

Underwater Trails: a New Possibility of Marine Tourism

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ABSTRACT

WEGNER, E.; TONIOLI, F.C.; CABRAL, D. Q., 2006. Underwater trails: a new possibility of marine tourism. Journal of Coastal Research, SI 39 (Proceedings of the 8th International Coastal Symposium), 990 - 993. Itajaí, SC, Brazil, ISSN 0749-0208.

For the first time in Brazil, an underwater-guided tour was created for the practice of snorkeling in the city of Porto Belo at João da Cunha Island in the state of Santa Catarina. The main objective was to develop a diving activity that could be carried out under strict rules so to cause minimum environmental impact or human health damage. When the trails are properly planned, damage can be minimized. As self-guided trails they can provide the divers education about the marine life they observe. This may concern the divers to have more conscience about the environment, as well as the impact they are able to do. For eight months twenty-five expeditions have taken place in the whole island in order to scout and select the best areas for scuba diving and underwater trails. Based on biological, physical and social indicators, public material was developed, such as leaflets containing information about natural sites for diving and species that occur in the area was collected in order to identify biota of the diving areas. We identified 26 species of marine invertebrates, 42 species of fish and 36 genera of algae. Between December 13th, 200 and February 28th, 2001, underwater trails opened to divers visiting the Island. A number of 1429 visitors dove in groups of 5 people, guided by a monitor. Before diving the monitor would present visitors with safety instructions and information about the natural environment. To make the activity more enjoyable and educative waterproof trail guides were given to the tourists for them to identify the organisms they could observe while diving. A poll was made to help define the profile of the visitors who experienced the underwater trails and their opinion about them. Results show that most of the visitors were divers with little or no experience in diving. Most of them also showed interest in attending classes to learn scuba diving as a way to improve their diving abilities and their contact with underwater natural environments. Other aspects such as safety measures during snorkeling and local community involvement in snorkeling as a tourist activity were also evaluated. The conclusion is that studies like this can provide subsidies for the establishment of underwater trails as a coordinated and formal tourist activity that integrates both the natural environment potential and its protection, but also the main social-economical conflicts about the use of coastal environments for leisure activities.

ADDITIONAL INDEX WORDS: *Underwater trails, snorkeling, marine island management.*

INTRODUCTION

Marine tourism has established itself as a significant part of the tourism. On literature it seems to be an agreement that tourism on coastal areas shows a faster development than other areas (MILLER, 1990; ORAMS, 1999). The beauty, the diversity and the singularity of insular views have had the attention of a high number of visitors to different spots of the world.

The coast of the Santa Catarina state isn't an exception to this reality. Located on the south of Brazil, around 530 kilometers long, with several island and a very cut coastline, full with peninsulas, beaches, sea shores and bays, provide the location with privileged views. This coast is the main tourism attractive of an economy that has been receiving around 2,8 million tourists each summer season, adding around 500 million dollars.

There are many ways to know the marine environment, although, the most popular ways to visit the underwater world is practicing snorkeling or scuba diving.

In the Santa Catarina state the underwater tourism started to establish itself, as an economic activity, by the end of the 80's and beginning of the 90's, with the first scuba diving operators in Bombinhas, operating in the Arvoredo Island. Nowadays more than ten SCUBA diving's operators, located mostly in Balneário Camboriú, Bombinhas and Florianópolis, receive divers from different states of Brazil and abroad.

Strategically located on the central north of the Santa Catarina's coast, the João da Cunha Island (picture 1) is nearby the continent and to the most visited beaches in summer of the state like Balneário Camboriú, Itapema, Bombinhas, among others. The calm waters of the Porto Belo bay make it an easy

access area for either small boats or bigger ships. The present owners of the island have developed, since 1996, a coastal tourism project. To this project was given the fantasy name of "Porto Belo Island".

