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"*Bottom-up* management approach to coastal marine protected areas in Portugal"

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ABSTRACT

The classification and management of coastal marine protected areas is traditionally implemented without a strong public participation process in its early stage, resulting in conflicts. A *bottom-up* approach with public participation before defining regulations is an innovative, yet difficult process. The case study presented is a local experience of Avencas Biophysical Interest Zone in Cascais, Portugal. The objective of this paper is to evaluate a new approach, to assess the success of the management action applied in terms of the short-term response from users of the costal marine protected area.

Public participation assemblies were conducted to welcome input from the fishing community regarding the new regulation; visual census and interviews directed at different users, were used to assess the short-term effectiveness of the implemented management actions. A new regulation is underway and user management actions have been implemented: visitors' pathways through the rocky platforms and information spots at the entrance to the beach.

Positive results point to the success of this approach, as visitors either agreed or respected the various management actions implemented: 84% of them agree with information spots, and 76% agree with the pathways. Recreational fishers are now mostly located outside the protected area, though there are still some who choose to stay inside, which indicates the need to change some points in the regulation, to improve its compliance by the fishing community. The short-term evaluation methodology was effective in detecting changes in usage patterns from users when the bottom-up approach was applied.

1. Introduction

Many scientific papers have been written about coastal zone management and particularly about Marine Protected Areas (MPA) management. It is a complex problem with several perspectives, from the economic (Grafton et al., 2004), to the social (Sanchirico et al., 2002) and finally the environmental points of view (Reis et al., 2014). Most of the studies are conducted at a national or regional scale (Martins et al., 2011) and promoted by research groups or national organizations that intend to define a strategy for Coastal Zone Management or analyse a particular situation. The local consequences of these same studies, however, are not usually quantified. There is a lack of information about the effectiveness of global strategies at a local level, or about the adaptation of management guidelines defined for a particular problem to the local reality. The Municipality of Cascais intends to minimize this gap by promoting the evaluation of management measures applied at a local level.

The compliance of the population is essential for nature conservation purposes; usage conflicts arise whenever there are different users of the same area. One such example when creating a new protected area, is the constriction of public access to an area people are accustomed to access freely. Another example of a strong source of conflict happens whenever fishing activities are limited, while other tourist activities are permitted (eg, scuba diving, or tide pooling). In order to minimize this type of conflict it is necessary, for example, to control the number and mobility of visitors inside the area, minimizing the impact that a high number of tourists have on the environment and on local communities (Carter, 2000).

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Traditionally, the conservation strategy in coastal or marine protected areas is defined in a *top-bottom* perspective. It was largely demonstrated however, that such strategies have severe limitations in the case of local MPA, having major gaps in its implementation (Kelleher and Kenchington, 1992; Shipman and Stojanovic, 2007; Martins et al., 2011; Reis et al., 2014).

Phillips (2003) states, that there have been conceptual advances for establishing/management of protected areas over the last 30–40 years. In theory, it is now known what needs to be done to achieve a successful management of the protected areas. The challenge as always is to apply the theory.

Top-bottom management strategy to marine protected areas is usually applied at a regional or national scale (Gaymer et al., 2014), ranging from oceanic (e.g. Wilhelm et al., 2014) to coastal areas (e.g. Cohen et al., 2012; Garces et al., 2013). In this type of marine protected area there are broader and holistic conservation objectives usually aligned with international commitments, protecting the entire ecosystem and its buffer connection to other ecosystems (Toonen et al., 2013). The management strategy is centralized by the government, based in scientific knowledge and with residual public participation (Gaymer et al., 2014). Because of this centralized strategy of management there is a very favourable costs/benefit relation in the creation of the protected area (Wilhelm et al., 2014) and its implementation is faster than a bottom-up approach.

A lack of compliance from the users due to a non-consultation before establishing the regulation is the main reason pointed as responsible for the failure of the conservation strategy (Sanchirico et al., 2002). This is followed by a weak knowledge of the geographical limits of the area, the restrictions and negative feedback from the social, economic and cultural perspectives (Sanchirico et al., 2002; Bennett and Dearden, 2014a).

