



Using Of Natural Spaces For Tourism Activity Scuba Diving And Impacts On Aquatic Animals

Luis Mota

Experts4asia Post-Doc At Syiah Kuala University, Banda Aceh, Indonesia, Faculty of Veterinary

Abstract

There were few provisions to strongly expand the growth of scuba diving activity, and nowadays training standards are enforced for safety and also for respecting the natural space where dive tourism takes place. Based on literature review, environmental impacts were noted in terms of providing positive aspects, mainly represented by economic benefits and employment opportunities. The negative side was revealed by wildlife impacts whereby animals change their behavior due harassment or contact with nature-based users, with authors reporting their concerns and measuring the consequences and long-term learning impacts. The over-usage of the reefs can result in physical devastation and chemical contamination. Land development in support of scuba diving can also cause negative impacts and affect the surrounding infrastructure, with alternating living patterns and by creating economic differences among the local society. When dive techniques are mastered, scuba diving itself does not represent a threat to the environment, neither to marine animals, but bad dive practices, poor buoyancy control associated to the lack of awareness can contribute to damage the benthic zone. Divers physical impact on the reef can benefit some species looking for opportunity to feed or compete for space, although, it destroys the habitat and lifting up sediment affect negatively coral structures by inducing stress and reducing the average amount of light.

Key words : Development, disturbance, consequence, recreation, resilience, tolerance, tourism growth.

Background

Uzun and Keles (2012) addressed the importance of natural environments where users can become more thoughtful by collecting first-hand information about them. Natural environments have the ability to provide inputs capable of stimulating a person's learning process (Ozoner, 2004; Uzun and Keles, 2012), used for the purpose of explaining the natural process of life, raising awareness, and are support to nature-base tourism activities.

After the Second World War people started traveling more often and further afield, making a contribution to tourism growth and at the beginning of the 21st century tourists started seeking out low-impact sports tourism adventures in water environments, with these adventures eventually becoming niche tourism. Diving tourists like to explore the aquatic environment in various ways; there are scuba divers, snorkelers, free divers, snuba and for more adventurous participants, there is the re-breather. When enjoying their free time at the destination it is normal for them

to participate in more than one diving-related activity. Tourism Queensland (as cited in Jennings, 2007) stated that diving tourism takes place when individuals travel to a destination where at least one scuba dive is included. A contemporary interpretation for diving tourism, defined by Garrod and Gössling (2008, p.7), based on the World Tourism Organization (WTO), takes into account popular diving-related activities and motivation for traveling: "Diving tourism involves individuals traveling from their usual place of residence, spending at least one night away, and actively participating in one or more diving activities, such as scuba diving, snorkeling, snuba, or the use of re-breather apparatus."

Global tourism takes divers to coastal areas of the United States, Australia, Japan, the Red Sea, the Maldives, the Seychelles and the Philippines (Davis et al., 1995). The Caribbean Sea, Pacific coast of Central America, Pacific Islands, Papua New Guinea and other destinations in Asia are also areas of biodiversity and therefore diving grounds (Musa, 2003).

Diving destinations such as Palau are very popular for scuba diving holidays, in particular for shark-diving activities. The recent trend of shark tourism produced some studies into the species and the economic benefits for the local populations, which depend strongly on an active promotion of the tourism destination. According to Graham (2004), whale shark watching (*Rinichodon typus*) was estimated to have generated 47.5 million USD worldwide. The shark industry has grown much more; Topelko and Dearden (cited in Vianna et al., 2010) reported that approximately 500,000 divers had participated in shark-diving activities. In South Africa, Hara et al., (2003) estimated the annual revenue from cage diving with great white sharks (*Carcharodon carcharias*) to be around 4.1 million USD and with tiger sharks (*Galeocerdo cuvier*) around 1.8 million USD in 2007 (Dicken and Hosking, 2009). According to studies carried out by DEMA (2012) for the Caribbean coral reefs including Florida, recreational scuba diving has generated around 2.1 billion USD, from of 4.56 million visitor-days per year. Diving is also responsible for 26,000 full-time jobs related to the activity, and in 2009 Florida took in around 20 million USD from locals taking diving courses, purchasing equipment and utilizing services related to scuba diving.

Since 1992, the Professional Association of Diving Instructors (PADI), one of the most popular training agencies, has issued more than half a million new certifications per year, topping more than 21 million since it came into existence (PADI, 2013). The World Tourism Organization estimated there to be 6 million divers in 2001, and predicted that there would be 10 million active divers by 2005. Although, Cater and Cater (2001) predicted a much higher number of 28 million. Water-related activities are the ones moving more people around the world, but there is a lack of representative data to back up the numbers. It is known that snorkeling involves less equipment and is more affordable than scuba diving, although Lindgren et al., (2008) observed a connectivity between

both activities, triggering participants to engage in scuba diving.

Based on literature review and regarding the fact that scuba diving is a typical nature-based activity for coastal tourism, the objective of this paper is to identify how scuba diving tourism can impact aquatic animals. The activity is accepted as benefit for the environment and give contribution to local GDP, although, it can also impact negatively the land- and marine-base resources, generate socio-economic conflicts and affect local culture (Wongthong and Harvey, 2014). The review of literature is a reference to local managers to take into account for local governance and the policy-making process.

