 2009).

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Chapter 7

ENHANCING SATISFACTION AND SUSTAINABLE MANAGEMENT: WHALE WATCHING IN THE AZORES

Abstract

This study explores satisfaction with whale watching tours in relationship to expectations and demographic variables and identifies tour aspects that contribute to satisfaction. Based on a survey of 466 participants it applies both *importance-performance* (IP) *analysis* and *performance-only perspective* to strengthen the reliability of the results and enable a critical analysis of both approaches. Environmental-friendly conditions were the most important expectation. Seeing one whale, seeing lots of whales, the cost of the trip and the boat type were the most influential factors contributing to satisfaction. Cost has not been previously identified as a factor influencing the satisfaction of whale watching customers. Satisfaction was also related to participants' place of residence. Some results of the IP analysis were inconsistent with the *performance-only approach*. Several tour features identified as important by IP analysis, have little impact on satisfaction, suggesting that the *performance-only approach* provides a more valid insight into satisfaction.

Key words: *Importance-performance analysis; performance-only perspective; ecotourism; marine wildlife tourism; tourists' attitudes.*

1. Introduction

1.1. Human dimensions of whale watching

Whale watching is a marine wildlife tourism market with the potential to generate economic and environmental benefits to regional economies. Whale watching in Europe generated 97 million dollars of revenue in 2008 and has grown at an annual rate of 7% during the last decade. The Azores with a 15.5% annual growth rate in whale watching are one of the European regions with a higher growth rate (O'Connor *et al*., 2009). Whale watching is reported by 12.5% of tourists as the main motivation to visit the Azores (SREA, 2007).

Research on whale watching has studied the potential environmental impacts (e.g. Bejder *et al*., 2006; Duffus, 1996; Lusseau, 2004; Magalhães *et al*., 2002), as well as recognizing the complexity of factors influencing whale watchers such as participant personality, attitude, motivations, preferences, satisfaction and perceptions (e.g. Andersen & Miller, 2006; Amante-Helweg, 1996; Avila-Foucat *et al*., 2013; Christensen *et al*., 2009; Duffus & Dearden, 1993; Evans, 2005; Higham & Carr, 2003; Orams, 2000; Valentine *et al*., 2004). However, what people value in a whale watching trip and which factors contributes to overall satisfaction has been less studied.

Satisfaction with outdoor activities can be influenced by many variables (Orams, 2000). The demographic profile of the visitor can influence satisfaction including gender (Musa, 2002), education level (Reynolds & Braithwaite, 2001), previous experience (Christensen *et al*., 2009) and nationality (Kozak, 2001a; Moscardo, 2006; Pearce, 2006). Environmental conditions such as weather as well as crowding can have an impact on overall satisfaction (Birtles, *et al*., 2002; Musa, 2002). Visitor satisfaction with whale watching tours has been related to factors such as proximity to whales (e.g. Duffus & Dearden, 1993; Kessler *et al*., 2014; Moscardo, 2006; Mustika *et al*., 2013; Valentine *et al.*, 2004; Zeppel & Muloin, 2013), the number of cetaceans seen (Moscardo, 2006; Mustika *et al*., 2013; Orams, 2000; Valentine *et al*., 2004) and whale behavior (Duffus & Dearden, 1993; Zeppel & Muloin, 2013). Other important factors related to satisfaction include knowledge provision on whales and marine life, the variety of different marine wildlife seen (Duffus & Dearden, 1993; Moscardo, 2006; Zeppel & Muloin, 2013), the natural setting and scenery (Mustika *et al*., 2013; Zeppel & Muloin, 2013) and satisfaction with the facilities (Moscardo, 2006). Many of the factors contributing to satisfaction in whale watching (e.g. the number of whales seen) cannot be controlled in the same way as many other attractions. Given the complexities of understanding satisfaction at a site where a key attraction cannot be controlled, holistic approaches are needed to address this subject (Coghlan, 2012; Scarpaci & Parsons, 2014).

1.2. Measuring satisfaction in recreation activities

There are two dominant conceptual approaches for measuring satisfaction in outdoor recreation. One is rooted in expectancy theory and suggests that participants engage in recreation activities with the expectation that this will fulfill selected needs, motivations, or other desired states (Manning, 2011). The congruence between expectations and outcomes defines satisfaction (Chon,

1989; Dann, 1981). If expectations are met or exceeded, the participant is satisfied and unfulfilled expectations alter judgments of satisfaction about a destination or activity (Noe & Uysal, 1997; Pearce, 2006). Several approaches derive from this model including contrast theory, aspiration theory, gap analysis and *importance-performance analysis* (Kozak, 2001a).

The other dominant approach to satisfaction assessment is the performance-only perspective where the customer's perception of the quality of the product or experience is what really matters for satisfaction (Kosak, 2001a; Pearce, 2006). It is argued that regardless of the existence of previous expectations, the customer is likely to be satisfied when a product or service performs at a desired level. Clarity of the task for the respondent and consequently higher reliability of results are advantages of this strategy. The approach is recommended for measuring tourist satisfaction with scenic qualities and environmental features as opposed to instrumental, basic setting features of an experience (such as toilets, physical comfort of the location) (Pearce, 2006). Studies applying this approach examine which factors are related to satisfaction.

Generally, studies measuring satisfaction apply either a technique based on expectancy theory or on a performance-only perspective. In this study both approaches are applied to measure satisfaction with whale watching tours enabling a critical analysis of the two approaches for measuring satisfaction in outdoor activities.

This study presents a quantitative analysis of overall whale watching satisfaction and with tour attributes and has four specific objectives:
1. Explore satisfaction compared to expectations of tour participants
2. Analyze participants' overall satisfaction and explore factors significantly related to, and contributing to, satisfactory whale watching
3. Compare the results of the expectancy theory with the performance-only perspective
4. Discuss results and applied approaches as input for sustainable whale watching management.

1.3. The Azores as a case study

The Azores archipelago, situated on the mid-Atlantic ridge, consists of nine small islands (Fig. 14). Coastal recreational activities are a major tourist attraction featuring sailing, boat tours, cruise tourism, hiking, whale and dolphin watching, sport fishing and scuba diving (Calado *et al.*, 2011). Whale watching plays an important role within the tourism sector, as the Azores offer a great diversity of cetacean species close to the shoreline (Bentz *et al.*, 2013; International Council for the Exploration of the Sea (ICES), 2010). Resident populations of common dolphins, bottlenose dolphins and sperm whales can be spotted all year long. Migratory species such as blue whales and sei whales can be spotted in certain seasons. Twenty-four operators have active whale watching permits to offer trips around the islands of São Miguel, Terceira, Pico and Faial. Most operators use rigid hull inflatable boats for twelve to twenty-four passengers, and there are also medium-sized cabin-boats for up to 80 people.

Despite considerable growth of the whale watching industry in the Azores, little emphasis has been placed on assessing the tourism experience (Oliveira, 2005; Sequeira *et al.*, 2009). Measuring whale watching tourist satisfaction in the Azores is a necessary pre-requisite for successful destination marketing and for sustainable management of the activity. This study provides a detailed analysis exploring user satisfaction in order to enhance a more sustainable whale watching management and contributes to fill a knowledge gap regarding satisfaction with whale watching tours in general.
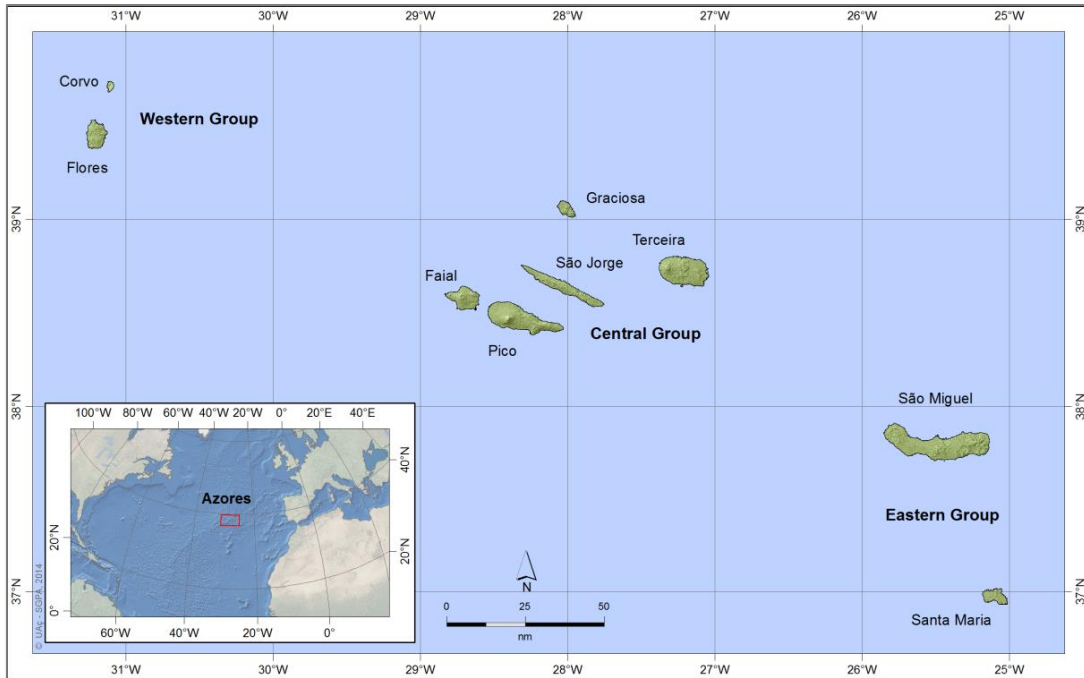
Figure 14. Azores geographic location (source: Centre of Geographic Information Systems, University of the Azores)

2. Methodology

A self-administered questionnaire was the primary data collection instrument. It consisted of 23 mainly closed-ended questions addressing various aspects of the experience including demographics, visit characteristics, motivations and satisfaction, specialization and impact perception. The questions were developed through a literature review and refined following a pilot study in the Azores in May 2013. Questionnaires were provided in Portuguese, English and German and distributed on São Miguel, Pico and Faial Islands from May to August 2013, the main whale watching season. Both weekdays and weekends were sampled. Tourists were selected opportunistically as they descended from the boats returning from the tours. Most operators facilitated the approach to the tourists by a brief introduction of the researcher and the assistants. The researchers distributed the questionnaires and stayed nearby in case of questions and collected the completed questionnaires. In total, 466 whale watchers responded to the questionnaires.

The concept of satisfaction was studied from different angles. An *importance-performance* (IP) *analysis* was performed to assess satisfaction compared to expectations. This approach compares the importance of expectation for particular elements of the experience to satisfaction (Martilla & James, 1977). It has been used frequently to investigate satisfaction compared to expectation in recreation settings (Dwyer *et al*., 2012; Ryan & Cessford, 2003; Sever, 2015) with some application to nature tourism settings such as protected areas and wildlife tourism (Coghlan, 2012; Tonge & Moore, 2007; Tonge *et al*., 2011; Ziegler *et al*., 2012). It can also be used to formulate indicators of quality due to its ability to determine variables important to visitors and the performance of these indicators (Azzopardi & Nash, 2013). The technique has gained acceptance because of its ability to illustrate results and suggest action to improve performance. Originally the results were presented in a two-dimensional grid with four categories: (1) high importance and high performance (keep up the good work; sustain resources), (2) low importance and high performance (possible overkill; curtail resources), (3) low importance and low performance (low priority; no change in resources) and (4) high importance and low performance (concentrate here; increase resources) (Martilla & James, 1977). Alternatively to the grid, the diagonal line approach which separates the graph into two areas, has been recommended as more appropriate in assessing the high priority features requiring management attention (Dearden & Harron, 1994; Bacon, 2003), and this is the approach taken in this research. The points above the line indicate an area of high priority for improvement and opportunity (area of concern; I > P), while the region below suggests low priorities (performance satisfaction; I < P) and a sustainable industry.

A frequent problem with IP analysis is insufficient variance between importance and performance scores making it difficult to interpret the outcome with confidence (Azzopardi & Nash, 2013; Lai & Hitchcock, 2015). Another problem is non-normal distributions, which are frequent in studies measuring satisfaction with a scale due to a commonly weak usage of the lower end of the scale (Noe & Uysal, 1997). These so called "ceiling effects" (Oh, 2001) possibly arise from desirability, unawareness, respondent fatigue or self-esteem protection (Azzopardi & Nash, 2013; Pearce, 2006). Ordinal data gathered by surveys are therefore often skewed which especially affects mean scores (Shieh and Wu, 2011). Martilla and James (1977) and Shieh and Wu (2011) recommend the use of the median scores when there is insufficient variance or when the importance ratings show a non-normal distribution (Oh, 2001). On the contrary to the mean, the median is robust to outliers and thus is more suitable for ordinal or highly skewed interval data (Shieh & Wu, 2011). Alternatively, performance and importance scales can be normalized so that the same ratings have the same weight on both scales (Sever, 2015) or *cluster analysis* can be applied to divide the segments of the sample and then IPA can be conducted with different segments (Lai & Hitchcock, 2015). In contrast to most studies in tourism research, which use mean scores for the IP analysis (Frauman & Banks, 2011; Tonge & Moore, 2007; Tonge *et al*., 2011; Ziegler *et al*., 2012) this study used median scores of importance and satisfaction as a result of small variance of ratings and non-normal distributions.

In addition to the IP analysis this study also applied a performance-only perspective both to provide a broader base of understanding on satisfaction and also to be able to compare the results of these two approaches. Based on the *performance-only approach* several different types of analysis were

conducted to explore the relationships between various factors and overall satisfaction with the whale watching experience. Kruskal-Wallis tests were performed to explore relationships between factors significantly related to satisfaction. A Spearman correlation was computed between variables measured with rating scales and overall satisfaction.

