# COASTAL-MARINE PROTECTED AREAS IN SANTA CATARINA UNDER THE LOCAL PEOPLE'S PERSPECTIVE: CONTRIBUTIONS OF THE LITERATURE[1]

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## Introduction

The creation of protected areas (PAs) impacts local people´s lives in numerous ways (MASCIA *et al*., 2010; KARANTH & NEPAL, 2012). Solutions that benefit both biodiversity conservation and the promotion of human welfare are difficult to find, because they usually involve complex tradeoffs and choices that result in losses and costs for stakeholders (MCSHANE *et al*., 2011). The inclusion of local people in management of PAs and conservation projects is a strategy to increase the acceptance of these areas (BROOKS *et al*., 2006; GERHARDINGER *et al*., 2009; KARANTH & NEPAL, 2012) and to improve compliance with PAs rules and regulations (ANDRADE & RHODES, 2012). To promote such inclusion it is crucial to understand the relationships among local people and PAs, which can be studied considering different domains of analysis (*e.g*. DAY *et al*., 2012; IBAMA, 2007; ICMBIO, 2012).

We analyzed the relationships among local people and five Federal Coastal-Marine PAs in the state of Santa Catarina from the people´s perspective and based on the literature. Research efforts focused on the Santa Catarina coast PAs are not recent (FABRIS, 1997; MADUREIRA, 1997; STRENZEL, 1997) nor scarce. Thus, we searched for studies that embraced the vision of local people about the influence of PAs in their lives, considering five analytical domains: economic, environmental, spatial, organizational and cultural.

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## Material and Methods

*Study area*

The State of Santa Catarina, southern Brazil, has 531 km of coastline, which is equivalent to 7% of the Brazilian coast (BRASIL, 2011a). This region lies in the Atlantic Forest domain, with different coastal formations, including mangroves, salt marshes, beaches, dunes, rocky shores, islands, estuaries, lagoons, bays, coves, creeks and ponds (BRASIL, 2011a). The PAs studied were: Right Whale Environmental Protection Area (Área de Proteção Ambiental da Baleia Franca/APABF) and Anhatomirim Environmental Protection Area (Área de Proteção Ambiental do Anhatomirim/APAA), both are category V in the IUCN classification system (IBAMA, 2004a); Pirajubaé Extractive Reserve (Reserva Extrativista Pirajubaé/REP), category VI (IBAMA, 2004a); Carijós Ecological Station (Estação Ecológica de Carijós/EEC) and Arvoredo Marine Biological Reserve (Reserva Biológica Marinha do Arvoredo/RBMA), which are category Ia (IBAMA, 2004a) (Figure 1). They form together a conservation mosaic with different categories of management, objectives and operating systems (Table 1).