Considering the fact that tourism in coastal and insular areas nowadays brings, beyond the economic benefits to the area, concerns about the environmental degradation caused, several efforts have been made trying to stop or reverse this tendencies.

This paper work is presented as a methodological propose for the marine tourism development plane, more specifically for the underwater tourism on the João da Cunha Island (figure 2), by the insert of the underwater trails around the island. Since this is an activity that relies on the natural potential of the environment, there was a special concern that the snorkeling activity on the Island would interfere as a less significant way to the marine environment, keeping the integrity of the visited ecosystems.

The possibility of introducing new people to the practice of snorkeling, sensitizing them for a conscious practice on the marine environment, meets the interest of a sustainable human development. For that matter, it was tried to allow the practice of this sport with the knowledge, the awareness and the respect for the marine environment.

Using biological, physical and social indicators, it was developed a folder with precious informations, giving the visitor the possibility of practicing snorkeling according to the visitors skills (inexperienced, little experience and experienced). Besides this, through this information the tourist could better understand the underwater environment, realizing the fragility and sensibility caused by human action.

HAWKINS (*in press*) affirms that the trails minimize the

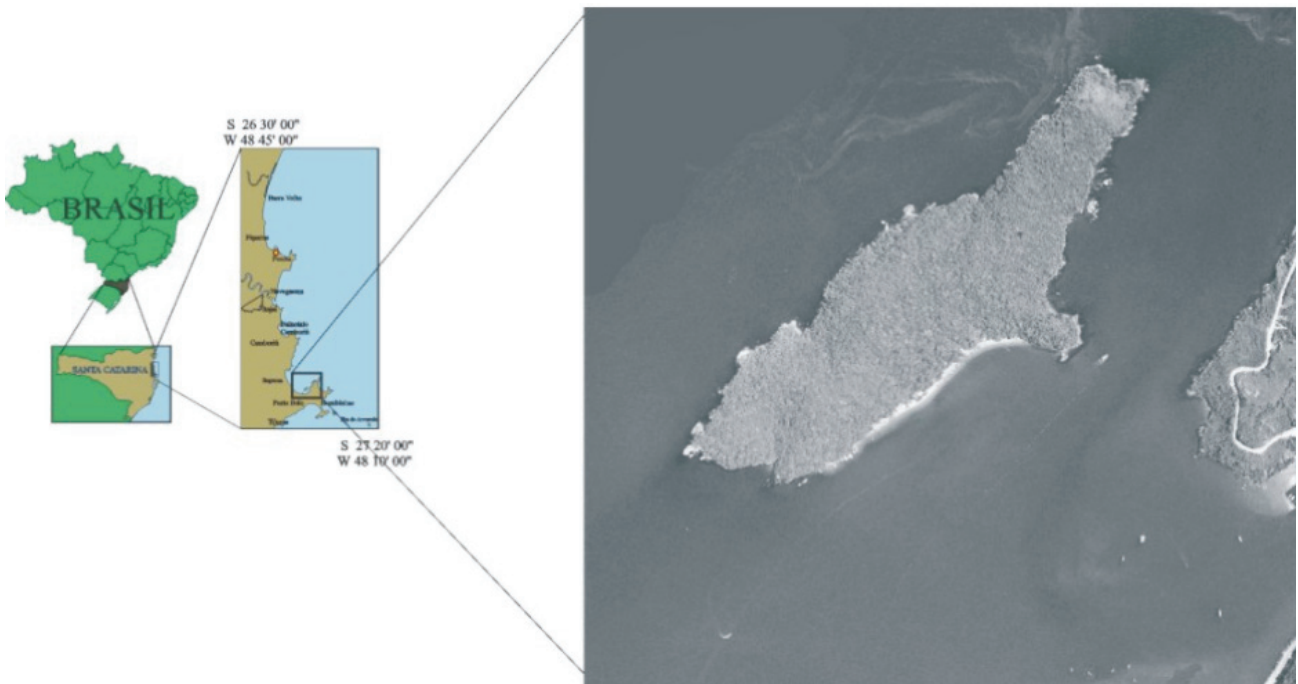


Figure 1. Localization of the João da Cunha Island, in Porto Belo, SC.

when are guided, with explanations, and located in an environment with good water visibility and easy access to the practice of both, scuba diving and snorkeling.