Approaching tourism, nature and users

Nature-based tourism is a fast-growing branch of tourism, involving activities and visits to natural areas, which in some cases carry physical and social risks (Cater, 2006), in order to participate in activities and enjoy nature. The very fact of people living in busy cities breaks their linkage with the natural environment and impels them to adopt forms, feelings and habits alien to the natural form of nature. Nature-based tourism attempts to function in balance with the natural environment, taking into account both positive and negative impacts.

There is something of a mutual dependence: Tourism activity requires natural resources for development of the activity and in some way nature 'requires human pressure' for conservation and sustainability of the species. That is to say a symbiotic relationship can be developed that prolongs the existence of certain species, and through the use of sustainable strategies the tourism industry can also positively affect the natural environment (Kuenzi and McNeely, 2008). Motivation comes from the opportunity to participate in recreational actions focused on nature where natural resources are used for sports activities that require various levels of physical strength (WTO, 2001). Nature-based tourism also includes ecotourism, which describes traveling to less disturbed areas and is focused on educational activities or the

consumption of sustainable tourism products. The characterizations have been adjusted for describing the sustainable use of nature with benefits for tourists, local communities and nature. In some cases, nature-based tourism carries the risk of dependency, impacting directly on local communities and, therefore, a Environmental impacts were noted in terms of providing positive aspects, mainly represented by economic benefits and employment opportunities (WTO, 2001). The negative side was revealed by wildlife impacts whereby animals have changed their behavior due to contact with tourists, with authors reporting their concerns and measuring the consequences and long-term learning impacts (Forestell and Kaufman, 1990; Orams, 1996; Falk et al., 2007; Ballantyne, et al., 2010). The over-usage of the reefs has resulted in physical devastation and chemical contamination. Land development in support of scuba diving has also caused negative impacts and affected the surrounding infrastructure, with alternating living patterns and by creating economic differences among the local society (Rouphael and Inglis, 1997; Moscardo et al., 2001; Musa, 2003; Garrod and Gössling, 2008).

Disruption of the activity can negatively affect the flow of tourism and lower a country's gross domestic product (GDP). Tourism consumers are also exposed to personal health and safety risks when engaging in extreme activities; for example, injuries or fatalities can occur when skiing, rock climbing, rafting, etc. Krakauer (as cited in Kuenzi and McNeely, 2008) reported that since 1953 over 150 climbers have died attempting to reach the summit of Mount Everest, and Lischenke (as cited in Kuenzi and McNeely, 2008), p.10) found that during the period 1987 – 1997 there was “an average of 414 fatalities per year” among climbers in the European Alps. Moreover, tourism activity is also conditioned by external risks such as civil conflicts, disease, and fuel price fluctuations, which affects travel and transportation.

Based on studies conducted worldwide on visitor profiles, it is possible to understand their motivation for choosing such forms of tourism and activities. Information becomes crucial for managing nature-based tourism and developing attractive products for each segment. For example, Sinyenga (2005) profiled tourists visiting Zambia in 2005 and found that nearly 80% of those with a highly paid job were motivated to visit Victoria Falls and consume wildlife tourism. Approximately one third were repeat visitors to Zambia; overall 44% spent more than 6 days in the country and 43% 3 to 6 days, and all were willing to pay to visit national parks. Good management of the abundant wildlife, culture, natural heritage sites and water resources in Zambia boosted tourism activity from 200,000 in 1995 to over 500,000 visitors in 2005. Tourists enjoyed the thrill of close encounters with wild animals, in particular big cats (Sinyenga, 2005). Since the 1990s, Costa Rica has gained a high position in the nature-based tourism sector (Villalobos-Céspedes, 2012) and according to the Institute for Tourism in Costa Rica (ITC), in 2009, 40% of international tourists are motivated to participate in nature-based activities, accessible in the country's public and private natural parks and reserves. Costa Rica has a high amount of tourism activity, and is well known for being able to provide natural resources 'on demand' such as geological formations, fresh- and salt-water systems and the biodiversity living in rain-forests or mangroves, which usually require specialized equipment to ensure safety and enjoyment (Buckley, 2007). The country hosts approximately 5% of the world's biodiversity and over 25% of its area comprises natural parks, wildlife sanctuaries, protected areas, forestry reserves, biological reserves and areas of natural conservation (Villalobos-Céspedes, 2012). Visitor profiles for Costa Rica revealed the majority to be male, over 50 years old, educated predominantly to university level and married, and arriving mostly from the U.S. followed by Europe (Villalobos-Céspedes, 2012). There was a

considerable percentage of repeat visitors, the average length of stay was 11 nights, and the average spend approximately 1,308 USD (ICT, 2012). Tourists were assessed for the how they traveled, whether alone, with family, friends or a partner. Tourists on a family holiday were 3.14 times more likely to purchase nature-based activities than those traveling alone. Also, tourists not visiting nature parks and reserves had no intention of spending money on nature-based tourism, and repeat visitors were found to be 60% less willing to demand such forms of tourism.