The *bottom-up* management approach, where main stakeholders can participate, is usually applied at local scale in coastal areas, with a long lasting community based management, where users live in the proximity and experience direct impacts and benefits from the marine protected area (Gaymer et al., 2014). The conservation objectives of this type of areas are at the habitat or ecosystem level and intend to resolve a specific problem (Qiu et al., 2009). The *bottom-up* approach has a strong public participation with active engagement of communities and stakeholders (Sayce et al., 2013). Therefore it is a complicated, long lasting and expensive process of creation and management of marine protected areas. An interdisciplinary approach to develop a new management methodology is essential and the problems associated with the lack of engagement between scientists, practitioners and policies makers must be overcome (Fritz, 2010).

Another disadvantage of the *bottom-up* management is the time it takes in biological surveys to record a change in the pattern of the biological communities. This fact can cause a discrediting of protection measures, especially when dealing with coastal zone areas that are highly dependent on the surrounding environment. Measuring the success and adequacy of marine conservation initiatives and policies is a challenge for the scientific community.

Many obstacles can be found when measuring the success of marine conservation initiatives simply by analysing the biological community response or using a combined sets of indicators (biophysical, socio-economical and governance) (Garces et al., 2013). Lack of long series of data, interference from other source of human disturbance, pollution events, or even storm events can mask any biological community response to the management measures applied. While the use of combined indicators could be compromised when applying it to other case studies, due to the lack of necessary base information. It would be more accurate to evaluate the short-term response in the human population that uses the coastal protected area once they are directly affected by the management measures and respond immediately to them.

Thompson et al. (2002) suggests that the simple control of human access to the coastal zones allows an effective management of marine habitats. For example, a simple stroll along a rocky shore can be a problem to this marine habitat, once individual algae can lose about 20% of their biomass with a single footstep (Schiel and Taylor, 1999). Controlling the trampling of this area will have a positive ecological benefit in a long term, therefore the human access, directly correlated to the trampling, might be a good indicator of the marine conservation initiatives in marine protected areas.

In Portugal there are “Coastal Zone Management Plans” (POOC) that operate at a regional level and define the several constrictions of land use and the environmentally sensitive areas. These management plans also define the “carrying capacity” of the beaches present in the coastal zone, in order to calculate the maximum number of visitors that allow a sustainable use of the beach without compromising its nature (POOC, 1998). The first coastal zone management plan to be implemented was located in the southern coast of Cascais (POOC Cidadela – São Julião da Barra) in 1998, and it included a unique marine protected area, Avencas Biophysical Interest Zone (Zona de Interesse Biofísico das Avencas - ZIBA). Even though this marine protected area was defined as a “no fishing zone” in the aforementioned plan, the lack of information for visitors and/or lack of compliance from the recreational fishing' community are hampering conservation objectives of the area (Ferreira et al., 2012).

In 2009 the Municipality of Cascais, acknowledging the territorial enhancing of having this coastal marine protected area and the problems associated with the non-compliance with the actual regulation, started the long process of its reclassification. While taking over its management and implementing local actions, a participative process was simultaneously promoted by the Municipality, including public assemblies, to allow public participation before establishing the new regulation for the coastal protected area. Taking this into consideration, the main objective of this paper is to evaluate from a social perspective the new *bottom-up* management approach from the Municipality at a local level for ZIBA, and to measure the success of this approach in a short-term scale.

2. Material and methods

This study was conducted between 2010 and 2013 in Cascais. It started with visual census in 2010 to characterize the uses of Avencas Biophysical Interest Zone. Continued throughout 2012 with visitor interviews and public participation assemblies in to analyse the compliance of the population with management measures applied in 2012 (visitor pathways and information spots). The visual census was repeated in 2013 to analyse in a short term the user's behaviour under the new *bottom-up* management measures. Both visual census and visitor interviews were conducted by young volunteers from the Municipal Volunteer Program that occurs every summer.