Aspects as the involvement of the local community, income and outcome, security and the level of satisfaction of the visitors were also considered. A questionnaire was applied in a random way for some of the visitors after dive. Those questionnaires provided informations to built a database, which through statistic analysis, made the profile of the diver and the level of satisfaction regarding the service provided.

Considering the main problems about the use of natural resources of the study field and suggesting protection rules for the marine environment was provided a zoning of the activities developed around the island.

METHODS

The implantation of the underwater trails at Porto Belo Island was accomplished by the following steps:

Description of the study field: to obtain the data necessary for the description of the study field, an important review of the literature was done recovering the historical, social and economic aspects of the area. This method was also used, as a complementary to the database, on the search for the biological characteristics, physical, geological and chemical conditions and also climatic information.

Incursions were made to the area for observation, by a team of researchers to recognize the area and collect biological and bathymetric information, physic and geological conditions of



Figure 2. João da Cunha Island (EWERTON WEGNER, 2001).

the marine environment. A lot of the material collected was treated and studied at the lab of the Center of Technological Science of the Ocean and Earth (CTTMar), at the University of the Itajaí Valley (UNIVALI).

Elaboration of an island's map: the island's map was achieved introducing the bathymetric information collected by the researcher's to the already existing planialtimetric information of the island on a 1: 2.500 scale. For that the HypackTM software was used, the final map was generated on UTM and on a 1: 10.000 and 1: 6.500 scales.

Defining the underwater trails: four underwater trails were defined under the following criteria: safety of the tourists, the possibility of snorkeling activity face at different wind conditions and the choice of different marine environments.

The installation of signalizing floats: the installation of the marine moorings buoys was done by scuba diving operations, where the appropriated spot was located by the divers caring not to damage the existing organisms. To each mooring was attached a cable and to the cable a floating signalizing the trail ("mooring buoys system" (QUIROLO, 1999)).

Installation of an information center for the visitors: it was install at the Porto Belo Island a kiosk of nautical activities for bookings and information of the underwater trails.

Choosing the best diving monitors: certificated students of the Oceanography and local divers with snorkeling experience were selected to guide the visitors on the activity.

Lectures about the underwater trail's program: the monitors before each diving trip, would perform a briefing for the correct use of the snorkeling equipment; information about the environment where the snorkeling would take place; most common organisms to be spotted; and information on how to cause less or non impact on the marine environment.

Elaborating a zoning of the marine tourism on the island: on the island map were defined distinct areas, detaching marine tourism, fishing and shellfish culture, and conservation zones.

Evaluating the snorkeling activity on the underwater trails: a questionnaire was made to find out whose was the visitor of the underwater trails and them satisfaction level.

RESULTS

As new options of entertainment for the visitors of the Porto Belo Island four underwater trails were defined around the island (Figure 3).

Considering different levels of snorkeling ability and keeping in mind their safety, shallow areas were selected, with approximately 1,5 meters deep, and deeper spots, around 4,5 meters deep. Areas exposed to wave and marine currents were avoided to keep the diver from having a physical exhaustion, considering that the majority public for the trials was inexperienced divers.