During the recession period of 2008–2009, wildlife tourism registered 1.6% growth. A study conducted in the Kruger National Park in South Africa in December 2009 identified 6 motivations for consuming wildlife tourism, with the most common being 'escape, wildlife experience, and benefits for the family' (Kruger et al., 2013). Economy issues were not a big constrain for consuming wildlife tourism, backing up Eagles's (as stated in Kruger et al., 2013, p.8) statement: "visitations to nature areas such as national parks will continue to increase as more people turn to nature tourism". Also such an increase during a recession can be related to feelings and attractive marketing campaigns. People tend to relate strategic wording for relaxation, get away or stress removal with their actual need, and therefore consume wildlife tourism by visiting a national park.

Countries with natural resources suitable for tourism exploitation run campaigns catering for holidaymakers seeking nature-based tourism, and through this gain a position in the market and become more attractive to visitors in the process. Users tend to have standards, who is willing to travel overseas to experience and appreciate particular natural attributes from a certain region, remaining all the while focused on environmental issues. The continuous increase of worldwide tourism activities requires adequate management and responsibility by both developers and visitors in order to strengthen the relationship between nature-based tourism and users. The UNWTO issues regular

reports on international tourism with representative economic figures and data to support tourism forecasts. In 1993, Sindiga (as cited in UNWTO-UNEP, 2011) reported 23% of the 826,000 visitors to Kenya purchased wildlife safari tourism products; in 2000, nature-based activities represented 75% of "Australia's international tourism, and 42% of recreational tourism activities in Europe". The same agency places important economic value on nature-based tourism, which generated 122.3 billion USD for the USA tourism market in 2006. The Centre on Ecotourism and Sustainable Development (CESD) and The International Ecotourism Society (TIES) reported in 2005 that travelers were becoming more willing to pay for nature-based tourism activities and sustainable tourism development, thus to the benefit of local communities and conservation (UNWTO-UNEP, 2011).

The development of artificial environments imitating the original resource, can be taken as a strategy by some managers to respond to the loss of natural habitats and as a consequence of the global changes in the environment. In this case, 'resources' become independent and attractive for specific markets (Dwyer et al., 2009). Examples include underwater sanctuaries such as shipwrecks for scuba diving, which boost local economies and become a shelter for some marine species, which allows them to be observed more easily; or manmade structures used for coral reef restoration where divers can be educated about reef ecology, and alternative strategies for coral reef management.

Diving tourism

Important attributes for choosing a dive location include "clean water, good visibility, plenty to do and see underwater, good diving facilities (close to dive sites) and dive center staff who speak the diver's language" (WTO, 2001, p.86). Studies have been mostly represented by the masculine gender (Vianna et al., 2010; Mota, 2014), which is thought to be associated with image and the physical strength required for handling diving gear. Sometimes it is related to comfort in lower water temperatures and

willingness to travel long distances for visiting different reefs with different attributes for scuba diving activity. Divers were aged 18 to 65 years old, of which 70% were male and 30% female (Belknap, 2008), and Mota (2014) has registered ages between 18 and more than 50 years old on Cozumel Island. Furthermore, the dive training agency PADI (2013) released on-line data showing that 66% of the 945,107 new certifications in 2012 were male. The median age for new certified divers was 29 years old.

From the 80,000 tourists visiting Palau, Anon (as cited in Vianna et al., 2010) concluded that 51% were divers, and the study conducted by Vianna et al. (2010), characterized the divers demographic profile as 36% Europeans, followed by 33% from Asian countries with Japan leading with 23%, U.S. divers 21%, and Australians 7%. Divers had a minimum of 50 dives, but 57% had at least 100 logged dives, and 75% were interested in shark-diving experiences. The divers had spent an average of 5.6 days in the water with an average stay in Palau of 8.1 days. Two thirds of those surveyed had an annual average income of more than 50,000 USD, and had spent on average 2,081 USD per trip. Vianna et al. (2010) estimated the diving-related annual income for Palau to be 82.8 million USD, representing 59% of its tourism revenue. Annual taxation income amounted to 517,500 USD and income from sharks alone 179,000 USD per year.

The rising numbers of scuba divers has created an increasing demand for diving services and diving-related operations; moreover, it has raised concerns in regard to marine environment impacts (Ong and Musa, 2011). Taking part in nature-based activities can show participants how important it is to get close to nature as in today's society we tend to be disconnected from it. This form of tourism enhances the understanding of the impacts created by issues such the overuse of resources (Forestell, 1993).

Materials and Methods

Nature-based tourism is commonly associated with educational components in natural and protected areas, as a form of balanced interaction with distinctive species, culture and societies linked to the natural environment. such an association has become popular through wildlife interaction (Orams, 1996; Moscardo and Saltzer, 2004; Ballantyne et al., 2007; Minnaert, 2012) in places considered for low-impact tourism where adventure tourism and ecotourism take place, and visitors can learn from their experiences (Falk, 2011).

For this study, reliable sources such as edited books about marine environment and coastal tourism, and articles published in scientific magazines were screened for impacts on aquatic animals created by scuba diving. Although, the activity itself had the need to be understood as one activity part of coastal and marine development (Garrod and Gössling, 2008), regulated or not, but which includes related activities and side-impacts. For example the loss of natural habitat to give place to housing projects need to be taken into account as one stress factor existent for the aquatic environment. According to Newsome et al., (2004) wildlife tourism describes a method of encountering wildlife that takes place in natural or artificial environments where visitors can observe and sometimes interact with animals. Such encounters can cause impacts, both positive and negative for the wildlife. Thus, marine wild animal watching were taken in consideration for the study.