2.1. Study area

The Cascais Municipality is located in the Lisbon Metropolitan Area (Portugal). In the 2011 census, it was home to 206,479 people (INE, 2011) most of which living by the shore and working in Lisbon (CMC, 2012). Due to its privileged location at the entrance of the Tagus estuary, the extended sea shore and its geological characteristics - Sintra Mountain Rage - Cascais has a rich natural heritage to the west, with the Sintra-Cascais Natural Park; the south of Cascais is highly urbanized, and it has fourteen urban beaches all of which very popular in the spring and summer (Fig. 1).

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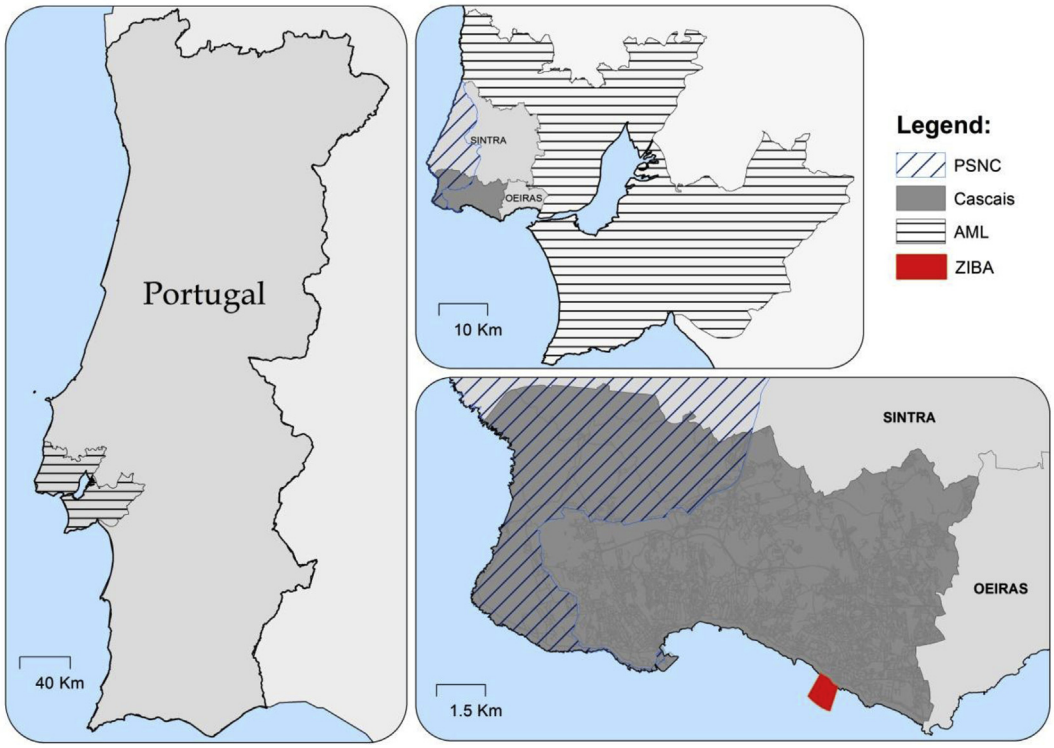

Fig. 1. Location of Cascais Municipality in Portugal and in the Metropolitan Area of Lisbon (AML). Cascais has two protected areas, one inland Sintra – Cascais Natural Park (PNSC) and another at sea, Avencas Biophysical Interest Zone (ZIBA).

ZIBA is located between two beaches, Bafureira and Parede. This area is characterized by extended calcareous rocky platforms with a small sandy beach in the middle (Avencas beach) sheltered from the dominant winds. This rocky shore is extremely rich in intertidal biodiversity, used by several schools and universities to perform their field trips. Visitors use this area in the summer for tide pooling and swimming. The rocky shore has also an historical and therapeutic interest due to its renowned health benefits in treating bone disease with natural limestone. Avencas Beach is located in the middle of the Avencas Biophysical Interest Zone and was classified as a type III beach (semi-natural beach) with a carrying capacity of 156 people in total (considering that each person occupies 12 sqm of sand while at the beach) (POOC, 1998) (Fig. 2). It has a local beach cafe open all year, with a concessional sand area between the 1st of May and the 30th of September (Fig. 2).