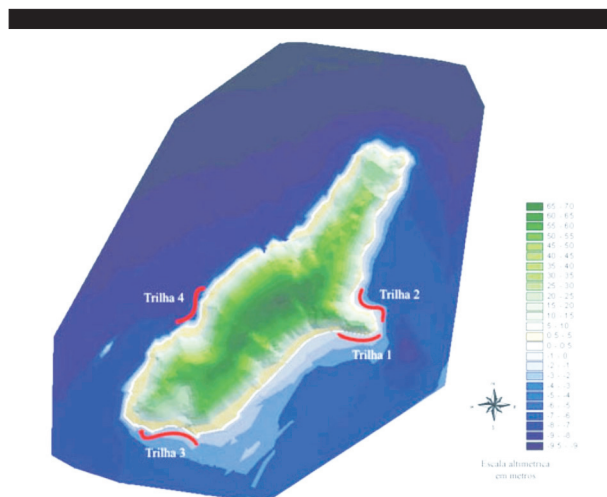


Figure 3. Map of the location of the underwater trails.

From December 2000 to February 2001, 1429 people used the underwater trails.

Trying to identify the characteristic diver at the underwater trails during the summer of 2000/2001, 225 questionnaires were analyzed.

The visitor's characteristics can be visualized as a young, well-educated diver with none or little experience on diving, but that wishes to continue to snorkel after this experience.

The diver's opinion was positive on most cases when asked about: water visibility, fauna, flora and equipment. And a very good opinion for: monitors, safety and information provided by the monitor.

It was identified 26 species of marine invertebrates, 42 species of fish and 36 species of macroalgae. An identification guide was made, with the most often observed species during the dive trips. The guide was printed on a waterproof material and was offered to the divers during the dive trip.

DISCUSSIONS

When the guided and contemplative snorkeling on the underwater trails was installed, a new tourist activity was added to the Porto Belo Island Project, caring for the marine environment, bringing a new income for the local community, caring for the safety and satisfaction of the visitor.

The main problems found during the experiment are listed below:

- On several occasions the signalizing floats were stolen, causing bad or no signalization at all on the underwater trails for a couple of days. Fitting to cite that the lack of signalization was a problem for the diver's safety, since there is heavy boating traffic around the island.

- Tenders (aid boats for the big ships) working around the island would cause waves, moving the settlements, prejudicing the water's visibility, and on that matter the snorkeling activity.

- The lack of visibility on areas not so protected from the wind, would oblige the monitors to use the same trails more often, causing more degradation to the area.

- Although the tourists would listen to the lecture, ministered by the monitors before the dive trip, the lack of conscience of some of the tourists would damage the work, since they wouldn't listen to the advice and would walk on the rocks, touch the organisms and even try to take some as souvenirs.

- Some material that were installed around the area of the trails, such as car tires and concrete structures, some garbage originated by the tourism and the bad conditions of the access areas to the island, gave the tourists a bad impression.

The zoning of the activities proposed around the João da Cunha Island determinates and exclusive the use of defined areas, trying to coordinate the activities already offered on the area, the tourist visitation, local economic activities (fishing and shellfish culture) and the preservation of ecologically interesting areas (Figure 4).

The zoning map divided the island in several zones: entertainment and beach zone (for sea bathing and entertainment. Are allowed on this area: swimming, the use of floaters, use of the sand area for walks, sun bathing and racquetball practice); boarding and disembarks zone (restricted area for the boats to come alongside the pier for the boarding and landing of passengers, and for the stranding of smaller sailing and motor propulsion boats); shellfish culture zone (on this area are allowed the installing and maintenance of the shellfish culture parks and the transit of boats for that matter. That is also a scientific experimentation area); snorkeling zone (the area defined by the signalizing floats of the underwater trails is exclusive for snorkeling and scientific diving); sportive fishing zone (sportive fishing is allowed on this areas if following the present conservation rules); special protection zone (the ecological importance of this areas are recognized by the presence of in danger animals like the otter (*Lutra longicaudis*) and it's use is exclusive for scientific experiments and evaluations).