Results

Impacts on animal life include the possibility of injury, distress, disruption of natural behaviors and breeding partners, pollution or the destruction of habitats (Newsome et al., 2004; Constantine and Bejder, 2007). Moscardo and Saltzer (2004) found a relation between tourists watching rare and exotic wildlife from close proximity with an increase in their learning about the animals and their behavior, and as well contributing to the visitors' satisfaction. These actions also carry additional negative impacts for the ecosystem. When animals find the natural course of life disrupted and

become used to the presence of humans, Constantine and Bejder (2007) observed a disturbance in reproductive success.

Reynolds and Braithwaite (2001) detected negative impacts caused by management actions and pollution. Along coastal areas new facilities to accommodate visitors have been developed that are taking over the shoreline, and interfering with natural habitats and coastal hydrodynamics. The expansion of such areas has become crucial for local development, but ecotourism has led to coastal stress and disrupted the natural process of the sea turtle (Tisdell and Wilson, 2002).

Garrod and Gössling (2008) revealed an increase in nature-based tourism for animal watching for species such as dolphins, whales, manatees, potato cods, whale sharks, penguins and turtles (Baxter, 1993). Interactions with wild animals cause impacts, which can turn negative when conservation becomes 'product exploitation'. Confining animals to their habitats can offer the chance for tourists to break important rules regarding animal interaction like touching or riding them. Conservation increases the number of specimens in an area making it a bigger attraction and almost guaranteeing that visitors will see the animal they came to see (Orams, 1996). Forestell and Kaufman (1990) reported the same for whale watching in Hawaii and Shackley (1990, p.316) argued that "anyone who wants to ensure the survival of the species would be well advised to avoid visiting them". The same authors found high visitor numbers and manifested their concerns about the cumulative effects and potential impacts, and disruption to the natural process: "Tourism creates more tourism, the location becomes well known and thus desirable creating demand, more supply and ultimately destruction of the original reason for going there" (Zell, as cited in Orams, 1996, p. 83).

Diving tourism destinations cause negative impacts across society and affect local culture through the behaviors, lifestyles or attitudes introduced by visitors (Leiper, 2003). Foreign investments boost local economies based on diving-related

activities, requiring further development in infrastructures, allowing populations to grow, therefore, proliferating on coastal areas and affecting directly the natural habitat of local species.

On the environmental side, marine tourism can bring about the creation of new infrastructure like marinas, pontoons and accommodation along the coast. An impact can be generated by services for tourists (Moscardo et al., 2001). Labuda (1981, p.139) highlighted environmental impacts in areas with "slow water movement such as lakes or lagoons". He also noticed an accumulation of pollutants from motorboats, including hydrocarbons and lead compounds. "Boat engines with more than 25 Hp stir up water layers and can damage aquatic life", especially during spawning. In marine ecosystems damage can be done to coral reefs through fining (Davis et al., 1995), touching the coral with the scuba tank, reef walking, touching and stirring up sediments from the bottom (Hawkins and Robert, 1992), paint scraping, crushed coral, holding on to coral and standing on the bottom (Rouphael and Inglis, 1997).

Diving has become popular and has developed communities in certain regions of the planet. To visit such places, which are usually in tropical, temperate and sometimes Arctic latitudes, travelers use long-distance flights. The energy required to fulfill such 'need' associated with accommodation and high-consumption boat engines, enlarges the ecological footprint for diving tourism and pollution created. At the destination it is common to use powerboats to reach dive spots, and Garrod and Gössling (2008) expressed concern about the difficulty of measuring such impacts.

One scuba diver creates a minimum impacts, although when scuba diving becomes popular and saturated in a certain diving area, the cumulative impact becomes much more significant (Bennet, 2003). Observing divers' behavior (Dimmock, 2007; Ong and Musa, 2012) brings the issue of underwater cameras which has been recorded by Barker and Roberts (2004) to be 3.5 times more likely to physically impact on coral structures, and 100 times to break

them if compared to divers not carrying cameras. Further studies where focus on divers' personality and experience based on the number of hours submersed and experience on different diving conditions, those are good indicators of the diver's conscience level for good diving practices. Moreover, it gives better chance to the reef system to be free from human impacts (Musa et al., 2010).

Di Franco, Baiata, and Milazzo, (2013) have studied about underwater impacts from recreational scuba diving worldwide, which majority is focus on potential disturbance on benthic zones, and just few are directed to motile species. These last reflex studies on interactions fish-human when fish-feeding occurs. Immediate disturbance is considered when divers have direct contact with benthic areas damaging structures and affecting living organisms (Di Franco et al., 2009), or regular feeding activity. Fish can react positively to a divers' physical contact with the bottom, showing curiosity, taking advantage for feeding or compete for space, but for example Dusky Groupers show higher neutral negative response to divers physical impact. Di Franco (2013) has registered more positive impacts then negative towards the divers as fish perceive the benefit of following divers to move safely on the reef and feed on occasional preys.

Siti and Badaruddin (2014) explain several impacts created by scuba diving on coral structures and fish communities. Their study is an alert to the frequency and amount of divers congregating the same site, and is calling for responsible behavior and good dive control techniques adopted by divers to reduce impacts on the reef.