3. Results

3.1. Respondent profiles

The number of male and female respondents was almost equal (50.4% male). Most of them were between 26 and 35 years old (32.2%) or between 46 and 55 years old (22.8%). Their place of residence was predominantly Western Europe (Austria, Belgium, France, Germany, Netherlands, Switzerland; 44.1%), Northern Europe (Denmark, Finland, Ireland, Sweden, Great Britain; 29%) and Southern Europe (Italy, Portugal, Spain; 18.8%). Eastern Europeans (Czech Republic, Hungary, Poland, Ukraine, Russian Federation; 2.4%), North Americans (USA, Canada; 4.6%) and other countries (China, South Africa and Chile) were less represented. Most of them were highly educated, with 30% having a bachelors' degree, 26% possessing a masters' degree, 17.3% post-secondary (non-tertiary) education, 15.2% having completed upper secondary education and 5.4% having a doctoral degree. Only 6.1% possessed either lower secondary or primary education. The majority income was between 2001 and 3500 Euro (26.6%) and between 1001 and 2000 Euro per month (26%). Over 12 percent had a monthly income between 3500 and 5000 Euro or more (6.1%). Low income earners were less represented with 7.8% earning 500-1000 Euro or less than that (2.8%). Almost a fifth of the respondents (18.4%) did not indicate the income.

3.2. Satisfaction compared to expectations

To measure satisfaction compared to expectations, respondents were asked to rate 17 environmental and service features according to their importance on a five-point Likert scale (between 1=not at all important and 5= very important). For the purpose of analysis, a score of 4 or 5 was considered important. The most important expectations were to see whales in a respectful manner for the whales and environment, the operator's commitment to the environment, knowledge and information provided by guide and to see at least one whale. It is worth noting that if only the "very important" category is considered, seeing a whale was the most important expectation for the tour. Figure 15 illustrates the importance of environmental and service features based on the percentage of respondents who scored a feature as important. Participants place great importance to the conditions under which they see whales. Together with seeing a whale and knowledge and information provided by the guide, these were the most important tour features.
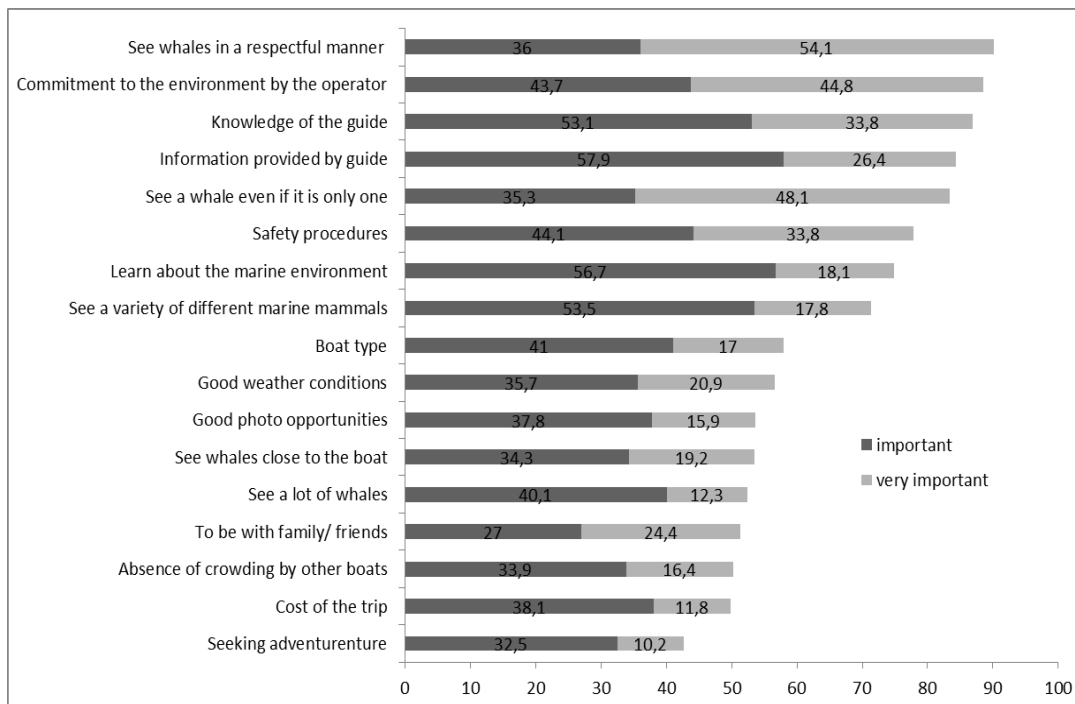
Figure 15. Importance of environmental and setting features (Percent)

Respondents were then asked to rate their satisfaction with the same 17 environmental and service features on a five- point Likert scale (between 1= very unsatisfied to 5= very satisfied). The majority of respondents indicated they were satisfied with the type of boat, the knowledge and information provided by guide, the commitment to the environment by the operator and with seeing whales in a respectful manner for whales and environment. More than half of the respondents were very satisfied with that fact that they saw a whale. Figure 16 illustrates the results of this analysis in terms of percentage of respondents who rated the features as "satisfied" and "very satisfied" (scores 4 and 5).

The IP analysis was performed using the importance and satisfaction median scores and the diagonal line method (Figure 17). Results suggest that respondents were generally satisfied with environmental and service setting features of the whale watching tour. Almost all tour features are positioned on the line indicating that expectations regarding the respective tour features were satisfied. In the *performance satisfaction* area was three features "seeing at least one whale", "seeking adventure" and "cost of the trip". Expectations for those tour features were exceeded. Two features were located in the *area of concern*: "Seeing whales in a respectful manner for whales and environment" and "absence of crowding by other boats". A gap analysis was performed to identify features with different importance and satisfaction median scores through subtraction of satisfaction median scores from importance median scores (Table 15). A positive value indicates a tour feature in which visitor expectations were not met, with dissatisfaction increasing with

increasing size of the discordance between the two values. Negative values represent features that were found to be satisfactory.
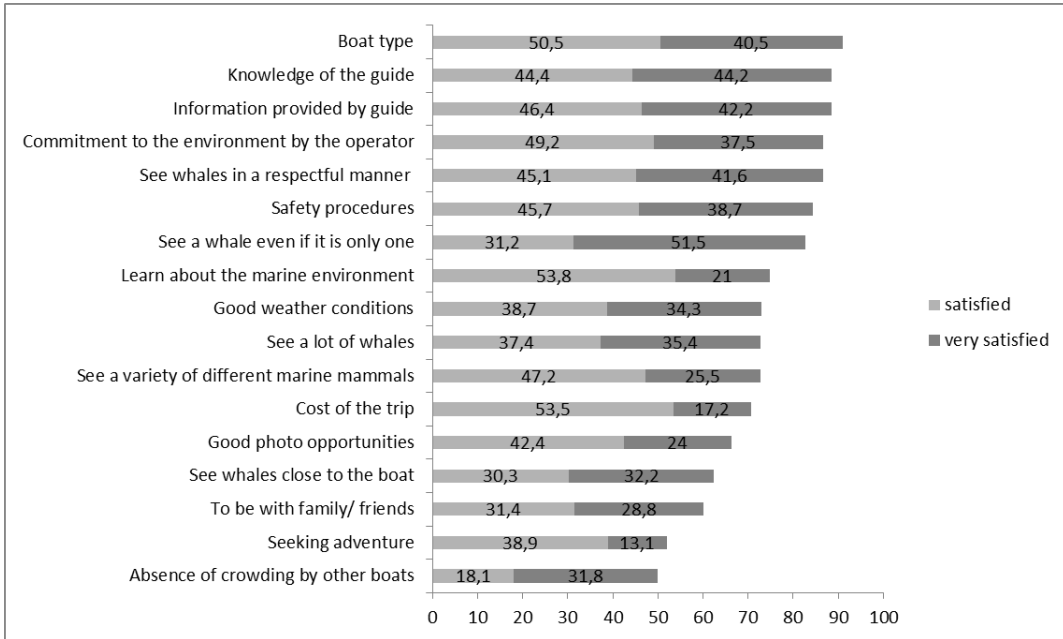
Figure 16. Satisfaction with environmental and service setting features (percent)
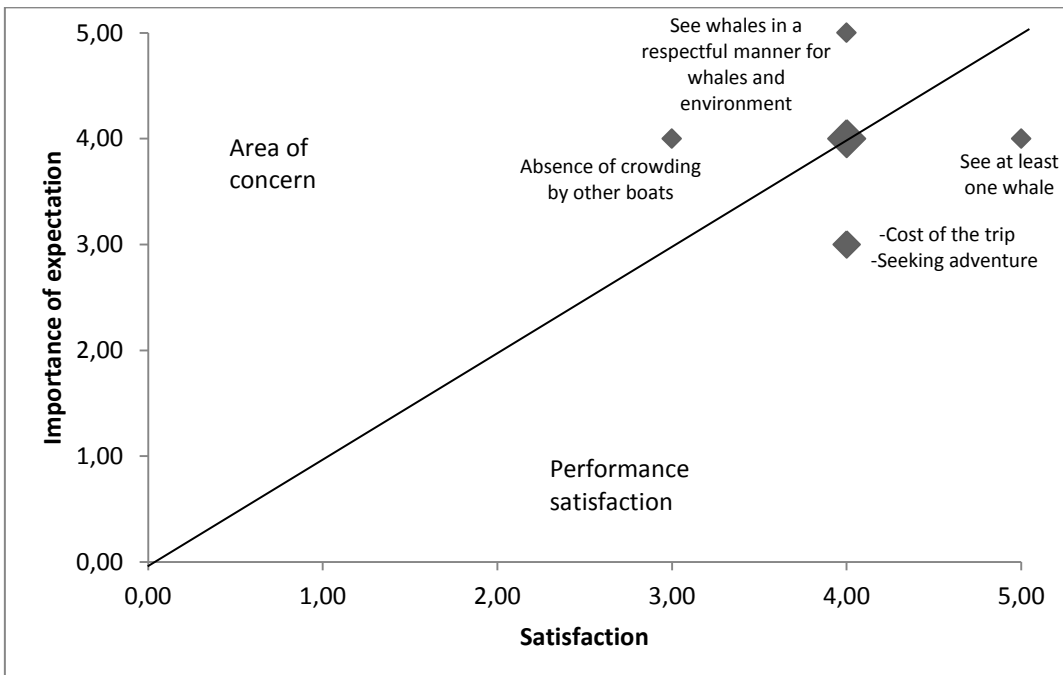
Figure 17. Graphical representation of Importance-satisfaction analysis

Table 15. Importance-satisfaction analysis and gap analysis

		Importance of expectation		Satisfaction		Gap value
		Mean	Median	Mean	Median	I-P
1.	See a whale even if it is only one	4.26	4	4.27	5	-1
2.	See a lot of whales	3.47	4	4.01	4	0
3.	See whales close to the boat	3.6	4	3.86	4	0
4.	See a variety of different marine mammals	3.85	4	3.95	4	0
5.	See whales in a respectful manner for whales and environment	4.42	5	4.26	4	1
6.	Seeking adventure	3.16	3	3.57	4	-1
7.	Absence of crowding by other boats	3.52	4	3.59	3	1
8.	Good photo opportunities	3.57	4	3.87	4	0
9.	Learn about the marine environment	3.87	4	3.91	4	0
10.	To be with family/ friends	3.38	4	3.79	4	0
11.	Good weather conditions	3.62	4	4.03	4	0
12.	Boat type	3.59	4	4.31	4	0
13.	Information provided by guide	4.08	4	4.26	4	0
14.	Safety procedures	4.08	4	4.21	4	0
15.	Knowledge of the guide	4.19	4	4.30	4	0
16.	Commitment to the environment by the operator	4.33	4	4.30	4	0
17.	Cost of the trip	3.53	3	3.85	4	-1

Participants were also asked to indicate general satisfaction compared to expectations. Possible answers were ranging from "much worse" to "much better" without indication of a type of scale. For more than half of the respondents expectations were exceeded (57.9%). For around a third of the respondents expectations were met (32.6%) and 9.5% indicated that satisfaction fell below expectations. These results confirm the outcome of the IP analysis that most expectations are satisfied

3.3. Performance – only approach and factors related to satisfaction

The overall satisfaction of participants was measured on a 10-point scale (1 = very unsatisfied; 10 = very satisfied). There was a relatively high level of satisfaction with the whale watching tours with 83.9% of the respondents scoring between 8 and 10 and a mean score of 8.48. To explore the relationships between overall satisfaction and various factors Kruskal-Wallis (KW) tests were performed. A Spearman correlation was computed between variables measured with rating scales and overall satisfaction (Table 17). There was a significant relationship between the place of origin and overall satisfaction. Highest mean satisfaction scores were obtained by visitors from North America followed by Northern Europe and Southern Europe. Participants from Eastern and Western Europe were less satisfied (Table 16). There was no significant relationship between overall satisfaction and gender, age or education level (p>0.05).

Table 16. Place of origin related to overall satisfaction

Region[a]	Mean satisfaction (sd)
North America (n=20)	8.90 (0.44)
Northern Europe (n=130)	8.69 (1.11)
Southern Europe (n=84)	8.42 (1.0)
Western Europe (n=195)	8.38 (1.38)
Eastern Europe (n=11)	7.91 (2.62)
others[b] (n=5)	7 (1.0)

[a]according to United Nations Geo scheme; [b] China, South Africa, Chile;
sd= standard deviation

Satisfaction with environmental and service setting features was significantly related to overall satisfaction, showing that a positive performance of each feature contributed to an overall satisfactory experience (significance was tested with a KW test; p<0.001) except the feature "seeking adventure". However certain features contributed more than others to overall satisfaction, namely satisfaction with seeing at least one whale, seeing lots of whales, cost of the trip and type of boat (Table 17).