To inform visitors about the natural resources present in the area, information spots were setup in all entrances to the beach in June 2012. In August, visitor pathways were established in the rocky shore to prevent random trampling on the platform. Those pathways were simple ropes attached to the rocks with direction signs indicating the start of the pathway.

2.2. Visual census

In 2010 and 2013 visual census were conducted by young volunteers from the municipality. This census aimed to register the number of recreational fishers and visitors to the study area. After an initial training between June and September, volunteers counted users from 8 distinct seashore segments (3 segments inside ZIBA; 5 segments outside ZIBA) over two daily periods. Volunteers had fixed schedules and days for the two daily counts (9:00 and 14:00; 11:00 and 16:00; 13:00 and 18:00) as the goal was to sample the same time period users are active at the beach, regardless of tide levels. For example, on day 1 there would be a visual census at both 9:00 AM and 14:00 PM; on day 2 the visual census would be at 11:00 AM and 16:00 PM; on day 3 it would be at 13:00 PM and 18:00 PM; on day 4 it would go back to 9:00 AM and 14:00 PM. The visual census was conducted with two observers to avoid bias and regardless of weather conditions or day of the week.

After an exploratory graphical analysis, and assumptions verification tests (Normality: Shapiro–Wilks and Homoscedasticity: Levene's test) the Mann–Whitney test ($\alpha = 0.05$) was used to analyse differences in the number of users between 2010 and 2013 in the study area. SPSS software (IBM SPSS Statistics V21) was used for the statistics procedure.

2.3. Public participation assemblies

In 2012 three public participation assemblies took place in Cascais, promoted by the Municipality. The first one was targeted at the local recreational fishers, the second at other users of the area, and finally the third at the general public.

In the first two assemblies the same methodology was followed. Beginning with a small technical presentation of the problem, followed by a work group where the participants were asked to: name the positive and the negative elements of the Biophysical Interest Zone; contribute with some ideas to achieve the conservation objectives of the area; and to identify a way of cooperation that would preserve the local biodiversity. Finally, groups were asked to present their conclusions to the audience. In the third and final assembly, a summary of the two previous ones was presented to users, followed by a debate. Representatives from: the Maritime and Municipal Police, the Environment Municipal Director of Cascais Municipality, the National Authority for Civil Protection, the Portuguese Environmental Agency and the Captain of the Port of Cascais participated in all assemblies These public participation assemblies were conducted to apply the bottom-up management approach at a local level.

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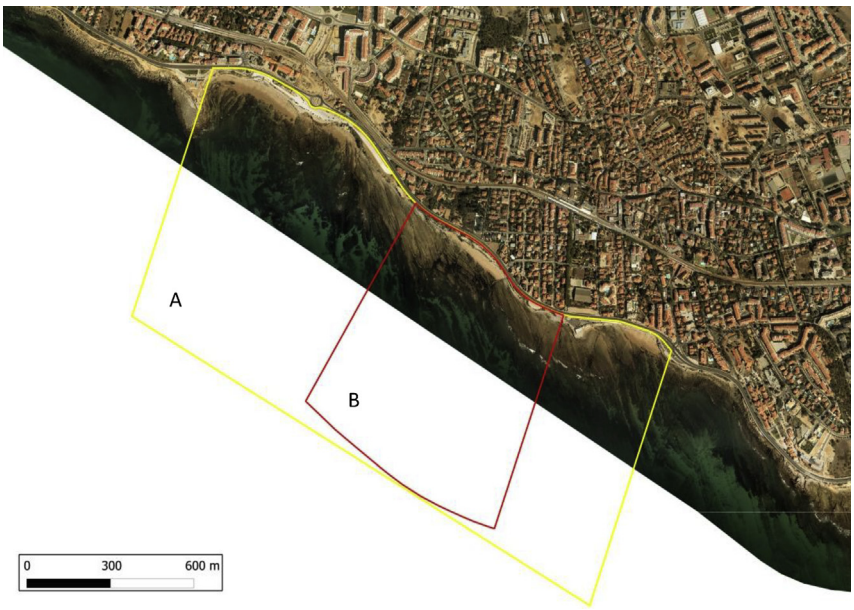

Fig. 2. Aerial picture showing the study area (A) and the Avencas Biophysical Interest Zone – ZIBA (B).