Coral structures are composed by calcium carbonate and are living colonies composed by polyps of Cnidaria in a diverse form. Divers' lack of buoyancy control can impact directly on coral structures mostly by touching, stepping and tank banging on the reef. Polyps produce carbonate exoskeletons as their living quarter, and the loss of such structure affects life on the whole colony. A broken coral loses polyps and make corals prone to diseases. Divers impacting on the

benthic zone lift sediment which becomes a threat to the reef colonies by interfering on functional mechanisms. Physical stress can asphyxiate coral and also influence the optimal growth rate of the coral skeleton, can cause abrasion, and reduce their living coverage with changes on biogeographic zone (Siti and Badaruddin, 2014).

Scuba diving can take place in a variety of locations, and for example artificial reef structures such as shipwrecks are commonly used for the activity. They congregate a big density of biota and are shelter to a variety of species, as the rapid growth of fixed lifeforms such as corals, sponges among others gives potential for scuba diving. Another type of diving subject area is shark diving, which is becoming more popular and takes interaction to the extreme for close encounters with big animals (Cater, 2008). Shark diving brings additional benefit to conservation programs by reducing shark fishing activity, and provides income for local populations living from shark-watching tourism. Although, dive tourism interfere on animal behavior by chumming the water to attract animals and creating habituation to humans. Animals become valuable.

Discussion

Authors like Tisdell and Wilson (2005), Ballantyne et al. (2007), Ballantyne and Packer (2009) confirmed both positive short- and long-term impacts on visitors' environmental learning through nature-based tourism experiences. Furthermore, it can also have positive impacts on the environment itself; however, there is also the potential for a negative effect on the species and ecosystems.

A common strategy for increasing wildlife encounters, facilitating close observation of species, is by feeding animals; the practice disrupts the animals' natural behavior, affecting population levels (Orams, 2003; Cater, 2008). The animals were found to be strongly dependent on the food provided by visitors and consequently sought habituation close to human proximity. Cater (2008) highlights a repercussion of sharks becoming more

aggressive and eventually attack divers. Orams (2003) approached aspects of the impacts caused on wildlife species where there is a noticeable modification of their natural behavior, leading to dependency on and habituation close to the presence of humans, reported aggression towards humans, health problems (Siti and Badaruddin, 2014) and injuries.

Facts show severe impacts created from divers associated to physical destruction, it is very importance to master diving techniques and raise awareness of how divers can damage such fragile environment (Franco et al., 2013). It is also important to understand the impact created by the activity (Musa et al., 2010), and therefore adopt 'safety for all' on the reef.

Conclusion

In certain coastal areas, the whole community is dependent on the water environment for living, so preserving reefs and the marine ecosystem are very important (Musa, 2003). Locally, diving creates the opportunity to develop and change the environment (Rouphael and Hanafy, 2007) and at the same time promotes tourism in protected areas and contributes to the conservation of species. The revenue collected from diving-related activities can easily be used to sponsor management work and tools for 'boosting' natural resources (Roberts and Hawkins, 2000), becoming even more attractive to tourists in the process. Local economies can benefit from diving tourism and 'preserve the local environment' (Weaver and Opperman, 2000). Economic impacts are also present with tourists exchanging foreign currency to spend on local goods, art crafts and services, and "jobs can be created to support tourism activities" (Leiper, 2003, p.139).

Environmental impacts were noted in terms of providing positive aspects, mainly represented by economic benefits and employment opportunities. The negative side is revealed by wildlife impacts whereby animals have changed their behavior due to contact with tourists, with authors reporting their concerns and measuring the

consequences and long-term learning impacts (Forestell and Kaufman, 1990; Orams, 1996; Falk et al., 2007; Ballantyne, et al., 2010). In some geographical locations, the over-usage of the reefs has resulted in physical devastation and chemical contamination. Land development in support of scuba diving has also caused negative impacts and affected the surrounding infrastructure, with alternating living patterns and by creating economic differences among the local society (Moscardo et al., 2001; Musa, 2003; Garrod and Gössling, 2008).

Now a days, recreational scuba diving is becoming very trendy and training agencies are very competitive. The number of Divers has been increasing at good rhythm (PADI, 2013). Despite the fact, there are a discrete number of publications about measuring the size of the entire diving community, and to predict the tendency line. Mostly are representative of small areas of interest, an some authors (Garrod and Gössling, 2008, Mota, 2014) have mentioned the lack of research on scuba diving with a representative diver numbers in the world; only the WTO (2001) and Cater and Cater (2001) have published a market prediction for the first decade. Diving studies can mostly be found in journals and included in some edited books as a random chapter (Garrod and Gössling, 2008). The literature review uncovered detailed articles describing several divers' profiles (see: Cater & Cater, 2001; WTO, 2001; Musa, 2003; Gössling et al., 2004; Musa et al., 2006; Belknap, 2008; Ong and Musa, 2011, Vianna et al., 2011, Mota, 2014) and impacts on the local ecosystem and community, but attributing little importance to management issues (Garrod and Gössling, 2008).