Table 17. Factors significantly contributing to overall satisfaction

Factors Satisfaction with:	Spearman correlation with overall satisfaction
See at least one whale	**rho=0.415****
See lots of whales	**rho=0.332****
Cost of the trip	**rho=0.308****
Boat type	**rho=0.302****
See whales close	rho=0.283**
Learn about the marine environment	rho=0.275**
See whales in a respectful manner for whales and environment	rho=0.270**
Knowledge of the guide	rho=0.252**
Information provided by the guide	rho=0.243**
See a variety of different marine mammals	rho=0.241**
Safety	rho=0.240**
Commitment to the environment by the operator	rho=0.205**
Good photo opportunities	rho=0.202**

**p<0.001

4. Discussion

High overall satisfaction

The mean satisfaction score of this study was 8.48 out of 10 with 83.9% of the respondents scoring between 8 and 10. In accordance with Pearce's (2006) benchmarking study and Hanan and Karp (1989) the satisfaction score obtained in this study can be classified as high. Pearce (2006) analyzed various cases in an international satisfaction study and developed a scale whereby mean scores smaller than 7.1 are considered low, mean scores between 7.1 and 7.8 are moderate and mean scores greater than 7.8 are good. Pearce (2006) also used the categorization of Hanan and Karp (1989) who considered the satisfaction level high when 85%–90% of the scores were between 8 and 10. When 70%–80% of scores are 8–10, the satisfaction is considered medium and when 60% or

fewer responses were 8, 9 or 10, satisfaction is considered low. It can be argued that a large part of the high overall satisfaction scores obtained in this study, can be credited to the good whale watching conditions in the Azores with an almost 100 percent probability of seeing whales (Bentz *et al*., 2013).

Place of residence and satisfaction of whale watchers are related

The place of residence had an impact on overall satisfaction with North Americans being the most satisfied, followed by Northern Europeans and Southern Europeans. Less satisfied were Western Europeans, Eastern Europeans and other countries. Other studies have also found that the nationality or place of residence can have an impact on tourist satisfaction or the way they use scales (Araña & Leon, 2013; Kozak, 2001b; Moscardo, 2006; Mustika *et al*., 2013; Saltzer, 2002; Shahrivar, 2012). According to Pearce and Moscardo (1984) an important component of satisfaction is the similarity of the cultural values system of the tourist and the host. Culture has an impact on perceptions of service quality and thus on satisfaction (Turner *et al.*, 2002). Demographic and cultural factors can also influence travel decision-making and satisfaction (Pou & Alegre, 2002). Few studies have analyzed cultural differences in satisfaction levels between European countries (Araña and Leon, 2013; Kozak, 2001b; Pantouvakis, 2013). Studies examining different levels of satisfaction among whale watching tour participants of different nationalities are still lacking.

The results of this study suggest that satisfaction with whale watching experiences are different for visitors of different nationalities and cultures. The high satisfaction scores of some of the main markets for the Azorean tourism industry suggest a good whale watching performance in the Azores. Measuring cross-cultural customer satisfaction is a little studied subject in the field of tourism and therefore worthy of further investigation. Araña and Leon (2013) recommend the use of anchoring vignettes to adjust satisfaction levels of different nationalities through the application of a simulated threshold model in order to avoid potential bias of results. They suggest that this technique has the potential to position satisfaction responses on a common cross-cultural and interpersonally comparable scale.

Importance of environmental-friendly whale watching and learning

Similar to findings of Lück (2003) and Moscardo (1998), the results of this study confirm that interpretation and education are components of importance in marine wildlife tours. Whale watchers in the Azores are interested in information about marine mammals and the marine environment, and are concerned with practices of whale watching being respectful for cetaceans and the environment. This is consistent with other studies (Kessler *et al*., 2014; Lück, 2003; Poon, 1993) which suggest a growing environmental awareness among tourists and whale watchers in particular. In contrast to traditional 'old' tourists, these 'new' tourists are more mature and experienced, have special interests and want to learn (Poon, 1993). Overall it was surprising to see that environmental-friendly watching and interpretation provision was as important as seeing a whale in terms of expectations.

Importance-performance versus performance-only approach

Studies measuring satisfaction generally apply either a technique based on expectancy theory or on a *performance-only approach*. This study applied both and the results permit a comparative perspective on the concept of satisfaction. The advantage of IP analysis is its ability to identify potential management gaps for service providers and managers (Akama & Kieti, 2003). The technique has been criticized because of lack of reliability and validity (Azzopardi & Nash, 2013), however in this study the results of the IP analysis are largely consistent with those of the *performance-only approach* (Table 18).

Table 18. Comparison of results of IP analysis and *performance-only approach*

	IP analysis		Performance-only approach
	Expectations[a]	Performance[b]	Impact on satisfaction[c]
See a whale even if it is only one	High	Expectations exceeded	High
See a lot of whales	High	Expectations met	High
See whales close to the boat	High	Expectations met	Medium
See a variety of different marine mammals	High	Expectations met	Medium
See whales in a respectful manner for whales and environment	Very high	Expectations unfulfilled	Medium
Seeking adventure	Neutral	Expectations exceeded	Irrelevant
Absence of crowding by other boats	High	Expectations unfulfilled	Irrelevant
Good photo opportunities	High	Expectations met	Medium
Learn about the marine environment	High	Expectations met	Medium
To be with family/ friends	High	Expectations met	Irrelevant
Good weather conditions	High	Expectations met	Irrelevant
Boat type	High	Expectations met	High
Information provided by guide	High	Expectations met	Medium
Safety procedures	High	Expectations met	Medium
Knowledge of the guide	High	Expectations met	Medium
Commitment to the environment by the operator	High	Expectations met	Medium
Cost of the trip	Neutral	Expectations exceeded	High

[a]neutral=3; high=4; very high=5;
[b]expectations exceeded: gap<0; expectations met: gap=0; expectations unfulfilled: gap>0;
[c]high: Spearmans rho>0.3; medium: rho>0.2; irrelevant: no significant correlation at 0.001 level

The users' high expectations regarding the different tour attributes were satisfied in most cases and the attributes' contribution to overall satisfaction was mostly medium or high. Most results on attributes with fulfilled expectations had also a high impact on overall satisfaction suggesting that the results of both approaches were consistent, which strengthens the reliability of results (Table 18). Overall the results suggest a high performance level for whale watching and the proposal for management interventions would be "keep up the good work" in accordance with the classification system recommended by Martilla and James (1977).

One interesting result that emerges from the comparison relates to the expectation for, and satisfaction with, a respectful whale watching environment. This was identified as a very high

expectation by participants, but also one in which expectations were not fulfilled (Table 18). The performance-only assessment also shows the variable had only a medium impact on satisfaction (rho=0.275). Given the high expectation for this variable and both satisfaction assessments showing modest achievements provides a clear indication that this variable should be a top priority for management attention.

The results on crowding showed that despite the high and unfulfilled expectations regarding the absence of crowding identified by the IP analysis, the impact of crowding on satisfaction was irrelevant. This irrelevance in turn is consistent with findings of Shelby and Heberlein (1986) suggesting that high satisfaction levels occur frequently, regardless of use level. Explanations of this phenomenon are self-selection, displacement of unsatisfied users or adoption of coping mechanisms. Recreationists sometimes supersede unpleasant situations focusing on positive aspects (Shelby & Heberlein, 1986). This may apply also to the present study, where most high expectations were met or even exceeded leading to a possible forgiveness of a negative performance of some tour attributes. However the fact that expectations regarding the absence of crowding were not fulfilled suggests that crowding is a second area for management attention. To enhance future sustainability of the whale watching industry, it seems an important strategy to address crowding issues at an early stage as Avila-Foucat *et al*. (2013) found that vessel crowding had clearly the potential to reduce tourist satisfaction and the willingness to return.

The results of the IP analysis and performance-only perspective about weather conditions and spending time with family and friends showed that both attributes had high expectation scores, which were fulfilled, but their contribution to overall satisfaction was irrelevant. The results are also inconsistent with Orams (2000) and Wiener (2013) who suggested that calm weather contributed significantly to overall satisfaction. However this outcome may depend on actual field survey condition with potential different results with bad weather conditions. The lack of relationship between social aspects and satisfaction differs from other studies. Studies on other marine wildlife tourism activities emphasize the importance of social aspects (Davis *et al*., 1997; Dimmock, 2009; Ince & Bowen, 2011; Todd *et al*., 2002; Tschapka & Kern, 2013) and suggest that many people participate in outdoor recreation in family, friendship or other social groups. Studies exploring the contribution of social aspects to whale watching satisfaction are still lacking.

In comparison with other whale watching studies, some novelties were found in this research. The attributes with the highest impact on user satisfaction were seeing one whale, seeing lots of whales, boat type and cost of the trip. The most important factor contributing to satisfaction was to see at least one whale, which is inconsistent with the findings of Orams (2000), who suggested that tourists were satisfied even without seeing a whale. Other studies suggest that seeing whales is significantly related to overall whale watching satisfaction (Duffus & Dearden, 1993; Kessler *et al*., 2014; Valentine *et al*., 2004). The importance of cost as a factor influencing overall satisfaction is new in studies on whale watching but the number of whales seen and the type of boat are factors reported previously (e.g. Orams, 2000; Valentine *et al*., 2004). These results coincide also with those of the IP analysis, confirming the general satisfaction with the whale watching boat and with the sighting of a whale.

Research on other marine wildlife tourism activities found that the most influential condition items were the physical and natural conditions (Davis *et al*., 1997; Hammitt *et al*., 1993; Saltzer, 2002; Topelko, 2007) in contrast to service conditions such as type of boat and cost of the trip, which in this study were two of the four most important factors contributing to satisfaction. Proximity to whales, learning about the marine environment and knowledge of the guide increased overall satisfaction but were not as important as seeing whales, the boat or the cost. This finding is again inconsistent with Orams (2000) who suggested that proximity to the whales had no major influence on satisfaction but rather number of whales, their behavior, the numbers of fellow passengers, tour duration, boat type and sea-sickness influenced satisfaction.

The IP analysis provides an easily understandable graphical tool. Ideally the data for this analysis should be collected in two steps: importance ratings are collected before the activity and the satisfaction ratings afterwards (e.g. Bennett *et al*., 2003), which involves a larger research effort. Collecting both, importance and performance ratings, at the same time comprises the risk of respondent fatigue and confusion about an apparent repetition of variables or reflective questions leading to a potential bias in responses (Lai & Hitchcock, 2015; Pearce, 2006). The *performance-only approach* is easier to administer and provides insight into information people don't say but which is inherent to satisfaction suggesting that these results are more meaningful. The technique has been previously evaluated as better for measuring satisfaction than techniques rooted in expectancy theory, because it has the potential to predict future behavior (Baker & Crompton, 2000; Naidoo *et al*., 2011; Prakash, 1984; Saltzer, 2002). This is extremely relevant for tourism studies with the objective to design management interventions to deal with future situations. Bearing also in mind also the conceptual and methodological issues of the IP analysis outlined by several researchers (e.g. Azzopardi & Nash, 2013; Lai & Hitchcock, 2015; Oh, 2001; Sever, 2015) and the increased research expenditure, we recommend the application of performance-only perspective.

Management implications

Overall the results of both satisfaction measurements suggest a high performance level for whale watching and proposed management interventions would be to "keep up the good work" (Martilla and James, 1977). Yet several priorities for management attention were identified. The IP analysis detected two tour attributes with unfulfilled expectations: "absence of crowding by other boats" and "seeing whales in a respectful manner for whales and environment". Participants place great importance on a respectful whale watching environment which identities this feature clearly as a priority area for management intervention. Management interventions are recommended which strengthen environmentally friendly practices and reduce vessel crowding. Results suggest to increase the commitment by the operators to the existing regulations regarding distances between vessels and animals and the maximum number of boats, possibly through land-based or boat-based control mechanisms as identified elsewhere (Bentz *et al*., 2013; Silva, 2015). The high expectations regarding environmental friendly whale watching indicate a predisposition of participants for interpretations programs. The quality of interpretation programs on the Azores is highly variable. The quality of education programs delivered during wild cetacean encounters is also critical to

longer-term conservation benefits (Coghlan, 2012; Zeppel & Muloin, 2013). According to Orams (1996), an interpretation program should offer interesting questions, to make participants curious and to develop a cognitive dissonance between the questions and their knowledge. With stories about the animals encountered, the affective domain should be addressed involving the emotions of participants. The state of cognitive dissonance is meant to motivate an incentive to act. The interpreter can address specific environmental problems, and offer solutions to act, such as petitions to sign, a membership of an environmental organization, or products to purchase that support environmental research (Orams 1994, 1996, 1997).

The overall satisfaction with cost of the trip and the type of boat suggest maintaining prices and boat sizes as these factors strongly contribute to overall satisfaction of whale watchers. The majority of the respondents (54.1%) saw whales in rigid-inflatable boat for 10-24 passengers or in small fiberglass boats for 12 passengers. In São Miguel and Faial islands other boat types such as fiberglass boats for 30-40 passengers or fiberglass or wooden boats for 50-80 passengers correspond to the needs of higher tourism numbers and provide a diversified product.

5. Conclusion

This study aimed to explore satisfaction compared to expectations and to identify factors contributing to satisfactory whale watching. It applied and compared *importance-performance analysis* and performance-only perspective to measure satisfaction of whale tour participants in the Azores and discusses results as an input for sustainable whale watching management.

The application of both models permitted different perspectives on the concept of customer satisfaction as well as a critical analysis of both approaches. There is convergence of most of the results of the approaches, strengthening the reliability of these results. The results of the *importance-performance analysis* suggest a high performance level for the whale watching industry in the Azores. Almost all expectations of participants are satisfied, except some discontent with aspects of environmentally respectful observation, one of the most important attributes, and crowding. Improvement in this regard can be achieved through strengthening environmentally friendly practices and commitment by the operators to the existing regulations regarding minimal distances, maximum number of boats and time spent with the animals.

The results of the *performance-only approach* complement these results with information on what makes whale watchers happy with their tour. Similar to some other studies (Duffus & Dearden, 1993; Moscardo, 2006; Valentine *et al.*, 2004) seeing a whale highly influenced overall satisfaction. The type of boat and the cost of the trip were also important contributors to satisfaction. Trip cost as an influencing factor on overall satisfaction is new in studies on whale watching satisfaction. Most studies suggest that the natural conditions are more important in contributing to satisfaction than social setting features (Davis *et al.*, 1997; Hammitt *et al.*, 1993; Topelko, 2007). In contrast, this study revealed that two of the four most important factors contributing to satisfaction were related to service conditions: the type of boat and cost of the trip.

Enhancing satisfaction and sustainable management

Some aspects of the whale watching tour identified as important through the IP analysis had little impact on overall satisfaction indicating a discrepancy between expressed preferences of visitors and the factors which ultimately account for satisfaction. The *performance-only approach* provides information on these underlying factors influencing satisfaction, while IP analysis detects weaknesses of management. Satisfaction remains a complex psychological phenomenon. Further research is necessary to draw conclusions on which technique is more viable for exploring satisfaction.