2.4. Interviews to the visitors

From June to September 2012, visitors to Avencas beach (inside the Biophysical Interest Zone) were interviewed by the same municipal volunteers, in order to analyse their knowledge of the area, and their acknowledgement of management actions implemented on the beach that year.

The interview was divided in four parts: general characterization of the user, reasons for choosing the beach, knowledge about the protected area and opinion on the management actions. The final part of the interview was elaborated using the Likert scale for measurement of attitudes (Likert, 1932). All the volunteers had previous training on how to perform the interview.

The visual census and interviews to the visitors were conducted to measure the success of the applied management approach in a short-term temporal scale.

3. Results

3.1. Visual census

Data from volunteers' observations show a clear pattern for all users of ZIBA, both in 2010 and 2013. The total observations in 2010 were 115 visual census and in 2013, 159 visual census.

The graphical analysis (Fig. 3) shows that recreational fishers, between 2010 and 2013, changed their usual fishing spots from within the Biophysical Interest Zone of Avencas to other locations. As the graphical analysis indicated, a significant statistical decrease in recreational fishing was recorded inside ZIBA when comparing 2010 to 2013 (Table 1) but this was not the case when considering the outside of the protected area.

Concerning the visitors, the graphical analysis (Fig. 4) shows a general decrease in visitors in 2013, regardless of location, inside or outside the Biophysical Interest Zone of Avencas. These differences, however, were only proven to be significant outside ZIBA (Table 1). Therefore, it can be stated that the number of visitors inside the protected area suffered a slight insignificant decrease. There is a significant preference (Table 1) for the area outside ZIBA for both years.

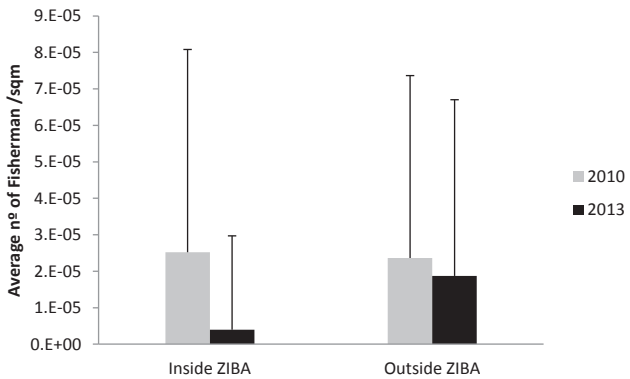

Fig. 3. Average number of recreational fishers per sqm recorded both for the inside and outside of the Biophysical Interest Zone of Avencas (ZIBA) in the years 2010 (before the implementation of management measures) and 2013 (after the implementation of management measures). The error bars represent the standard deviation.

3.2. Public participation assemblies

Public participation assemblies promoted by the Municipality had more than 30 participants in each of the three sessions. A total of 50 proposals (recreational fishers = 15 proposal; area users = 21 proposals; general public = 14 proposals) were submitted by the different groups and also by some recreational fishing associations. Local decision makers were present in all sessions, answering to direct questions from participants, enabling direct resolution of some problems and conflicts discussed during the assemblies. The main focus of submitted proposals was on prohibiting fishing activities (limiting the protected area to local recreational fishers only) and on the excess of visitors in the summer (proposals included the decrease of parking space as a way of regulating visitor numbers to the protected area).

3.3. Interviews to the visitors

Individual interviews of the users of Avencas Beach (total = 163) were conducted while they were still at the beach. The sample

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Table 1
Mann–Whitney test results for the different hypothesis tested with a significance level of 0.05.