The definition of the recreation and beach entertainment

Zoneamento do Litoral da Ilha João da Cunha

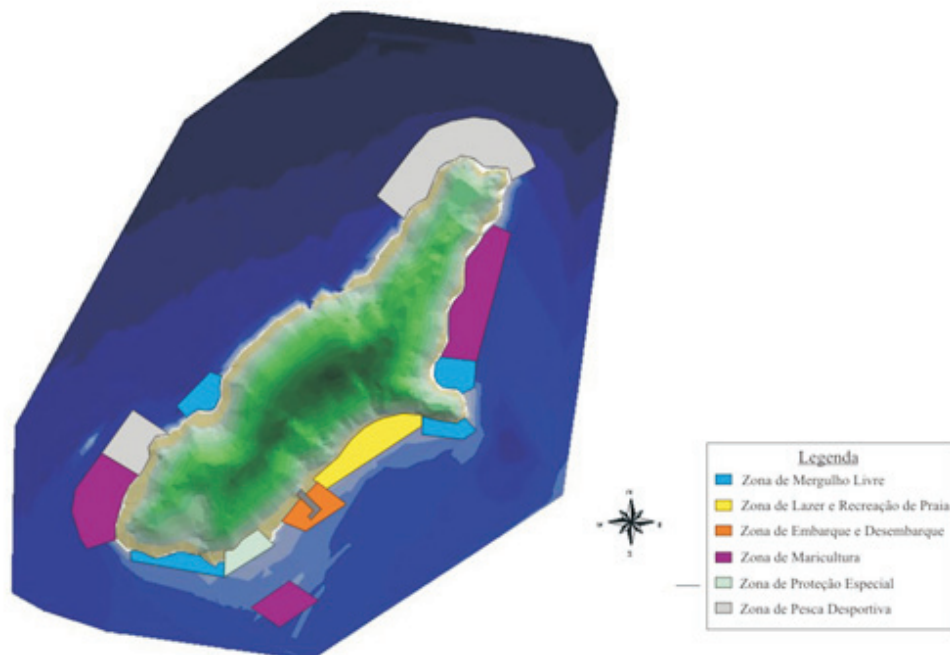


Figure 4. Zoning of the João da Cunha island.

zone areas with signaling floats is an extremely important matter done by the Porto Belo Island Enterprise, which guarantees to the visitors of the island, the safety has provide trough not allowing boats or personal watercrafts on the area reserved for bathing.

CONCLUSIONS

Interesting examples of changes in the mentality of the local community about marine resources has been proportionated by the marine tourism (ORAMS, 1995).

On the special case of Porto Belo Island, fishermen whose years ago would concentrate their affords on the trawl net or gill net, causing the exhaustion of the marine resources on the area, nowadays make part of their income bringing tourists to the island, and to the snorkeling areas, observating the species in loco.

The importance of a better control of the submarine hunting activity, the presence of personal watercrafts and other boats inside inappropriate areas, specially on the underwater trails area was verified through the problems observed during the experiment.

The analysis of the changes on water temperature, air temperature, water visibility, number of visitors to the island, and number of divers on the underwater trails, showed a positive correlation between the temperatures and the number of tourists visiting the island, and a negative correlation with the water's visibility. Showing that, because of the lack of experience of the divers, the water's visibility is not a major factor on their willing to dive.

Considering that 56% of the underwater trail divers were having their first dive experience, and that 89% intend to keep diving, it could be concluded that the snorkeling in the

underwater trails at João da Cunha Island was considered for most of the tourists a good experience, meaning that the study proposal and the results were cohesive.

The participation of local inhabitants on the implantation of the underwater trails, as monitors, or as owners of the boats, which transported the divers to the trails (with restrict access), showed benefits for the local community, reinforcing the social importance of the research.

The instruction lecture given to the tourists, that look for the underwater trails for snorkeling, tried to bring to their attention, on an interactive way, the importance of the ecological processes of the marine environment, acting as an important tool for environment education.

ACKNOWLEDGEMENTS

We thank to Alexandre Stodieck for providing us the opportunity to work in the island of João da Cunha.

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