Finally, relying on visitor opinions and satisfaction level alone will not be enough to enhance sustainable whale watching. Systematic cetacean surveys and monitoring of whale watching are necessary to develop long-term data on the potential impact of the activity within the Azores archipelago and elsewhere, as well as the establishment of an efficient law-enforcement scheme (ICES, 2010).

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CONCLUSION

The overall goal of this study was to understand how social science dimensions of whale watching and diving experiences can lead to more successful and sustainable industries. As discussed in the foregoing chapters, this research evaluates human dimensions of marine wildlife experiences using diving and whale watching as a tool to strengthen marine conservation while contributing to a sustained economic benefit for local communities. The findings provide lessons that are applicable to other dive and whale watching destinations as well as different marine tourism industries.

Duffus and Dearden's (1990) model of *non-consumptive wildlife-oriented recreation* provided the main conceptual model for this research. This model provides orientation for the design of optimal management interventions for managers, researchers and tour operators who seek to derive sustainable benefits that wildlife tourism can bring supporting conservation and economic growth (Catlin *et al.*, 2011). Nevertheless Duffus and Dearden (1990) recommend that for each particular case study the applicability of their framework needs to be validated empirically. This study has undertaken such an investigation for the first time in the Azores, and for the first time has compared two different marine tourism activities in the same location. This concluding chapter provides an overview of the main findings and their implications for theoretical development of the model as well as practical application in the Azores, points to limitations in this study and identifies areas for future research.

1. Main findings

1.1. Objective 1: Strengths, weaknesses and conflicts in the whale watching and dive industries.

A qualitative research technique was applied to explore the strengths, weaknesses and conflicts associated with whale watching and diving in the Azores as perceived by local stakeholders and experts. Main problems identified were the absence of a regional marine wildlife tourism strategy, the disregard of the existing whale watching regulation by the operators, the decline of shark sightings, the unmanaged shark fisheries, the conflicts among operators and with fishers, and the lack of well managed marine protected areas.

Sharks and manta rays important component in wildlife tourism product

The stakeholder interviews revealed that diving with blue sharks is an important component of the emerging marine wildlife tourism in the Azores. However, the conflict between the new non consumptive uses and the traditional consumptive uses are clearly identified in the results of this study (chapter 3). The future of shark diving may be at risk due to increasing shark fishing. Integrated management of fisheries in the Azorean waters involving stakeholders (including fishers) appears to be a necessary step, from an environmental perspective but also for the sake of the shark diving industry.

Equally, the analyses on users' perceptions revealed the high importance of sharks and manta rays especially among specialist divers. This is consistent with Duffus and Dearden (1990) suggesting that specialist users are more concentrated on focal species (chapter 4). Almost a quarter of the surveyed divers (N=96) were assigned to the cluster *shark and manta divers* which reflects the recent growing trend in shark diving, a new marine wildlife tourism activity in the Azores and worldwide phenomenon (chapter 5).

The growing shark watching industry is of special interest to conservationists since sharks are facing high pressure from fisheries (Gallagher & Hammerschlag, 2011; Gallagher *et al.*, 2015). In the case study, shark diving has prolonged the temporary protected status of *Condor Seamount* with potential classification as a formal marine protected area in the future (chapter 3). However, future sustainability of the activity faces major challenges, as commonly happens in unmanaged wildlife tourism (Duffus & Dearden, 1990). The development of the code of conduct for shark diving is a positive step to regulate the activity. Specific legislation and a dual license system for shark diving would constitute valuable management tools towards sustainable development of the activity.

Questionable commitment to sustainable whale watching practices

Problems with the performance of whale watching, its management and ultimately its sustainability were identified by several results in this research. Some of the interviewed stakeholders considered it a major problem that operators would not follow the rules about minimum distances, speed and maximum observation period (chapter 2). Also users reported encounters of whale watching boats which exceeded in 21.6% of the cases the limit of three boats indicating a potential disregard of the

regional legislation (chapter 6). Finally, the results of the *importance-performance analysis* (chapter 7) revealed a discontent with the aspects "environmentally respectful observation" and "crowding". Improvement in this regard is recommended through strengthening environmentally-friendly practices and commitment to the existing regulations in the first place to limit potential negative impact on the focal species but also because environmental-friendly watching and interpretation provision are very important for participants.

1.2. Objective 2: Specialization of divers and whale watchers

Recreation specialization according to Bryan (1977) can be related to different experiences, skills and interests of participants in a given activity. Specialists are typically more knowledgeable and skilled about the activity and the destination, and require minimal infrastructure or interpretation. Generalists require greater facility development and more interpretation. According to Duffus and Dearden (1990) a destination attracts different types of tourists while it progresses through the life cycle stages. Initially it will attract specialists and as popularity increases, the number of generalist wildlife tourists who require greater facility development increases.

Arguable progression of whale watchers along a specialization continuum

Some of the results obtained are consistent with Bryan's (1977) *specialization continuum* and related studies (Duffus & Dearden, 1990; Duffus & Dearden, 1993; Malcom, 2003) such as the growing motivation to go whale watching with increased specialization and the importance of an uncrowded observation atmosphere. The factors which contributed most to satisfaction were seeing whales, the cost of the trip and the type of boat (Table 20). As whale watchers were by majority novices (49.3% *new whale watchers*, 29.4% *passionate new whale watchers*, chapter 4), this is consistent with Duffus and Dearden (1990) who suggest that generalists require greater facility development.

However deviations from the models were obtained in two ways: Firstly, generalists as well as specialists have both relatively little previous experience (chapter 4). This is inconsistent with Bryan (1977) who believed that people progressed to higher stages of involvement the longer they participated in a recreation activity. Secondly, environmental awareness was exhibited in all specialization levels, which is inconsistent with Duffus and Dearden (1990) and other research (e.g. Ong & Musa, 2012; Thapa *et al.*, 2006). Animal friendly observation and uncrowded atmosphere are highly important tour features for an inexperienced whale watcher type, in this study designated as passionate new whale watcher. These are also the users who are the most willing to return and who gave the highest importance to see whales in a respectful manner for animals and environment.

Consequently, the results of this study raise questions about the applicability of the specialization concept to whale watching. Rather it is suggested that in the case of whale watching there may not be a progression along a *specialization continuum* due to activity-specific characteristics: almost everybody can participate without specific preparation, there is no special equipment more advanced participants may acquire, nor increasing formal certification levels they can obtain (such

as in diving). Therefore, whale watchers seem to be wildlife tourists who are more difficult to position along a *continuum of specialization*.

Other researchers have pointed out inherent differences among activities and the difficulty of classification by specialization (Needham *et al.*, 2009; Scott & Thigpen, 2003), or questioned the existence of progression of recreationists due to the lack of confirmatory studies (Scott & Shafer, 2001). Other studies applying *recreation specialization* have suggested changes to Bryan's (1977) proposed indicators of specialization - commitment, preferences for activity settings, skills and equipment ownership - depending on the activity. Duffus and Dearden (1990) suggested that in order to apply the specialization concept to wildlife tourism, some variables, such as equipment, should be substituted by knowledge about target species and its environment and involvement in conservation initiatives. Still, consensus on the indicators defining specialization has not been reached, possibly due to the largely open way in which Bryan's paradigm was originally formulated, which allows many different interpretations (Lemelin *et al.*, 2008).

The results of this research also suggest that external factors may play a role in whale watching specialization. São Miguel Island has higher tourism numbers, more infrastructure development and 59.7% of whale watching tourists in the Azores. Whale watching participants are mostly generalist users who named whale watching as one of several equally important reasons for their destination choice. The more remote islands Pico and Faial have fewer tourists, less whale watchers and more specialized users, who come mainly for whale watching. This suggests that external factors such as the overall tourism numbers influence also the specialization level of whale watchers and vice versa. Accordingly Malcom (2003) argues that a generalist trend for whale-watching is likely at locations where whale watching draws from a large, generalist tourist-base and greater proportions of specialist whale watchers may occur only in remote locations, where ecotourism is the only tourism attraction. Thus, the specialization level of participants may also depend on other factors, which are not explained in the *wildlife tourism model* of Duffus and Dearden (1990) suggesting that the application of the model may need adaptations depending on the specific case or activity and needs to be set in a greater context.

Findings of the whale watching survey suggest a need to re-evaluate potential indicators to measure whale watching specialization. This study proposed a category of whale watchers in the questionnaire, the *passionate new whale watchers*, which combined no previous experience with high motivation for the activity, which by itself is not consistent with the original indicators of specialization proposed by Bryan (1977). This category was chosen by almost a third of the respondents arguing that specialization might be an *indicator of intensity* rather than of progression in whale watching, as suggested by Scot and Shafer (2001).

Passionate new wildlife watchers may be an emerging type of wildlife tourists, possibly to be encountered in other activities, such as wildlife watching safaris, which like whale watching, do not require special equipment, nor training, nor specific knowledge and thus are open to novices without limitation. In such activities it is also less likely that users participate frequently and achieve skill perfection. Instead participants may choose to diversify their wildlife activities rather than

pursue better experiences in a single activity, as suggested by other research (e.g. Kuentzel, 2001; Lemelin *et al*., 2008; Scot & Shafer, 2001).

Differing progression of divers along the specialization continuum

In contrast to whale watching, specialization levels of divers differed significantly in terms of previous experience, which is consistent with Bryans' (1977) theory and several studies specifically on diving (e.g. Augustine, 2013; Camp & Frazer, 2012; Dearden *et al*., 2006; Lucrezi *et al*., 2013) (chapter 3). Divers in the Azores are generally specialized and visit the Azores mainly to dive (Table 21). They do not spare increased cost or time associated with shark and manta dives in the more remote islands, which is also consistent with the *specialization theory* and the *wildlife tourism model* suggesting that willingness to spend money and time increase with specialization (Augustine, 2013; Dearden *et al*., 2006).

Specialist divers behaved in a large part consistent with the models of Bryan (1977) and Duffus and Dearden (1990). Deviations from the models are only shown in two aspects: on the one hand, social aspects of diving (such as knowledge expansion and spending time with family and friends) were important both for generalist and specialist divers, suggesting that interest in social aspects may not necessarily be limited to generalist divers. On the other hand, some specialized divers appreciate unpolluted, undamaged and uncrowded dive sites with underwater rock formations (such as caves, arches and seamounts) but give little importance to the abundance and diversity of marine life, showing an inconsistency with the findings of Dearden *et al*. (2006). This finding suggests that there may exist different types of specialists, one more bio-oriented type and one type which is more interested in the technical aspect of diving. Motivations of specialized divers may also vary between diving destinations, with divers seeking different types of experiences and species in their dives (chapter 5).

This research suggests that generalists do not necessarily have little environmental awareness (as shown in the case of whale watchers) and specialists are not always more focused on focal species and attach less importance to social aspects such as spending time with family and friends and expanding knowledge. In the case of diving it was shown that specialization was not correlated to the importance of commitment by the operator to the environment, suggesting that specialists do not necessarily have a greater environmental awareness. With respect to crowding, results showed that all levels of specialization were equally concerned with the absence of crowding by other divers (chapter 3), but the more specialized users were less tolerant for increasing encounters, which is consistent with Duffus and Dearden (1990) (chapter 6). This is also consistent with results of the *cluster analysis* (chapter 5) which produced four groups, with one (designated as *explorer divers*), highly specialized cluster for which the absence of crowding and unpolluted, undamaged, pristine dive sites with underwater rock formations were very important.

Conclusion

Table 19. Synthesis of main results of whale watching study

Main objectives	Main results	Management proposal/ theory evolution
1st objective: Strengths, weaknesses, conflicts in the industry	• Small, remote islands: strength/ weakness • Whale watching management : lack of compliance to law, lack of control • Lack of cooperation among stakeholders	*Management*: region-wide tourism strategy; control compliance to law; Promote partnerships among operators
2nd objective: Specialization of whale watchers	• Overall level: mainly generalists • Indicators of specialization: previous experience not reliable predictor • Relation to motivations: travel motivations increases with specialization • Relation to crowding: absence of crowding as motivation increases with specialization but specialization not related to *perceived crowding* • Relation to environmental awareness: environmental awareness increases with specialization • Relation to satisfaction & willingness to return: specialization did not affect satisfaction, generalists less willing to return • Geographical variation: specialists concentrate on Pico and Faial, generalists on São Miguel • Whale watching/São Miguel is located further along the *wildlife tourism model* trajectory than Pico and Faial	*Theory evolution*: Whale watching specialization not reliable as predictor for *perceived crowding*, satisfaction, willingness to return. Arguable progression along a specialization continuum; *Further research*: Explore external factors playing a role in whale watching specialization. Review indicators to measure specialization
4th objective: Crowding of whale watchers	• Absence of crowding important or very important for 50.3% of respondents • Overall level: 35.8% crowded users with higher levels in Faial Island (45.1%) • *Minimum acceptable condition*: 2.18 boats • Relation to satisfaction: Satisfaction not significantly reduced (-0.8% variance) • Specialists: Absence of crowding as motivation increases with specialization but *new whale watchers* and *committed whale watchers* specialized feel more crowded. • Relation to environmental impact: No correlation • Geographical variation: Santa Maria and Faial more affected by crowding	*Management*: Control compliance to legislation; *Theory evolution*: Socially sustainable number of boats: 2-3; Crowding does not predict satisfaction nor perceived impacts. *Further research*: Do tourists choose the Azores because they expect an uncrowded atmosphere? Collect more data.
5th objective: Satisfaction of whale watchers	• Satisfaction compared to expectations: 1. Positive performance: seeing at least one whale; seeking adventure; cost of the trip; 2. Area of concern: Seeing whales in a respectful manner for whales and environment; absence of crowding by other boats • High overall satisfaction: mean 8.48/10 • Satisfaction level/place of residence: North America (1), Northern Europe (2), Southern Europe (3), Western Europe (4), Eastern Europe (5) • Factors highly contributing to overall satisfaction: See at least one whale, see lots of whales, cost of the trip, boat type.	*Management:* Strengthen environmental-friendly whale watching and learning; *Theory evolution*: Place of residence and satisfaction are related; Importance of service conditions: cost of trip and type of boat; seeing whales highly affects satisfaction;

1.3. Objective 3: Diving motivations

Different motivations among wildlife users can be associated with specific behaviors, perceptions, levels of skill and knowledge (Lucrezi *et al.*, 2013). Users' motivations to participate in an activity can give information on centrality of the activity in the user's life and also on its' specialization and are therefore input variables for Duffus and Dearden's (1990) *wildlife tourism model*. In the present research the emphasis was on the factors which attract users to the Azores.