Hypothesis	Mann–Whitney test	
Equality of the average no. of recreational fishers/sqm. inside ZIBA (2010 *vs* 2013)	U = 66360	p = 0.000
Equality of the average no. of recreational fishers/sqm. outside ZIBA (2010 *vs* 2013)	U = 213541	p = 0.070
Equality of the average no. of recreational fishers/sqm. in 2010 (inside *vs* outside)	U = 96149.5	p = 0.732
Equality of the average no. of recreational fishers/sqm. in 2013 (inside *vs* outside)	U = 160036.5	p = 0.000
Equality of the average no. of visitors/sqm. inside ZIBA (2010 *vs* 2013)	U = 77938	p = 0.277
Equality of the average no. of visitors/sqm. outside ZIBA (2010 *vs* 2013)	U = 184069	p = 0.000
Equality of the average no. of visitors/sqm. in 2010 (inside *vs* outside)	U = 77869	p = 0.000
Equality of the average no. of visitors/sqm. in 2013 (inside *vs* outside)	U = 146147.5	p = 0.000

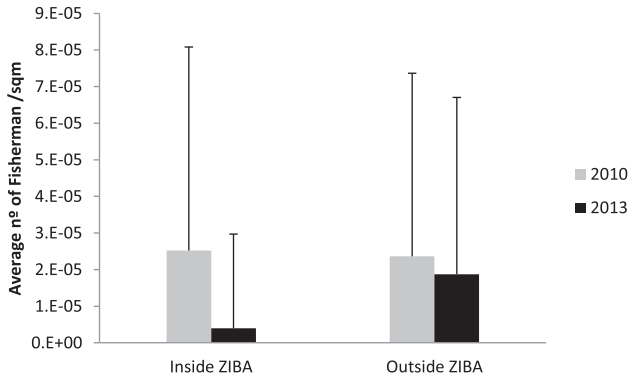

Fig. 4. Average number of visitors per sqm. recorded both for the inside and outside of the Biophysical Interest Zone of Avencas (ZIBA) in the years 2010 (before the implementation management measures) and 2013 (after the implementation of the management measures). The error bars represent the standard deviation.

includes 87 women and 76 men of all ages, with the most common age range between 35 and 44 years old (23%) and the less common age range, the one under 18 years of age (7%). Most people interviewed live in the Lisbon metropolitan area (96%), of which 45% live in the Cascais Municipality. The large majority of visitors travelled went to the beach by car (74%) and chose this particular beach because of its proximity to home (28%), therapeutic characteristics (24%) and physiographic characteristics that make Avencas a beach sheltered from wind (25%).

Concerning the usage of the rocky platform, 46% of beach visitors use the rocky intertidal platform; in addition, 52% prefer to freely roam the area using it for recreational activities like swimming (43%) and observation of marine life (32%) (Fig. 5).

Regarding the knowledge of the protected area and acknowledgement of the management actions, 72% of visitors knew they were in a protected area, 63% were aware of its restricted activities,

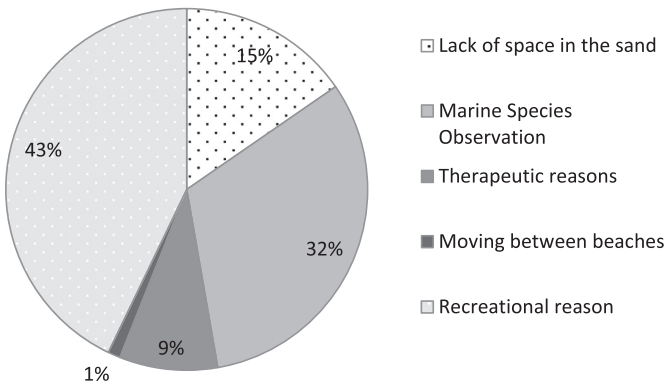

Fig. 5. Characterization of rocky shore usage in the study area (n = 163).

while 77% knew the consequences of such interdictions. Information spots were read by 80% of visitors, 95% of whom agreed with its location. In a scale of 1–5 (5 being in total agreement) 84% of visitors totally agree with the existence of information spots and 67% totally agree with the content of the spots. Regarding the adequacy of the amount of information presented, the results were not clear. There was dispersion around level 3, 4, and 5 (22%, 31% and 26%) of agreement. In terms of visitation pathways, 76% of visitors totally agree with their existence and 69% of them completely agree with the location.