Studies about scuba diving, are mostly highlighting socio-economical perspective, or impacts on the bottom of the water-bodies (Di Franco et al., 2013), some others report divers' performance and comfort level (Dimmock, 2007) for underwater behavior towards good diving practices in benefit of the environment (Musa et al., 2010). Diver skills and education have been targeted for

commercial use and access to interest groups (Dimmock, 2004). "Regular monitoring of both biophysical and social dimensions of involvement is required to manage impacts of the activities from a holistic perspective" (Dimmock, 2007, p.141) Impacts caused by nature-based tourism are more common to be studied in regard to social, cultural, environmental and economic activities. Apparently development is associated with economic return and impacts might be both positive and negative. There is also the need for managing natural resources and reducing foot prints by educating local populations and visitors about the importance of good practices and use in order to leave a legacy for future generations.

Diving coral reef environments has become important for dive tourism as it enhances divers' personal experience (Garrod and Gössling, 2008). Understanding that scuba diving related activities introduce pressure in the ecosystem, they compromise the sustainability of the resource (Wongthong and Harvey, 2014). Therefore, responsibility for good management and practices need to be addressed to host and visitors, as negative impact have the power to reduce the attractiveness and interest for tourism activity.

Scuba diving as itself does not harm the environment, but these suffer from side activities necessary for providing comfort and safety. Unless divers grab, touch or harass marine animals (Franco et al., 2013; Siti and Badaruddin, 2014), the activity follows good ethics and does not disrupt normal activity on the reef, and the only accountable impact is "leave bubbles".

Recommendations

It is very important for tour designers and wildlife tourism managers to ensure good practices and ethics for education in nature (Ballantyne et al., 2010). Zhong et al. (2011) described direct relations between tourism activity, local society and the use of natural resources, pointing out both positive and negative aspects of progress. Humans feel attracted to wildlife interactions, probably due to nature coverage by

environmental-based media and magazines; Orams (1996) stated a few perspectives on such attractions and on-site management procedures which can be used for conservation programs offering wild animal watch tours (Garrod and Gössling, 2008) and explain to visitors about possible impacts of poor diving techniques, touching or even riding animals.

Reefs found along the coast are widely used for tourism activities, making the resource as one good contributor for local economy, but when mismanaged, it compromises sustainability. One recommendation to achieve sustainable tourism development is to combine adequately integrated coastal management and demand for tourism (Wongthong and Harvey, 2014), taking into account governmental support and strategies to minimize social factors.

References

- Ballantyne, R., and Packer, J. 2009. *Future directions for research in free-choice environmental learning*. In Falk, J., Heimlich, J., and Foutz, S. (Eds.). *Free-choice learning and the environment*, Alta Mira Press, Lanham, MD: 157-170.
- Ballantyne, R., Packer J., and Falk J. 2010. Visitors' learning for environmental sustainability: Testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling. *Tourism Management*, 32(6): 1243-1252.
- Ballantyne, R., Packer, J., and Hughes, K. 2007. Conservation learning in wildlife tourism settings lessons from research in zoos and aquariums. *Environmental Education Research*, 13(3): 367-383.
- Barker, N. H.L., and Roberts, C. M. 2004. SCUBA diver behaviour and the management of diving impacts on coral reefs. *Biological Conservation*, 120(4): 481-489.
- Baxter, A. 1993. *Management of whale and dolphin watching, Kaikoura, New Zealand*. In Postle, D., and Simmons, M. (Eds). *Encounters With Whales '93: A Conference to Further Explore the Management Issues Relating to*