Results showed that specialization and diving motivations are related. Specialists are motivated by the possibility to see sharks and manta rays or to appreciate unpolluted, undamaged and uncrowded dive sites with underwater rock formations (chapter 5).

Different diving motivations were found between Southern and Western Europeans (Table 21). Other regions were less represented and therefore made it difficult to draw statistically-robust conclusions. It can be suggested that motivations to dive are different for visitors of different nationalities and cultures and/or the way they interpret scales. Measuring cross-cultural diving motivation is a new subject in the field of marine wildlife tourism (but see Topelko, 2007) and therefore seems worthy of further investigation. Studies comparing diving motivations among different European countries are still lacking. Although Northern Europeans constitute a major group of tourists visiting the Azores (SREA, 2007), they were underrepresented among divers in this study. It can be argued that they are not visiting the Azores for the purpose of diving but further research is necessary to draw conclusions (chapter 5).

The absence of crowding was an important motivation for participating in diving and whale watching. This suggests that tourists choose the Azores because they expect an uncrowded atmosphere, strengthening a tourism management approach which provides high quality experiences for fewer participants through limiting use levels (chapter 6).

1.4. Objective 4: Crowding of whale watchers and divers

In this research *perceived crowding* was studied with the help of Jackson's (1965) *social norm curves*, which describe norms as evaluative standards using a graph to evaluate acceptance of impacts associated with user experiences (chapter 6). The tolerance for encounters with whale watching boats and with other divers at a dive spot as well as *perceived crowding* are explored, defining *minimum acceptable conditions* of encounters for satisfactory experiences for both activities. This assessment helps to define standards of quality for wildlife tourism and contributes to a more sustainable management of the activities.

Overall 28.5% divers felt crowded during their dive, however higher levels were measured on the islands Santa Maria and Faial (around 40%), which might reach unsatisfactory states without management interventions. For whale watching, altogether 35.8% of the respondents felt crowded with significantly higher levels in Faial Island (45.1%; Table 20). This research suggests the need to address crowding in marine wildlife tourism in the Azores, based on the fact that crowding reduced

satisfaction of divers (chapter 6). In addition, research has shown that crowded whale watchers are less willing to return (Avila-Foucat *et al*., 2013).

Eight divers at one dive site and three whale watching vessels with a group of cetaceans were determined as acceptable limits. Similar results were obtained in a whale watching study in Banderas Bay, Mexico (Avila-Foucat *et al*., 2013). The proposed mean of 2.37 boats, is close to the maximum number of boats allowed by the Azorean legislation.

Some islands are more affected by crowding than others. Santa Maria and Faial demonstrate higher levels of crowding whereas São Miguel, Pico and Graciosa show lower levels (Table 21). Santa Maria and Faial are among the islands which have attracted attention among divers due to the occurrence of blue sharks, mako sharks, whale sharks and manta rays. The results suggest potential over-crowding and the need to intervene and limit divers per site in these islands to avoid future unsustainability in both social and environmental realm. Spatial zoning of diving, especially with reference to specialization has been discussed by Dearden *et al*. (2006). *Perceived crowding* could be also reduced through temporal zoning. Whale watching was more affected by crowding in Faial Island. Although operators in Pico and Faial Islands theoretically possess a large observation area which includes the coastline of three islands (Pico, Faial and São Jorge) the actual observation area depends on the location of the look-outs on land. Dividing the management zone of Pico and Faial as well as a better distribution of look-outs are possible management interventions to mitigate crowding.

Table 20. Synthesis of main results – diving survey

Main objectives	Main results	Management proposal/ theory evolution
1st objective: Strengths, weaknesses and conflicts in the dive industry	• Diving with blue sharks is important component of wildlife tourism industry, is attracting increasing numbers of tourists. • Future of shark diving may be at risk due to increasing shark fishing. • Shark diving strengthens the prolongation of the temporary protection status of *Condor Seamount*.	*Management*: Develop legislation shark diving with duals license system and species-specific management approach. Manage shark fisheries, create shark sanctuary; Promote partnerships between sectors of tourism, fisheries and science
2nd objective: Specialization of divers	• Overall level: mainly specialists; • Specialization levels differed significantly in terms of previous experience; • Relation to motivations: travel motivations increases with specialization; • Relation to focal species: high importance of sharks and manta rays among specialist divers; • Relation to easy dive conditions: importance decreases with specialization; • Relation to importance of absence of crowding: no correlation;	*Management*: Ensure that the specialist market niche persists; Protect sharks and manta rays *Theory evolution*: specialization not necessarily affects satisfaction, environmental awareness, or importance of absence of crowding.

Table 20. *Cont*

	• Relation to importance of commitment to environment by operator: no correlation; • Relation to satisfaction: not correlation; • Relation to willingness to return: specialists less willing to return; • Geographical variation: specialists concentrated on Pico, Faial, Graciosa and Santa Maria; generalists predominant on São Miguel.	
3rd objective: Diving motivations	• specialization and diving motivations are related: specialists want see sharks and manta rays or appreciate unpolluted, undamaged and uncrowded dive sites with underwater rock formations; • transversal importance of social aspects (knowledge expansion and spending time with family and friends); • specialized *explorer divers* gave no importance to the abundance and diversity of marine life; • Cultural background influences motivations to dive: differences between Southern and Western Europeans; • High interest in large iconic species: expectations to see sharks and manta rays around any of the nine islands due to misleading marketing; • Unpolluted, undamaged, uncrowded and pristine dive sites were strong motivations for highly specialized divers in the Azores.	*Management*: protect environmental features and attract more specialized clientele; For less specialized divers: limit potentially damaging practices and provide of effective education: briefings with a strong conservation component prior to trip. Develop and implement integrated strategy for diving with coherent marketing strategy. *Further research*: explore diving motivations of Northern Europeans.
4th objective: Crowding of divers	• Absence of crowding important or very important for 64.2% of divers; • Overall level: 28.5% crowded users with higher levels in Faial Island (ca. 40%); • *Minimum acceptable condition*: 7.81 divers per site; • *Perceived crowding* accounted for - 5.4% of variance in satisfaction; • Specialization increases *perceived crowding*, but no correlation between importance of absence of crowding and specialization; • Relation to environmental impact: No impact; • Geographical variation: Santa Maria and Faial more affected by crowding than São Miguel, Pico and Graciosa.	*Management*: reserve access to certain dive sites to specialists; improve education of divers *Theory evolution:* 7.81 divers per site socially sustainable; crowding had no impact on perceived environmental impacts of diving *Further research*: Do divers choose the Azores because they expect an uncrowded atmosphere? Collect more data on crowding.

1.5. Objective 5: Satisfaction of whale watchers

Understanding tourists' satisfaction with the experiences is a key component to the successful management of a tourism industry. In this research satisfaction with whale watching tours was studied with two different approaches. On the one hand, satisfaction was evaluated in comparison with expectations with the help of *importance-performance (IP) analysis* (Martilla & James, 1977). On the other hand, satisfaction was explored based on the *performance-only* perspective which

considers only the customer's perception of the quality of the experience (Kosak, 2001a; Pearce, 2006). Factors significantly related to, and contributing to, satisfactory whale watching were identified.

Results showed that satisfaction levels were high but expectations were unfulfilled regarding environmental-friendly whale watching and crowding. Most important attributes contributing to whale watching satisfaction were seeing a whale, seeing lots of whales, the boat type and cost of trip. Different levels of satisfaction levels were measured among different nationalities (chapter 7).

In comparison with other whale watching studies, some novelties were found in this research. The most important factor contributing to satisfaction was to see at least one whale, which is inconsistent with the findings of Orams (2000), who suggested that tourists were satisfied even without seeing a whale. Other studies suggest that seeing whales is significantly related to overall whale watching satisfaction (Duffus & Dearden, 1993; Kessler *et al.*, 2014; Valentine *et al.*, 2004). The importance of cost as a factor influencing overall satisfaction is new in studies on whale watching but the number of whales seen and the type of boat are factors reported previously (e.g. Orams, 2000; Valentine *et al*., 2004). These results coincide also with those of the IP analysis, confirming the general satisfaction with the whale watching boat and with the sighting of a whale (chapter 7).

Overall, satisfaction results suggest a high performance level for whale watching and proposed management interventions would be to "keep up the good work" (Martilla & James, 1977). Yet several priorities for management attention were identified. Two tour attributes with unfulfilled expectations were detected: "absence of crowding by other boats" and "seeing whales in a respectful manner for whales and environment". Participants place great importance on a respectful whale watching environment which identities this feature clearly as a priority area for management intervention. Management interventions are recommended which strengthen environmentally friendly practices and reduce vessel crowding. The high expectations regarding environmental friendly whale watching indicate a predisposition of participants for interpretations programs. The quality of interpretation programs on the Azores is highly variable. Strategies for improved visitor interpretation should be a management priority.

The overall satisfaction with cost of the trip and the type of boat suggest maintaining prices and boat sizes as these factors strongly contribute to overall satisfaction of whale watchers. The majority of the respondents (54.1%) saw whales in rigid-inflatable boat for 10-24 passengers or in small fiberglass boats for 12 passengers. In São Miguel and Faial Islands other boat types such as fiberglass boats for 30-40 passengers or fiberglass or wooden boats for 50-80 passengers correspond to the needs of higher tourism numbers and provide a diversified product.

2.   Implications for the marine *wildlife tourism model* by Duffus and Dearden (1990)

Bearing in mind possible adaptations of input indicators, this study determined several variables which allow a preliminary positioning of whale watchers on the *wildlife tourism model* trajectory. Findings suggest that whale watching (especially on São Miguel Island) may reach the point on the *wildlife tourism model* trajectory where maximum visitors can be tolerated and still maintain the activity (between point B and C, Figure 18), based on the fact that:
- whale watchers are mostly generalists,
- whale watching is one of several activities responsible for trip decision,
- willingness to return is highest among generalists and medium specialized,
- the type of boat is important,
- the cost of the trip is important,
- less than 50% of users are crowded,
- overall satisfaction is high.
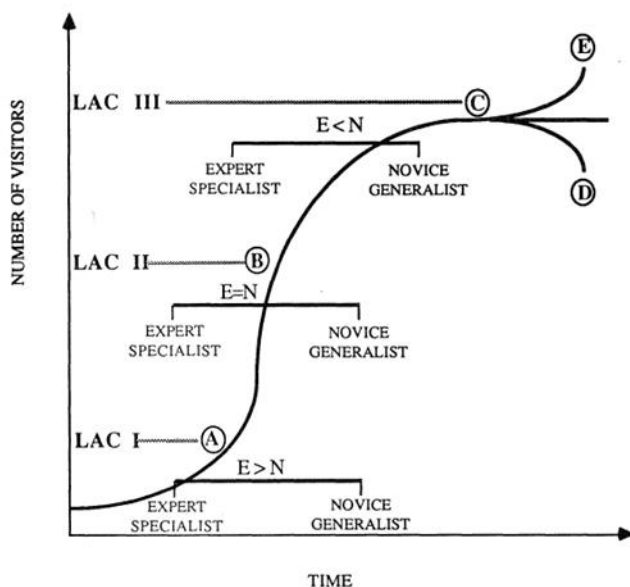
Figure 18. Duffus and Dearden's (1990) marine wildlife tourism framework

Diving (especially on Pico, Faial, Santa Maria and Graciosa Island) appears to be at an early stage of the marine wildlife tourism trajectory (between point A and B, Figure 18), based on the facts that:
- divers are mainly highly specialized and experienced,
- diving is highly important in the trip decision (centrality),
- specialized dive experiences (with sharks and manta rays) are very important,
- willingness to return is highest among generalists.

Conclusion

The mean score of the divers' overall satisfaction was 7.79 out of 10 with 67.5% scoring between 8 and 10, which is considered a moderate result according to Pearce (2006) and medium or low according to Hanan and Karp (1989). Satisfaction levels differed significantly between islands. The highest levels were measured in Graciosa and Faial (mean 8.47 and 8.19; 88.2% and 77.1% scored between 8 and 10), medium levels were obtained for Pico and São Miguel (mean 7.94 and 7.81; 8-10: 70.1% and 67.6%) and the lowest satisfaction was found for Santa Maria (mean 7.05; 47.3% scoring between 8 and 10). These results indicate a potential displacement of specialist users, especially in Santa Maria. The low satisfaction levels may be partially due to increased crowding. Results of chapter 6 showed that crowding was responsible for reduced satisfaction of divers (-5.4%) and that Santa Maria was one of the islands approaching unsustainable levels of crowding (around 40%). Other factors potentially responsible for reduced satisfaction especially on Santa Maria Island may be the drastic decline of blue sharks sightings (-80% in 2 years) and the weak reliability of whale shark sightings in this island (chapter 3), which continues to be advertised by the official regional tourism portal (visitazores.com). Therefore, without adequate management, it is likely that the diving activity may progress to a further position on the wildlife tourism trajectory with greater proportions of generalist users and the implicit potential negative environmental and social impacts. Proof for that is also that willingness to return decreases with specialization (chapter 3).

3. Methodological limitations

Two self-administered questionnaires were applied as the primary data collection instruments. The questionnaires consisted of 23 mainly closed-ended questions. Questionnaires run the risk of misunderstanding by the respondents and of different interpretation of questions, leading to potentially skewed results. Self-reported data can contain several potential sources of bias such as selective memory or exaggeration. Recreation studies measuring satisfaction are especially affected by skewed results, because people generally choose recreation activities they enjoy and avoid those they do not which results in generally high levels of satisfaction. This leads to a commonly weak usage of the lower end of the scale (Noe & Uysal, 1997). These so called "ceiling effects" (Oh, 2001) possibly arise from desirability, unawareness, respondent fatigue or self-esteem protection (Azzopardi & Nash, 2013; Pearce, 2006). Variables assessing satisfaction with environmental and service setting features of whale watching tours demonstrated non-normal distributions which required alternative approaches of analysis for the *importance-performance analysis* (chapter 7). Also overall satisfaction scores are generally high. Pearce (2006) developed therefore a technique to correctly interpret results that show an extreme response style adopting interpretation of levels of satisfaction.