4. Discussion

In 2012 several efforts were made from the Cascais Municipality in order to enhance the conservation of the Avencas Biophysical Interest Zone (ZIBA) from a *bottom-up* management perspective. These efforts resulted in a new media impact that revived public opinion and led to a new cycle of this existing protected area. It was therefore necessary to assess whether or not such efforts were resulting in direct changes of usage pattern in the protected area, and if there was an increase in the number of visitors.

The Avencas Biophysical Interest Zone was a suitable place to test the proposed innovative methodology of *bottom-up* management in the short-term. ZIBA has the ideal area and means to conduct a study of this nature, given the youth volunteering program taking place every summer that enables the systematic collection of data. It also has the correct size for an easy daily survey, allowing for the visual census to occur from the cliffs, facilitating the data collection process.

The short-term evaluation results show that combining visual census with interviews to the visitors, allowed to test the impact and compliance of the population when faced with such management actions, showing a clear pattern from different users of the area. An increase in the number of visitors was expected with the new publicity effort, along with a decrease in the fishing activity due to the restrictions to their activity (Garcia and Smith, 2013). The visual census results, however, did not comply with the expected results in the visitors' case. There was no increase in the number of visitors to the Avencas Biophysical Interest Zone between 2010 and 2013; on the contrary, there was a decrease. In both years, for the study area, the majority of visitors were outside ZIBA. This tendency could be due to their provenance, since most of them come from nearby locations or from the Cascais Municipality itself; they are regular visitors and the increase in publicity may not have exerted great influence on them. Results from the visual census of recreational fishers show a higher compliance with the current regulation, as there is a significant decrease of practitioners inside the Avencas Biophysical Interest Zone in 2013. Recreational fishers are showing a change in their fishing spots from the inside of the protected area to other fishing areas, therefore are responding positively to the implemented management measures (e.g. public assemblies, information spots, etc.). There was no increase in law

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enforcement agents in the study area and the census methodology does not allow any possible hiding from recreational fishers while the census is being conducted.

The socioeconomic aspects of establishing MPAs can be considered in an integrated way along with the ecological factors. MPA managers must identify all stakeholders, including commercial and recreational fishers and involve them at each stage of the decision-making process (Kelleher and Kenchington, 1992; Beaumont, 1997; Castilla, 2000; Sachirico et al., 2002). A strong commitment from the managers of a MPA, along with the effective policing and training of responsible officers is also essential (Martins et al., 2011). With the public participation assemblies, the co-management process was initiated. This process, however, takes a long time to be implemented and there are still few successful cases of this type of management approach (Martins et al., 2011; Gelcich et al., 2005). In Chile another solution has shown positive results to improve habitat conservation and effectively complement no-take MPA networks: the creation of Management and Exploitation Areas for Benthic Resources (MEABRs) managed solely by recreational fishers and using a *bottom-up* governance of marine resources (Gelcich et al., 2008). In the Easter Island the example presented by Gaymer et al. (2014) showed how a process to manage marine resources initiated *top-down* by the centralized government due to its urgency, can evolve in to a *bottom-up* strategy for development and implementation of a management plan. In China the MPA system is characterized by decentralized designations, with management responsibilities assigned to local governments and lack of *top-down* objective evaluations Qiu et al. (2009). This model enabled a rapid and continuous increase in the number of MPA with low management effectiveness, due to limited stakeholder involvement, insufficient investment and major conflicts between conservation objectives and socio-economic and political interests. China's experience demonstrates the need for a balance between *top-down* and *bottom-up* approaches for effective management of the local MPA. In the Philippine islands it appears that a multi-disciplinary approach, involving various institutional partners and using an appropriate mix of indicators, provides a more complete assessment for measuring the success of MPA and generating results that can be utilized for adaptive management (Garces et al., 2013). It seems that there isn't a perfect formula to be applied while managing marine protected areas. However there are some very balanced *bottom-up* perspectives that may be tested in the future.