- Human/Whale Interactions, Great Barrier Reef Marine Park Authority, Townsville, Australia 108–20.
- Belknap, J. 2008. *A Study of the Relationship Between Conservation Education, and Scuba Diver Behaviour in the Flower Garden Banks National Marine Sanctuary*. Ph.D. Thesis A&M University, Texas.
- Buckley, R.C. 2007. Adventure tourism products: price, duration, size, skill, remoteness. *Tourism Management*, 28(6): 1428-1433.
- Cater, C., and Cater, E. 2001. *Marine environments*. In: Weaver, D. B. (Ed.). The encyclopedia of ecotourism, CABI, Wallingford 265–282
- Cater, C.I. 2006. Playing with risk? Participant perceptions of risk and management implications in adventure tourism. *Tourism Management*, 27(2): 317-325.
- Cater, C. 2008. *Perceptions of and Interactions with Marine Environments: Diving attractions from Great Whites to Pygmy Seahorses*. In Garrod, B. and Gössling, S. (Eds). New frontiers in diving tourism: Diving experiences, sustainability, management, Elsevier, Amsterdam 49-64.
- Constantine, R., and Bejder, L. 2007. *Managing the whale- and dolphin-watching industry: time for a paradigm shift*. In Higham, J. , and Lück, M. (Eds.), Marine wildlife and tourism management: Insights from the natural and social sciences, CABI, Wallingford, Oxfordshire 321-333.
- Davis, D., Harriott, V., and MacNamara, L. 1995. Conflicts in a marine protected area: scuba divers, economics, ecology, and management in Julian Rocks Aquatic Reserve. *Australian Parks and Recreation*, 31(1): 29–35.
- DEMA (2012).Fast Facts: Recreational Scuba Diving and Snorkeling. Retrieved on May 22, 2013, from: <http://www.dema.org>
- Dicken, M., and Hosking, S. 2009. Socio-economic aspects of the tiger shark-diving industry within the Aliwal Shoal Marine Protected Area, South Africa. *African Journal of Marine Science*, 31(2): 227-232.
- Di Franco, A., Baiata, P, and Milazzo, M. 2013. Effects of recreational scuba diving on Mediterranean fishes: evidence of involuntary feeding? *Mediterranean Marine Science*, 14(1): 15-18.
- Di Franco, A., Milazzo, M., Baiata, P., and Chemello, R. 2009. Evaluation of scuba divers' behaviour and of its effects on the biotic component of a Mediterranean MPA. *Environmental Conservation*, 36(1): 32-40.
- Dimmock, K. 2007. *Scuba diving, snorkeling, and free diving*. In Jennings, G. (Ed.), Water-based tourism, sport, leisure, and recreation experiences, Elsevier, Amsterdam 128–147.
- Dimmock, K. 2004. Managing recreational scuba experiences: exploring business challenges for New South Wales dive tourism managers. *Tourism Review International*, 7(2): 67–80.
- Dwyer, L., Edwards, D., Mistilis, N., Roman, C, and Scott, N. 2009. Destination and enterprise management for a tourism future. *Tourism Management*, 30(1): 63–74.
- Falk, J.H. Reinhard, E.M., Vernon, C.L., et al. 2007. *Why Zoos & Aquariums Matter: Assessing the Impact of a Visit*. Association of Zoos & Aquariums. MD, Silver Spring.
- Forestell, P., 1993. If Leviathan Has a Face, Does Gaia Have a Soul? *Ocean and Coastal Management*, 20(2): 267-82.
- Forestell, P.H., & Kaufman, G.D. 1990. *The history of whale watching in Hawaii and its role in enhancing visitor appreciation for endangered species*. In Miller, M. L. and Auyong, J. (Eds). Proceedings of the 1990 Congress on Coastal and Marine Tourism, National Coastal Resources Research and Development Institute, Newport, OR 2: 399-407.
- Garrod, B., & Gössling, S. (2008). *New Frontiers in Marine Tourism: Diving Experiences, Sustainability, Management*. Elsevier, Amsterdam.
- Gössling, S., Kunkel, T., and Schumacher, K. 2004. Use of molluscs, fish and other marine taxa by tourism in Zanzibar,

- Tanzania. *Biodiversity & Conservation*, 13(1): 2623–2639.
- Graham, R. 2004. Global whale shark tourism: a “golden goose” of sustainable and lucrative income. *Shark News* 16: 8-9.
- Hara M, Maharaj I, & Pithers L. (2003) *Marine-based tourism in Gansbaai: A socio-economic study*. Department of Environmental Affairs and Tourism (DEAT), South Africa. Pretoria.
- ITC (2012). Instituto Costarricense de Turismo. Cifras turísticas Marzo 2012. Retrieved on Sep 18, 2013, from: http://www.visitcostarica.com/ict/paginas/cifras_turisticas/Junio_2012/CifrasTuristicas.pdf
- Jennings, G., 2007. *Water-Based Tourism, Sport, Leisure, and Recreation Experiences*. Elsevier, Oxford.
- Kruger, M., Scholtz, M., and Saayman, M. 2013. Understanding the reasons why tourists visit the Kruger National Park during a recession. *Acta Commercii*, 13(1): 1–9.
- Kuenzi, C., and McNeely, J. 2008. *Nature-Based Tourism*. In. Retrieved on Renn, O, and Walker, K. (Eds). *Global risk governance: Concept and practice using the IRGC Framework*, Springer, Amsterdam 155-178.
- Labuda, K. 1981. *Activity profiles for three water-based recreational activities*. National Park Service, Interpretation and Visitor Services Division, Ontario, Canada.
- Leiper, N. 2003. *Tourism management*. Pearson, Melbourne, Australia.
- Lindgren, A., Palmund, J., and Wate, I. 2008. *Environmental Management and Education: The Case of PADI*. In Garrod, B., & Gössling, S. (Eds). *New Frontiers in marine tourism: Diving experiences, sustainability, management*, Elsevier, Amsterdam 115- 136.
- Minnaert, L. 2012. Social Tourism as Opportunity for Unplanned Learning and Behavior Change. *Journal of Travel Research* published XX(X): 1-10.
- Moscardo, G., and Saltzer, R. 2004. *Understanding wildlife tourism markets*. In Higginbottom, K.(Ed.). *Wildlife tourism: Impacts, management and planning*, Common Ground Publishing Pty Ltd and Cooperative Research Centre for Sustainable Tourism, Altona 167-186.
- Moscardo, G., Pearce, P., and Green, D., 2001. Understanding coastal and marine tourism demand from three European markets: implications for the future of ecotourism. *Journal of Sustainable Tourism*, 9(3): 212–227.
- Mota, L. 2014. *The Synergy between Scuba Diving and Household Behaviour: Testing Plastic and Food Waste "The use of natural habitats for tourism education"*. Ph.D. Thesis. University of Santiago de Compostela, Spain.
- Musa, G. 2003. *Sipadan: An over-exploited scuba-diving paradise? An analysis of tourism impact, diver satisfaction, and management priorities*. In Garrod, B. and Wilson, J.C. (Eds.). *Marine ecotourism: issues and experiences*, Channel View Publications, Clevedon, UK 122–137.
- Musa, G., Kadir, S., and Lee, L. 2006. Layang Layang: An empirical study on scuba divers' satisfaction. *Tourism in Marine Environments*, 2(2): 89–102.
- Musa, G., Seng, W., Thirumoorthi, T., and Abessi, M. 2010 The influence of scuba divers' personality, experience, and demographic profile on their underwater behavior. *Tourism in Marine Environments*, 7(1): 1-14.
- Newsome, D., Dowling, R., & Moore, S. (2004). *Wildlife tourism*. Cleveland, UK: Channel View Publications.
- Ong, F. and Musa, G. 2011. An examination of recreational divers' underwater behaviour by attitude–behaviour theories. *Current Issues in Tourism*, 14(8): 779-795.
- Ong F., and Musa, G. 2012. Examining the influences of experience, personality and attitude on SCUBA divers' underwater behaviour: A structural equation mode. *Tourism Management*, 33(6): 1521–1534.
- Orams, M., 1996. Using Interpretation to Manage Nature-Based Tourism. *Journal of Sustainable Tourism*, 4(2): 81-94.
- Orams, M. 2003. *Marine ecotourism in New Zealand: An overview of the industry and its management*. In Garrod, B. and