Another methodological problem was the lack of reliable baseline data with regards to diving. The official numbers of divers varied significantly year by year as a result of lacking notification of the numbers by the operators to the authorities. Although unofficial estimations indicate a growth of diving activity in the Azores, official numbers have been declining since 2011. Several islands, including some of the most important diving destinations within the archipelago, officially exhibited

low numbers of divers in 2012 and 2013, therefore in this study the numbers of 2011 were used for sample calculations, as these numbers seemed more reliable.

In addition to the lack of reliable baseline data, the lack of comparable studies about diving and whale watching in the case study area complicated the analysis of results. The application of Duffus and Dearden's (1990) *wildlife tourism model* is facilitated by longitudinal data (e.g. Augustine, 2013), and in the absence of such data then various assumptions must be made. Further research is necessary to make reliable assumptions regarding the application of this conceptual model.

Another specific example of the need for further research in order to draw reliable conclusions is the exhibition of cultural response differences. The cultural background of respondents had an impact on preferences and satisfaction. Different diving motivations were found between Southern and Western Europeans. With regards to whale watching it was found that satisfaction levels varied among different nationalities. Also other studies have found that the nationality or place of residence can have an impact on tourist satisfaction or the way they use scales (Araña & Leon, 2013; Kozak, 2001; Moscardo, 2006; Mustika *et al.*, 2013; Shahrivar, 2012). Araña and Leon (2013) recommend the use of anchoring vignettes to adjust satisfaction levels of different nationalities through the application of a simulated threshold model in order to avoid potential biasness of results. Studies examining different motivations and levels of satisfaction among wildlife tour participants of different nationalities are still lacking. Further research is necessary to explore whether divers and whale watchers of different cultures have different preferences or whether they interpret scales differently. In order to improve future survey design, the introduction of control questions like the anchoring vignettes provide a potentially viable validation tool. Additionally, schemes for interpreting predominant response styles (extreme response style, midrange response style, socially desirable response style) improve analyses of such results.

Finally, the data for this study were collected from participants of dive and whale watching tours during a period of five months during which cetacean sightings, shark sightings, underwater visibility and weather conditions can vary significantly. Migratory species such as blue whales and sei whales can be spotted in certain seasons of the year and sharks are more reliable in July, August and September when water temperatures are warmer. Resident populations of common dolphins, bottlenose dolphins and sperm whales can be spotted all year long. Therefore the wildlife tourism experience on the surveyed day is likely to influence divers' and whale watchers' perceptions.

4. Recommendations for sustainable marine wildlife tourism in the Azores

A goal of this research was also to provide recommendations for optimal strategies for the marine wildlife tourism activities diving and whale watching in the case study and to evaluate potential applicability to other destinations and wildlife tourism activities.

The *limits of acceptable change* framework (Stankey *et al.*, 1984) has the potential to achieve a sustainable balance between environmental and social needs (Diedrich *et al.*, 2011). It uses social

and ecological standards to determine the acceptable levels of impact a particular activity has on a site. The framework has been used for sustainable management of several marine wildlife activities (e.g. Bell *et al*., 2011; Inglis *et al*., 1999; Roman *et al*., 2007; Shafer & Inglis, 2000; Sorice *et al*., 2003) and has been recommended as a control mechanism for tourism in natural and protected areas by the *Secretariat of the Convention of Biological Diversity* and by the *World Conservation Union* (Secretariat of the Convention on Biological Diversity, 2004; Lee & Middleton, 2003). The process of establishing *limits of acceptable change* identifies desirable (and achievable) social and ecological conditions, assesses current conditions, identifies management actions, and monitors and evaluates implemented management actions (Stankey *et al*., 1984).

This section uses findings from chapters 2 to 7 to suggest preliminary *limits of acceptable change* for whale watching and diving in the Azores which can be used as a basis for sustainable management of these activities.

Preliminary limits of acceptable change for whale watching

The analyses of this research produced indicators with the potential to contribute to the determination of *limits of acceptable change*. The *importance-performance analysis* identified variables important to visitors and the performance of these indicators. Also the *performance-only approach* produced factors contributing to overall satisfaction which can be considered indicators of quality. Results show the critical importance of several tour aspects, namely (important or very important for more than 80% of respondents; Spearman's rho>0.3):

- Respectful whale watching for whales and environment
- Commitment to the environment by operator and crew
- Knowledge of the guide
- Information provided by the guide
- Seeing at least one whale
- See lots of whales
- Type of boat
- Cost of the trip

The analysis on *perceived crowding* also produced important results for sustainable whale watching management: It determined the socially sustainable number of whale watching boats at a group of cetaceans, which coincides with the regional legislation allowing a maximum of 3 boats. With the presence of more boats, responses get increasingly negative. The level of crowded whale watchers (35.8%) can be classified as low-normal according to Vaske and Shelby (2008), at which displacement as a consequence of crowding is unlikely to happen. However Faial is more affected by crowding than others, with unsustainable levels being reached (45.1%). It is therefore recommended to develop and implement control mechanisms (from land or onboard) to ensure compliance with existing legislation. The promotion of partnerships among operators would be beneficial in this regard. Indicators contributing to the determination of *limits of acceptable change* are therefore:

- 2-3 boats at a group of cetaceans

- Less than 50% of crowded users in all islands (Vaske & Shelby, 2008)

Overall satisfaction ratings are also considered indicators of quality of a wildlife activity. The mean satisfaction score in this study was 8.48 out of 10 with 83.9% of the respondents scoring between 8 and 10. Pearce (2006) suggests that mean scores greater than 7.8 out of 10 are good and Hanan and Karp (1989) considered the satisfaction level high when 85%–90% of the scores were between 8 and 10. Therefore, satisfaction indicators can contribute to the *limits of acceptable change* framework:

- Mean satisfaction >7.8/10 (Pearce, 2006)
- 85%–90% of the satisfaction scores between 8 and 10 (Hanan & Karp, 1989)
- High willingness to return of medium specialized (passionate new and active) whale watchers

Implementation and monitoring of the suggested indicators of quality have the potential to maintain the whale watching industry in the Azores on its position on the wildlife tourism trajectory and avoid its decline. This seems to be consistent with the objective of regional whale watching legislations (nr. 9/99/A and 10/2003/A) defined as the balance between protection, conservation and management of the cetaceans of the Azores and development of tourism related activities. In this regard the existence of a regulation limiting the number of vessel licenses is helpful. An increased number of boat licenses should be avoided to prevent crowding of participants and to restrict environmental impacts, in the absence of research determining an environmentally sustainable number of boats with cetaceans in the Azores. Compliance with the regulation regarding distances between vessels and animals and the maximum number of boats is also important to maintain the activity on its position on the *wildlife tourism model* trajectory and thus its sustainability.

The obtained social indicators have to be complemented with data regarding economic stability of the activity as well as with biological indicators which measure the impact of the industry on the target species and the environment, including changes in population numbers of the focal species, reproductive capacity, animal fatalities, demonstrated changes in the behavior and water quality (Duffus & Dearden, 1990; Higham *et al.*, 2009).

Preliminary limits of acceptable change for diving

Indicators contributing to the establishment of preliminary *limits of acceptable change* for diving were produced by several of the analyses. The *principal component analysis* produced several environmental and social indicators, which explained more that 0.75% of variances, namely:

- Presence of blue sharks
- Presence of manta rays
- Presence of other sharks
- Pristine, undamaged dive sites
- To be with family and friends
- Knowledge expansion

Conclusion

In order to provide satisfactory diving experiences it seems crucial to protect natural assets on which the activity depends. Protecting blue sharks and manta rays through a regional sanctuary would be a possible intervention or to review and restrict shark fishing in the area. Additionally, managing the shark diving activity through a dual license system, one which applies to all commercial tour operators and another permission to attract sharks, would be beneficial. This licensing scheme has proven to be a viable instrument for sustainable shark diving in Australia (Techera & Klein, 2013). For successful diving and shark diving management in the Azores it is crucial to improve stakeholder engagement, especially of fishers, in the management of marine resources (e.g. through the establishment marine protected areas). The weak engagement of the fishing communities in planning and management of marine-related issues is perceived as a lack of respect for a long-lasting tradition in Azorean history (chapter 3).

The satisfaction analysis showed a moderate or low satisfaction result (Pearce, 2006; Hanan & Karp, 1989). In order to avoid displacement of specialist divers and thus a further progression along the wildlife tourism trajectory resulting ultimately in potential decline of the industry, satisfaction of users should be improved. Results showed also that the willingness to return is weaker among specialists (chapter 4). Satisfaction indicators were determined according to Pearce (2006) and Hanan and Karp (1989), suggesting a good satisfaction level in the case of:

- Overall satisfaction, mean score >7.8 (Peake, 2006)
- Overall satisfaction, respondents scoring between 8-10/10: >85% (Hanan & Karp, 1989)

A possible intervention could be to reduce crowding, as this was shown to be a factor negatively influencing satisfaction (chapter 6). The analysis on crowding obtained results which contribute to the establishment of socially acceptable limits of divers per dive site and sustainable levels of crowding. It was shown that when the number of divers exceeded eight, respondents demonstrated increasing preference for less divers and satisfaction decreased. Results showed that 28.5% of the divers felt crowded, with higher levels on the islands Santa Maria and Faial (around 40%) or at specific dive sites. Shelby and Heberlein (1986) and Vaske and Shelby (2008) suggest levels of less than 50% of users crowded as a sustainable limit. Indicators for were therefore established as:

- Maximum 8 divers per dive site
- Maximum 50% of crowded divers (Shelby & Heberlein, 1986; Vaske & Shelby, 2008)

Researchers have recommended focusing on more specialized clientele where these exist as they often result in higher economic returns per capita and lower environmental impacts (Baldacchino 2004; Dearden *et al*., 2006). For the less specialized divers, the focus should be on limiting potentially damaging diving practices and providing rich experiences to encourage higher specialization. Delivery of effective education programs is essential in this regard. The educational aspects of diving in the Azores could be strengthened through comprehensive briefings with a strong conservation component prior to the trip, an approach which is used for whale watching tours.

Accepting and monitoring the suggested indicators of quality has the potential to maintain the diving industry in the Azores on its early position on the wildlife tourism trajectory (Fig. 18). It seems

crucial to develop and implement an integrated strategy for diving with a coherent marketing strategy and to agree on overall objectives. The presence of large iconic focal species is important for many of the divers in the Azores, therefore a dive management strategy should be accompanied by a protection mechanism of these focal species and their habitat.

Remoteness as a tourism strategy

The remoteness of small islands is often seen as a development-hindering factor. Several authors have accentuated the constraints and weaknesses of small islands such as remoteness, isolation, smallness, making planning and management in small islands challenging in scientific and technical terms (e.g. Calado *et al.*, 2007; Mimura *et al.*, 2007). For tourism however, isolation can be a benefit because it makes the destination more attractive and exotic. The opinions of the experts and stakeholders interviewed in this research were ambivalent in this regard. Remoteness was seen as positive (exotic) by some stakeholders and negative by others, who would prefer higher numbers of tourists and saw the remoteness as obstacle to achieving this. In the same way, the tourism infrastructure was classified as weak by some stakeholders, whereas others regretted the construction of modern facilities, which would take away the uniqueness and simplicity that tourists would seek (chapter 3). These arguments indicate the need to agree upon a regional integrated marine (wildlife) tourism strategy in the Azores. In the case of diving, one of the flagships of the regional tourism industry, the lack of an integrated management with a coherent marketing strategy, can lead to unsustainable development and ultimately to a decline in diving. Divers who expect to see sharks and manta rays around any of the nine islands indicate a misleading marketing, which advertises these species for the whole archipelago (chapter 5).

Although situated in a remote location in the northeast Atlantic, the Azores are in relative close proximity to two major source areas for marine wildlife tourists: Europe and North America. Proportions of specialized divers in the Azores are higher than in some renowned diving destinations (e.g. Andaman Coast, Thailand: Augustine, 2013; Great Barrier Reef, Australia: Pabel & Coghlan, 2011; Florida Keys, USA: Young & Loomis, 2009) and may benefit as a receiving area for divers displaced from increasingly degraded tropical reefs. Several researchers have recommended focusing on more specialized clientele as they often result in higher economic returns per capita and lower environmental impacts (Baldacchino, 2004; Dearden *et al.*, 2006). Management for marine wildlife tourism should ensure that the specialist market niche persists as a higher yielding and more distinctive niche. The relative remoteness of the archipelago and of several islands within the archipelago is an advantage in this regard. More remote islands could be reserved for the specialist clientele who do not spare the increased costs to have an outstanding experience, such as a dive with blue sharks or manta rays or a whale watching trip with a high number of different cetacean species on a small rigid-inflatable boat. Pico and Faial islands are one of the few destinations worldwide where diving with blue sharks is offered with a high success rate to see the sharks. Whale watching conditions are also especially beneficial there offering a high diversity of marine mammals.

For the generalist divers and whale watchers, the focus should be on limiting potentially damaging practices and providing effective education. The educational value of marine wildlife tourism

activities has been outlined by several studies (e.g. Tisdell & Wilson, 2005; Townsend, 2008), with the potential to increase awareness for negative impacts and willingness to participate in monitoring projects (Dearden *et al.*, 2007). Results of this study reveal that for whale watching participants knowledge provision and learning about the marine environment was highly important and expected (chapter 7), suggesting to strengthen present interpretation programs. The educational aspects of diving in the Azores is still limited and could be strengthened through comprehensive briefings with a conservation component prior to the trip, similar to the approach for whale watching tours in the Azores. This seems to be especially important as the proportion of generalist divers is likely to increase and with it potentially negative environmental impacts.