Phillips (2003) suggests a new paradigm *bottom-up* oriented for protected areas, resulting from: changes in scientific understanding; cultural and social awareness; the acknowledgement of human rights; political developments; general developments in management practice; technological advances and economic forces. Cox et al. (2010) propose a list of eight principles adapted for community based natural resource management: clearly defined boundaries; congruence between appropriation and provision rules and local conditions; collective-choice arrangements; monitoring; graduated sanctions; conflict-resolution mechanisms; minimal recognition of rights to organize; nested enterprises. These are clear principles to guide a good *bottom-up* oriented management of a MPA in the future. There are however some critical reflections on this type of managements such as: the great demand of resources (staff, time and money) for the assumed essential stakeholder participation and community involvement; the difficult willingness or ability of all local communities to support conservation and sustainable use; the danger of diminishing the achievements of government-managed strictly protected areas; the risk of becoming an unmanageable area because of great interference from the population (Phillips, 2003).

As the carrying capacity of the beach was exceeded every day, the main negative impact identified for the study area was the trampling by visitors while performing their tide pooling and leisurely activities. Trampling is a major problem in rocky shore communities; individual algae can lose about 20% of their biomass with a single footstep (Schiel and Taylor, 1999). This impact is very difficult to minimize because in Portugal free beach access is a citizen's right, except in case of imminent danger. Consequently, controlling the number of visitors getting to the beach is a near-impossible endeavour.

If increasing surveillance or limiting the access is not the answer to this problem, then what is? Bennett and Dearden (2014b) indicate that only with an increase in public awareness and compliance with the regulation is possible to achieve the ultimate goal of environmental conservation by the general public. This objective can be achieved by: effective communication of rules and regulations (e.g. boundaries); extensive programs of environmental education and outreach; participatory processes of creation and management structures; acknowledge the relevance of all stakeholders; coordination with other management institutions; integration of scientific and traditional knowledge and mechanisms of conflict resolution and ensuring transparency and accountability (Bennett and Dearden, 2014b). A very positive remark was the results concerning knowledge of the protected area itself. Comparing this study results to the ones obtained by Ribeiro (2011) in the same area, there was an increase in the percentage of visitors that acknowledge they were in a protected area, moving from 58% to 72% of informed visitors. In this study, and considering a short temporal scale, the strategy of increasing the availability of information and attempting to establish an orderly visitation of the intertidal platform had a positive effect on visitors. It is therefore expected a positive impact on the biological communities in a long-term perspective.

Although easily damaged, rocky shore communities are quite resilient and are able to recover if sources of stress are removed (Crowe et al., 2000). The key benefit of protected areas is the increase in resilience of the communities, i.e., the speed it takes a population to return to a former state following a negative shock (Grafton et al., 2004). Such high percentage of interviewees agreeing with the orderly visitation of the intertidal platform was not expected, as the majority of visitors observed using the rocky intertidal platform for recreational activities or observation of marine life, were randomly exploring the area. According to Bennett and Dearden (2014a), when visitors suffer constraints in their usage of a protected area, there usually occurs disagreement with that decision due to their lack of awareness to the impact caused by their activity. In this case, as the majority of visitors are local inhabitants, a sense of ownership of the place is quite common, promoting its protection for generations to come. The work conducted in the Avencas Biophysical Interest Zone shows that the proposed methodology is effective in evaluating the short-term effects on the population when management measures are applied. This work focused on the summer period because of volunteer programs that allow the conduction of visual census, but it is also necessary to assess, analyse and ensure compliance during the rest of the year.

There are some problems associated with using volunteers for visual census and conduct interviews. The bias associated with different observers was reduced, by having two observers at a time, and the initial training period aims to calibrate the different observers/interviews while applying the same methodology. This is nonetheless, an effective and expedites procedure for the Municipality to collect long-term data for coastal zone management.

The participation of the community in the early stages of decision-making in a coastal marine protected area also showed positive results, with a good short-term response from users

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regarding the protected area regulation. In a future scenario, a biological recovery of this protected rocky shore is expected, but new studies will need to be conducted by the Municipality in order to verify the actual recovery of the system.

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