- Wilson, J. C. (Eds.). *Marine Ecotourism: Issues and Experiences*, Channel View Publications, Bristol, UK 233-248.
- Ozaner, F. S. (2004). Türkiye’de okul dışı çevre eğitimi ne durumda ve neler yapılmalı? V.Ulusal Ekoloji ve Çevre Kongresi 5-8 Ekim, Taksim International Abant Palace, Abant İzzet Baysal Üniversitesi & Biyologlar Derneği, Abant- Bolu. Bildiri Kitabı (Doğa ve Çevre), 67-98, Biyologlar Derneği, İzmir.
- PADI (2013b). Global Student Report, retrieved on 22.05.2013, from http://www.padi.com/scuba/uploadedFile/s/Scuba_--Do_not_use_this_folder_at_al/About_PADI/PADI_Statistics/2012%20WW%20Statistics.pdf
- Reynolds, P. C., and Braithwaite, D. 2001. Towards a conceptual framework for wildlife tourism. *Tourism Management*, 22(1): 31-42.
- Roberts, C. M., & Hawkins, J. P. (2000). Fully-protected marine reserves: A guide. WWF. Endangered Seas Campaign, Washington DC and Environment Department, University of York.
- Rouphael, A., and Inglis, G. 1997. Impacts of recreational scuba diving at sites with different reef topographies. *Biological Conservation*, 82(3): 329–336.
- Shackley, M. 1990. *Manatees and tourism in southern Florida: Opportunity of threat?* In Miller, M.L. and Auyong, J. (Eds). *Proceedings of the 1990 Congress on Coastal and Marine Tourism Vol. 2* (pp. 311–16). Newport, OR: National Coastal Resources Research and Development Institute.
- Sinyenga, G. 2005. Nature-based Tourism Demand in Zambia, November 2005. Tourism demand survey report. Retrieved on Sep 21, 2013, from: <http://fsg.afre.msu.edu/zambia/resources/Tourism%20Demand%20Survey%20Report%20Nov%202005%20Goodson.pdf>
- Siti, A., & Badaruddin, M. (2014). A review of SCUBA diving impacts and implication for coral reefs conservation and tourism management. *SHS Web of Conferences*, 12(01093): 1-8.
- Tisdell, C., and Wilson, C. 2005. Perceived impacts of ecotourism on environmental learning and conservation: turtle watching as a case study. *Environment, Development and Sustainability*, 7(3): 291-302.
- UNWTO-UNEP, 2011. World Tourism Organization, UNWTO Annual Report 2011. Retrieved on Jan 7, 2013, from: <http://www2.unwto.org/en/publication/unwto-annual-report-2011>
- Uzun, F. V., & Keles, O. 2012. The Effects of Nature Education Project on the Environmental Awareness and Behavior. *Procedia - Social and Behavioral Sciences*, 46: 2912–2916.
- Vianna, G., Meekan, M., & Pannell, D. (2010). Wanted Dead or Alive? The relative value of reef sharks as a fishery and an ecotourism asset in Palau. Australian Institute of Marine Science, Perth.
- Villalobos-céspedes, D., Galdeano-gómez, E., & Tolón-becerra, A. (2012). International Demand for Nature-based Tourism in Costa Rica: Socio-demographic and Travel Indicators, 7(1): 269–287. Retrieved on Sep 21, 2013, from: http://www.chios.aegean.gr/tourism/VOL_UME_7_No1_art14.pdf
- Weaver, D., and Opperman, M., 2000. *Tourism Management*. 4th ed. John Wiley & Sons, Incorporated, Brisbane.
- Wongthong, P., and Harvey, N. 2014. Integrated coastal management and sustainable tourism: A case study of the reef-based SCUBA dive industry from Thailand. *Ocean & Coastal Management*, 95: 138–146.
- WTO (2001). *Tourism 2020 Vision - Global Forecasts and Profiles of Market Segments – Chapter 7*. World Tourism Organization, Madrid, Spain
- Zhong, L., Deng, J., and Song, Z. 2011. Research on environmental impacts of tourism in China: progress and prospect. *Journal of Environmental Management*, 92(11): 2972-2983.