5.   Further research opportunities

Further research opportunities on the role of social science dimension in managing marine wildlife tourism in the Azores and elsewhere have been identified by this study:

- Given the fact that the unwillingness of the operators to work together was seen as a hindering factor to improve marine wildlife tourism management, further research could explore potential mechanisms to improve cooperation among whale watching and diving operators.

- The diving study clearly identified a conflict between the new non-consumptive uses and the traditional consumptive uses, namely fishing. It revealed a real possibility that declines in shark sightings will continue throughout the Azores if the shark fishery is not regulated. Further research is required to enhance understanding and cooperation between tourism operators and fishers and assess feasible management strategies for shark fishing in the Azores.

- Whale watching specialization fails to be a reliable predictor of aspects such as perceived vessel crowding, overall satisfaction, willingness to return, environmental awareness and previous experience of participants. Therefore, whale watchers seem to be wildlife tourists who are more difficult to position along a *specialization continuum*. The results of this research suggest to re-evaluate possible input indicators to measure specialization and to take external factors such as general tourist numbers into account in future research in order to address the question whether whale watchers progress along the *specialization continuum*. Further it is suggested to evaluate if passionate new wildlife watchers, such as the *passionate new whale watchers*, characterized as users with no previous experience but high motivation for the activity, may be an emerging type of wildlife tourist possibly to be encountered in other activities, such as wildlife watching safaris, which like whale watching, do not require special equipment, nor training, nor specific knowledge and thus are open to novices without limitation.

- The results of this study showed that specialization and motivations to dive are related but some aspects are inconsistent with expectations based on the concept of *recreation*

specialization (Bryan, 1977). Further research could examine if there exist different types of diving specialists.

- Few studies have analyzed travel motivations between different (European) nationalities. This research revealed that the motivations to dive are affected by income and place of residence. To improve destination image marketing and satisfactory diving experiences for the main clienteles in the Azores, further research should address intercultural diving motivations, such as the question why Northern Europeans (Scandinavian countries, United Kingdom, Ireland, Latvia, Lithuania and Estonia, according to UN Geo Scheme) are less motivated to go diving in the Azores, being a major portion of tourists in other outdoor activities in the Azores, including whale watching.

- Results of this study showed that for a large proportion of the respondents the absence of crowding was important for their decision to participate in diving or whale watching in the Azores. This suggests that tourists may have chosen the Azores because they expected an uncrowded atmosphere, along with other destination attributes. This question may need further research to make reliable conclusions. Such information would constitute a highly valuable input for designing a regional marine wildlife tourism strategy.

- This research identified *minimum acceptable conditions* for diving and whale watching in terms of number of divers and whale watching vessels. These constitute an orientation for operators and managers and provide a basis for determining social indicators and standards of quality. Further indicators need to be collected to draw robust conclusions on acceptable limits, from a social and biological perspective. Results showed also that crowding levels varied among islands with several islands or dive sites possibly reaching unsustainable use levels. Further research is recommended to examine crowding levels in specific high quality dive sites to support sustainable diving management. Future research could also address the question whether the assessed *minimum acceptable conditions* for divers in the water and whale watching vessels are applicable to other marine wildlife tourism destinations.

- Results indicate that satisfaction with whale watching experiences differs for visitors of different nationalities and cultures. Unclear remains whether nationality or place of residence have an impact on tourist satisfaction or the way different nationalities use scales. Measuring cross-cultural customer satisfaction is a little studied subject in the field of tourism and therefore worthy of further investigation.

Finally, the Azores archipelago, an emerging non-tropical marine wildlife tourism destination offers an interesting opportunity to study social dimensions of marine wildlife activities and how these possibly contribute to a more sustainable management of the different uses occurring in the marine environment.

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Conclusion

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Appendix

1. **Appendix I: Whale watching questionnaire**

<div align="center">

Welcome!
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I am inviting you to participate in a brief 10-minute questionnaire, aimed at recording the quality of your whale watching experience today. Complementing this survey will assist efforts to protect marine mammals, and improve the quality of whale watching experiences in the future. The results of this study will be provided to this company, other companies and the Azorean Tourism Authorities so that they can use your opinions to improve management.

This study is being undertaken by the University of the Azores as part of an ongoing research project examining marine tourism and conservation in the Azores.

Sincerely,
Julia Bentz
PhD Candidate,
CIBIO Research Centre for Biodiversity and Genetic Resources
University of the Azores

<div align="center">

Whale & Dolphin Watching in the Azores
</div>

In order to protect the marine biodiversity and provide a positive visitor experience, it is important for us to know your motivations and expectations for your whale and dolphin watching trip in the Azores.

1.   Was viewing whales and dolphins in the Azores:
- ☐   THE MAIN PURPOSE OF YOUR TRIP FROM HOME
- ☐   ONE OF SEVERAL EQUALLY IMPORTANT REASONS
- ☐   JUST AN INCIDENTAL STOP OR SPUR OF THE MOMENT DECISION
- ☐   OTHER: _____

2.   What kind of marine mammal watching did you take part here in the Azores?
- ☐   HALF DAY WHALE WATCHING TRIP
- ☐   DAY TRIP - WHALE WATCHING
- ☐   HALF DAY - SWIMMING WITH DOLPHINS
- ☐   PACKAGE OF SEVERAL WHALE WATCHING TRIPS
- ☐   OTHER TYPE (please specify)_____ _

3.   In what type of boat did you go whale watching?
- ☐   RIGID-INFLATABLE BOAT FOR 10-18 PASSENGERS
- ☐   FIBERGLASS BOAT FOR 12 PASSENGERS
- ☐   FIBERGLASS BOAT FOR 30-40 PASSENGERS
- ☐   FIBERGLASS CABIN BOAT / WOODEN BOAT FOR 50-80 PASSENGERS
- ☐   OTHER (please specify)_____ _____

4.   Is this your first whale watching experience in the Azores?

☐ NO →In how many whale watching trips have you participated in the Azores? _____

☐ YES

5. Did you whale watch already in other places in the word?

☐ NO

☐ YES →In how many whale watching trips have you participated in other places? _____

Whale & Dolphin Watching and You

6. Please choose one of the following that **best** describes the type of whale watcher you are:

1 New whale watcher: "This is the first time I saw whales and/or dolphins in the wild. I do not know a lot about whales and dolphins. I go whale watching to spend time with my friends/family or to have a new experience. I do not travel to destinations specifically to see whales."

2 Passionate new whale watcher: "This is the first time I saw whales and/or dolphins in the wild but I had already some knowledge about whales. The possibility to go whale watching was one reason to come to the Azores or would be an argument in favor of other travel destinations."

3 Active whale watcher: "I have seen wild whales and dolphins before. Whale watching is an outdoor activity that I appreciate a lot. I have considerable knowledge about these animals and the possibility to go whale watching was an important reason to come to the Azores or would be if I chose another travel destination."

4 Committed whale watcher: "I have seen wild whales and dolphins many times before and I love to go whale watching. I came to the Azores to see cetaceans (or a certain species that I haven't seen before) or if I chose other travel destinations this would be the reason. I have extensive knowledge about whales and dolphins and whale watching regulations."

Why Whale & Dolphin Watching?

In order to provide a high quality whale watching experience, it is helpful for us to know why people participate in this activity.

7. Please state how **IMPORTANT/UNIMPORTANT** was each of the following features for your decision to go whale watching in the Azores (Please circle).

FEATURES	NOT AT ALL IMPORTANT	LOW IMPORTANCE	MEDIUM IMPORTANCE / NEUTRAL	HIGH IMPORTANCE	VERY IMPORTANT
A. See a whale even if it is only one	1	2	3	4	5
B. See a lot of whales	1	2	3	4	5
C. See whales close to the boat	1	2	3	4	5
D. Swim with dolphins	1	2	3	4	5
E. See a variety of different marine mammals	1	2	3	4	5
F. See whales in a respectful manner for whales and	1	2	3	4	5

environment					
G. Seeking adventure	1	2	3	4	5
H. Absence of crowding by other boats	1	2	3	4	5
I. Good photo opportunities	1	2	3	4	5
J. Learn about the marine environment	1	2	3	4	5
K. To be with family/ friends	1	2	3	4	5
L. Good weather conditions	1	2	3	4	5
Is there any other? _____	1	2	3	4	5

The Whale Watching Services

8.   How IMPORTANT/UNIMPORTANT are each of the following services of your whale watching experience in the Azores (Please circle a number).

SERVICES	NOT AT ALL IMPORTANT	LOW IMPORTANCE	MEDIUM IMPORTANCE / NEUTRAL	HIGH IMPORTANCE	VERY IMPORTANT
A. Boat type	1	2	3	4	5
B. Information provided by guide	1	2	3	4	5
C. Safety procedures	1	2	3	4	5
D. Knowledge of the guide	1	2	3	4	5
E. Commitment to the environment by the whale watching operator	1	2	3	4	5
F. Cost of the trip	1	2	3	4	5
Are there any others? _____	1	2	3	4	5

Are you satisfied?

We would like to understand what you liked or didn't like about your whale watching experience to improve the management strategies.

9.   How SATISFIED were you with each of the following aspects? (Please circle a number)

SATISFACTION	VERY UNSATISFIED	UNSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
A. See a whale even if it is only one	1	2	3	4	5
B. See a lot of whales	1	2	3	4	5
C. See whales close to the boat	1	2	3	4	5
D. Swim with dolphins	1	2	3	4	5
E. See a variety of different marine mammals	1	2	3	4	5
F. See whales in a respectful manner for whales and the environment	1	2	3	4	5
G. Seeking Adventure	1	2	3	4	5
H. Absence of other whale watching boats	1	2	3	4	5
I. Good photo opportunities	1	2	3	4	5
J. Learn about the marine	1	2	3	4	5

	environment					
K.	To be with family/friends	1	2	3	4	5
L.	Good weather conditions	1	2	3	4	5
M.	Boat type	1	2	3	4	5
N.	Information provided by the guide	1	2	3	4	5
O.	Safety procedures	1	2	3	4	5
P.	Knowledge of the guide	1	2	3	4	5
Q.	Commitment to the environment by the operator	1	2	3	4	5
R.	Cost of the trip	1	2	3	4	5
S.	Any other opportunities? _____	1	2	3	4	5

Were you satisfied?

10.   On a scale of 1 to 10, with 1 being very unsatisfied and 10 being very satisfied, please indicate how satisfied are you overall with your whale and dolphin watching experience in the Azores. (Please circle the number that best reflects your feelings)

        1-----2-----3-----4-----5-----6-----7-----8-----9-----10
        VERY UNSATISFIED   VERY SATISFIED

11.   How would you rate your current whale watching experience compared to your expectations?

☐   MUCH WORSE
☐   SOMEWHAT WORSE
☐   ABOUT THE SAME
☐   SOMEWHAT BETTER
☐   MUCH BETTER

12.   During your experience, what was the maximum number of boats with a group of whales or dolphins at any one time? _____boats

13.   After your experience, how many boats do you think should be with a group of whales or dolphins at any one time? _____boats

14.   Did you feel that:

		TOO FEW	TOO MANY	ABOUT RIGHT
A.	The number of tourists on your boat was ……			
B.	The number of other whale watching boats was….			
C.	The number of staff on the boat was…..			

Impacts of Whale & Dolphin Watching

In order to ensure sustainable environmental conditions and positive visitor experiences, it is important to understand the impacts and benefits you feel whale watching has.

15.   In your opinion, which the following potential benefits and negative impacts apply to whale watching tours in the Azores (please circle a number)?

IMPACTS		STRONGLY DISAGREE	SOMEWHAT DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE
A.	Negative impact on whales	1	2	3	4
B.	Negative impact on dolphins	1	2	3	4
C.	Negative impact on other marine life	1	2	3	4
D.	Financial support for the protection of whales and dolphins	1	2	3	4
E.	Economic opportunities for local communities	1	2	3	4
F.	Education of participants, which helps to protect whales & dolphins	1	2	3	4
G.	Rise of awareness of participants for marine conservation issues in general	1	2	3	4
H.	Generation of waste/garbage	1	2	3	4
Others? (Please list)					
I.	_____	1	2	3	4

16.   Overall, how do you evaluate the impact of whale watching on whales and dolphins:
- ☐ VERY NEGATIVE
- ☐ SOMEWHAT NEGATIVE
- ☐ NEUTRAL
- ☐ SOMEWHAT POSITIVE
- ☐ VERY POSITIVE
- ☐ NOT SURE

About You

To help us understand your opinions, we are interested in learning a bit about you.

17.   Are you
- ☐ FEMALE
- ☐ MALE

18.   Where do you come from? _____
(city, country)

19.   It is important for us to understand the contribution that whale watching tourism makes to the Azorean economy. Approximately how much money will you spend during your time in the Azores?

_____€ WHALE WATCHING or SWIMMING WITH DOLPHINS TRIP

_____€ TRAVEL & TRANSPORTATION COSTS

_____€ OTHER TRIP EXPENSES (food, accommodation, entertainment, etc.)

20.   What is the highest level of education that you have completed?
- ☐ GRADE SCHOOL
- ☐ HIGH SCHOOL
- ☐ COLLEGE
- ☐ BACHELOR´S DEGREE

☐ MASTER´S DEGREE
☐ DOCTORAL DEGREE
☐ OTHER _____

21. Please indicate you monthly income:
☐ UNDER 500 €
☐ 500 € - 1000 €
☐ 1001€ - 2000 €
☐ 2001 € - 3500 €
☐ 3501 € - 5000 €
☐ MORE THAN 5000 €
☐ NOT APPLICABLE

22. What is your age?
☐ UNDER 25 YEARS
☐ 26 – 35 YEARS
☐ 36 - 45 YEARS
☐ 46 – 55 YEARS
☐ 56 – 65 YEARS
☐ OVER 65 YEARS

23. Would you return to the Azores for whale watching based on the experiences on this trip?
☐ NO
☐ YES
☐ NOT SURE

Finally, is there anything that you would like to tell us about your whale watching experience? If so, please use the space below to express your views.

....

....

THANK YOU FOR YOUR HELP!

PLEASE RETURN YOUR COMPLETED SURVEY TO THE GUIDE.

If you would like to be contacted when the results of this survey become available please leave us your email address here: ………………………………………………….

2. Appendix II: Diving questionnaire

<div align="center">

Welcome!

</div>

I am inviting you to participate in a brief 10-minute questionnaire, aimed at recording the quality of your diving experience today. Completing this survey will assist efforts to protect marine wildlife, and improve the quality of dive experiences in the future. The results of this study will be provided to this company, other companies and the Azorean Tourism Authorities so that they can use your opinions to improve management.

This study is being undertaken by the University of the Azores as part of an ongoing research project examining marine tourism and conservation in the Azores.

Sincerely,
Julia Bentz (jbentz@uac.pt)
PhD Candidate,
CIBIO Research Centre for Biodiversity and Genetic Resources
University of the Azores

<div align="center">

Scuba Diving in the Azores

</div>

In order to protect the marine biodiversity and provide a positive visitor experience, it is important for us to know your motivations and expectations for your dive experience in the Azores.

1.   Was diving at this location (Please tick one box):
        ☐   THE MAIN PURPOSE OF YOUR TRIP FROM HOME
        ☐   ONE OF SEVERAL EQUALLY IMPORTANT REASONS
        ☐   JUST AN INCIDENTAL STOP OR SPUR OF THE MOMENT DECISION
        ☐   OTHER:_____ (in case you are resident in the Azores please indicate here)

2.   What kind of dive trip did you take part today? (Please tick all that apply)
        ☐   ONE DIVE TRIP
        ☐   TWO DIVES TRIP
        ☐   SHARK DIVE
        ☐   MANTA RAY DIVE
        ☐   PACKAGE OF SEVERAL DIVE TRIPS
        ☐   TRAINING DIVE TRIP
        ☐   OTHER TYPE OF DIVE (please specify)_____

3.   Is this your first time diving in the Azores?
        ☐   NO → How many times did you SCUBA dive the Azores?_____
        ☐   YES

4.   How many trips for the purpose of diving have you made in the last five years?

Diving questionnaire

☐   TO / IN THE AZORES?_____ (# trips)
☐   TO OTHER PLACES?_____ (# trips)

Diving and You

5.   Please choose one of the following that best describes the type of diver you are:

☐   New diver: "I am a new diver. I am getting a certificate/ have limited diving certifications and dive mainly to spend time with my friends/ family or to have a new experience. I do not own any diving equipment and do not travel to destinations specifically to dive."

☐   Casual diver: "Diving is an enjoyable activity that is incidental to other travel and outdoor interests. I have some diving certification but am not highly experienced. I occasionally read diving articles, and own only basic equipment (mask, snorkel, fins)".

☐   Active diver: "Diving is an important outdoor activity in my life. I frequently read articles on diving and own standard diving equipment (BCD, regulator, gauges, computer). I am well certified but my participation in diving is inconsistent".

☐   Committed diver: "Diving is a highly important outdoor activity. I go diving every chance that I get, and invest considerable time and money in having specialized diving experiences. I am highly certified, I own specialized diving gear (underwater camera, video) and am a member of diving organizations or subscribe to diving literature".

6.   Which diving courses have you taken? (Please tick all that apply)
☐   DISCOVER SCUBA DIVING
☐   OPEN WATER
☐   ADVANCED OPEN WATER
☐   RESCUE DIVER
☐   DIVE MASTER
☐   INSTRUCTOR
☐   OTHER   Please list: _____

Why Diving?

In order to provide a high quality diving experience, it is helpful for us to know why people participate in scuba diving.

7.   Please state how **IMPORTANT/UNIMPORTANT** was each of the following features for your decision to dive in the Azores (please circle).

		NOT AT ALL IMPORTANT	LOW IMPORTANCE	NEUTRAL	IMPORTANT	VERY IMPORTANT
A.	Good underwater visibility	1	2	3	4	5
B.	Variety and abundance of marine life	1	2	3	4	5
C.	Unpolluted dive sites	1	2	3	4	5
D.	Pristine, undamaged dive sites	1	2	3	4	5
E.	Easy dive conditions	1	2	3	4	5
F.	Unique underwater formations	1	2	3	4	5

		1	2	3	4	5
G.	Absence of crowding by other divers	1	2	3	4	5
H.	Presence of blue sharks	1	2	3	4	5
I.	Presence of other sharks	1	2	3	4	5
J.	Presence of manta rays	1	2	3	4	5
K.	Good photo opportunities	1	2	3	4	5
L.	Seeking adventure	1	2	3	4	5
M.	To expand my knowledge	1	2	3	4	5
N.	To be with family/ friends	1	2	3	4	5
Is there any other? (please list) _____		1	2	3	4	5

The services on the dive boat

8.   Please state how IMPORTANT/UNIMPORTANT was each of the following services for your diving experience in the Azores (Please circle).

SERVICES	NOT AT ALL IMPORTANT	LOW IMPORTANCE	NEUTRAL	IMPORTANT	VERY IMPORTANT
G. Type of boat	1	2	3	4	5
H. Information provided by the dive master	1	2	3	4	5
I. Safety procedures	1	2	3	4	5
J. Expertise of the dive master	1	2	3	4	5
K. Compatibility of fellow divers	1	2	3	4	5
L. Commitment to the environment by the dive shop and boat crew	1	2	3	4	5
M. Cost of the trip	1	2	3	4	5
Are there any others? (please list)_____	1	2	3	4	5

Are You Satisfied?

9.   To help us understand what you liked or didn't like about your diving experience please indicate how SATISFIED you were with each of the following aspects of your dive trip. Please circle a number beside each statement that best reflects your feelings.

SATISFACTION	VERY UNSATISFIED	UNSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
A. Good underwater visibility	1	2	3	4	5
B. Variety and abundance of marine life	1	2	3	4	5
C. Clear, unpolluted dive sites	1	2	3	4	5
D. Pristine, undamaged dive sites	1	2	3	4	5
E. Easy dive conditions	1	2	3	4	5
F. Unique underwater formations	1	2	3	4	5
G. Absence of crowding by other divers	1	2	3	4	5
H. Presence of blue sharks	1	2	3	4	5
I. Presence of other sharks	1	2	3	4	5
J. Presence of manta rays	1	2	3	4	5
K. Good photo opportunities	1	2	3	4	5

Diving questionnaire

L.	Seeking adventure	1	2	3	4	5
M.	Knowledge expansion	1	2	3	4	5
N.	Being with family / friends	1	2	3	4	5
O.	Type of boat	1	2	3	4	5
P.	Information provided by the dive master	1	2	3	4	5
Q.	Safety procedures	1	2	3	4	5
R.	Expertise of the dive master	1	2	3	4	5
S.	Compatibility of fellow divers	1	2	3	4	5
T.	Commitment to the environment by the dive shop and boat crew	1	2	3	4	5
U.	Cost of the trip	1	2	3	4	5
Were there other opportunities? (please list)_____		1	2	3	4	5

Were you satisfied?

10.   On a scale of 1 to 10, with 1 being very unsatisfied and 10 being very satisfied, please indicate how satisfied are you overall with your diving experience in the Azores. (Please circle the number that best reflects your feelings)

1-----2-----3-----4-----5-----6-----7-----8-----9-----10
VERY UNSATISFIED   VERY SATISFIED

11. How would you rate your current diving experience compared to your expectations?
- ☐   MUCH WORSE
- ☐   SOMEWHAT WORSE
- ☐   ABOUT THE SAME
- ☐   SOMEWHAT BETTER
- ☐   MUCH BETTER

12. Which dive sites did you visit during your stay in the Azores? Please rank them according to your preference (1st, 2nd, 3rd)

Dive site	Island	Ranking

13. During your experience today, what was the maximum number of divers in the water in one dive site at any one time? _____people

14. After your experience, how many divers do you feel should be together in the water in one dive site at any one time? _____people

15. During your experience today, what was the maximum number of boats in one dive site at any one time? _____boats

16. Did you feel that:

	TOO FEW	TOO MANY	ABOUT RIGHT
The number of divers on your boat was			
The number of other dive boats was			
The number of staff on the boat was			

Impacts of diving

In order to ensure sustainable environmental conditions and positive visitor experiences, it is important to understand the impacts on the environment.

17a. In your opinion what are the potential environmental benefits of diving in the Azores (please circle a number)?

IMPACTS	STRONGLY DISAGREE	SOMEWHAT DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE
A. Incentive for the protection of endangered species (e.g. sharks, turtles)	1	2	3	4
B. Economic opportunities for local communities	1	2	3	4
C. Rise of awareness of participants for marine conservation issues in general	1	2	3	4
Others? (Please list) D. _____	1	2	3	4

17b. **In your opinion** what are the potential negative environmental impacts of diving in the Azores (please circle a number)?

IMPACTS	STRONGLY DISAGREE	SOMEWHAT DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE
E. Negative impact on fish	1	2	3	4
F. Negative impact on other marine life	1	2	3	4
G. Generation of waste/garbage	1	2	3	4
Others? (Please list) H. _____	1	2	3	4

18. Overall, do you feel the impact of diving on marine wildlife is:

☐ VERY NEGATIVE

☐ SOMEWHAT NEGATIVE

☐ NEUTRAL

☐ SOMEWHAT POSITIVE

☐ VERY POSITIVE

☐ NOT SURE

About You

To help us understand your opinions, we are interested in learning a bit about you.

19. Are you

☐   FEMALE
☐   MALE

20. What is your place of permanent residence?_____(city, country)

21. It is important for us to understand the contribution that dive tourism makes to the Azorean economy. Approximately how much money will you spend during your time in the Azores?

        _____€ DIVE TRIP

        _____€ TRAVEL & TRANSPORTATION

        _____€ OTHER TRIP EXPENSES (food, accommodation, entertainment, etc.)

22. What is the highest level of education that you have completed?
☐   GRADE SCHOOL
☐   HIGH SCHOOL
☐   COLLEGE
☐   BACHELOR´S DEGREE
☐   MASTER´S DEGREE
☐   DOCTORAL DEGREE
☐   OTHER _____

23. Please indicate you monthly income:
☐   UNDER 500 €
☐   500 € - 1000 €
☐   1001€ - 2000 €
☐   2001 € - 3500 €
☐   3501 €- 5000 €
☐   MORE THAN 5000€
☐   NOT APPLICABLE

24. What is your age?
☐   UNDER 25 YEARS
☐   26 – 35 YEARS
☐   36 - 45 YEARS
☐   46 – 55 YEARS
☐   56 – 65 YEARS
☐   OVER 65 YEARS

25. If you are not from the Azores, would you return for diving based on the experiences on this trip?
☐   NO
☐   YES
☐   NOT SURE

Finally, is there anything that you would like to tell us about your SCUBA diving experience? If so, please use the space below to express your views.

....
THANK YOU FOR YOUR HELP! PLEASE RETURN YOUR COMPLETED SURVEY TO THE DIVE MASTER.

If you would like to be contacted when the results of this survey become available please leave us your email address here: ………………………………………

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About the of co-authors

Fernando Lopes is associate professor at the Economics and Business Department of the University of Azores. His main research interests are economic valuation of coastal ecosystem goods and services and outdoor recreation economics.

Helena Calado is professor at the Biology Department of University of the Azores. Her main fields of expertise are geography, environmental and spatial planning, environ- mental law and politics, Integrated Coastal Zone Management, Marine Spatial Planning, GI

Philip Dearden is Professor at the University of Victoria in Canada and Leader of the Marine Protected Areas Research Group. His main research interests are protected area systems, particularly MPAs, and the development of incentive-based conservation approaches.

Erich Ritter is a shark behaviorist with special emphasis on shark–human interaction, including shark tourism. He helped to establish the blue shark diving in the Azores by developing appropriate feeding techniques and the code of conduct.

António Manuel Rodrigues holds a PhD. in Regional Economics from the University of Reading (2001). Presently he is a Post-Doctoral researcher at the Interdisciplinary Centre of Social Sciences - Universidade Nova de Lisboa (CICS.NOVA). His main research areas are Statistical Computing, Geographical Information Sciences and the use and development of Free and Open Source Software (FOSS).

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Research activity (2012-2015)

Publications in dissertation: see pp. vii

Other publications:

Calado, H., **Bentz**, J., 2013. The Portuguese Maritime Spatial Plan. *Marine Policy*, 42, 325-333. DOI: 10.1016/j.marpol.2013.03.014

Calado, H., **Bentz**, J., Ng, K., Zivian, A., Schaefer, N., Pringle, C., Johnson, D., Phillips M., 2012. NGO involvement in marine spatial planning: a way forward?. *Marine Policy*, 36, 382–388. DOI: 10.1016/j.marpol.2011.07.009

Oral communications:

Bentz, J., Lopes, F., 2014. Expectativas e satisfação dos mergulhadores nos Açores. Fórum de Apoio à Decisão: Conhecer o Mar dos Açores IV, December 10-12 2014, Ponta Delgada, Azores, Portugal.

Bentz, J., Dearden, P., Calado, H., 2013. Shark divers' satisfaction - a tool to promote marine conservation in the Azores, Portugal. 3rd International Marine Protected Areas Congress, October 21-27 2013, Marseille, France.

Bentz, J., Calado, H., 2013. Ordenamento e gestão em áreas protegidas – Turismo sustaintável. Seminário Turismo Sustentável a Áreas da Rede Natura 2000 nos Açores – MOST, September 13 2013, Ponta Delgada, Azores, Portugal.

Poster presentations:

Bentz, J., Dearden, P. Calado, H., 2013. Strategies for marine wildlife tourism in small islands – the case of the Azores. 12th International Coastal Symposium, April 8-12 2013. Plymouth, UK.

Bentz, J., Calado H., Dearden, P., 2012. Optimal strategies for marine wildlife tourism in small islands - the role of marine spatial planning. GIS islands 2012 – GIS, Climate Change and Coastal Environmental Planning, University Azores, August 5-11 2012, Ponta Delgada, Portugal.

Overseas Research Training:

Oct.-Dec. 2012: Marine Protected Areas Research Group, University of Victoria, Canada: Under the mentorship of Professor Philip Dearden

Sept. 2013-Feb 2015: Interdisciplinary Centre of Social Sciences (former eGeo - Research Centre for Geography and Regional Planning), Universidade Nova de Lisboa, Portugal. Under the mentorship of Professor Carlos Pereira da Silva