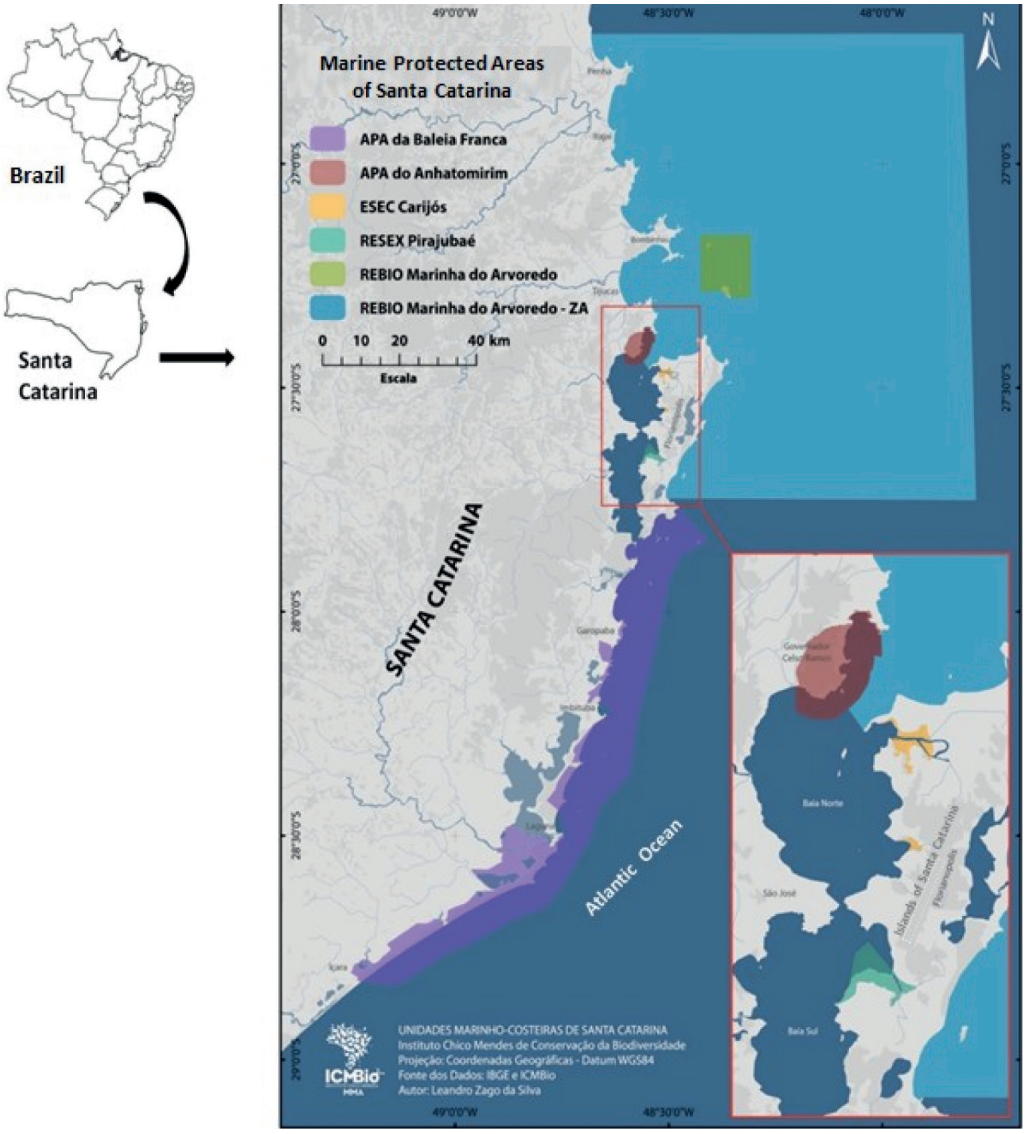
**Table 1. Description of Federal Coastal-Marine Protected Areas in the State of Santa Catarina, Southern Brazil.**

| PA* | County | Year of creation | Area (hectares) | Principal objectives | Management council | Management plan |
|---|---|---|---|---|---|---|
| APAA | Biguaçu, Governador Celso Ramos | 1992 | 4,436 | Protect the dolphin (*Sotalia guianensis*), water sources and remnants of the Atlantic Rain Forest | Advisory | Existent |
| APABF | Florianópolis, Palhoça, Paulo Lopes, Garopaba, Imbituba, Jaguaruna, Laguna, Tubarão, Rincão | 2000 | 154,866 | Protect the Southern Right Whale (*Eubalaena australis*), and ensure the rational use of natural resources in the region | Advisory | In preparation |
| REP | Florianópolis | 1992 | 1,712 | Organize the extraction of "berbigão" (*Anomalocardia brasiliana*) to support traditional livelihoods of the extractivists | Deliberative | In preparation |
| EEC | Florianópolis | 1987 | 759 | Conserve a portion of the mangroves on the island of Santa Catarina | Advisory | Existent |
| RBMA | Florianópolis, Governador Celso Ramos | 1990 | 17,104 | Protect a representative sample of the ecosystems of the north of Santa Catarina Island | Advisory | Existent |

*PA = Protected Area; APAA = Anhatomirim Environmental Protection Area; APABF = Right Whale Environmental Protection Area; REP = Pirajubaé Extractive Reserve; EEC = Ecological Station Carijós; RBMA = Arvoredo Marine Biological Reserve.

There are numerous local groups with different ethnic and cultural characteristics along Santa Catarina coast. They include: Guarani Amerindian (ISA, 2012), "Quilombolas" (descendants of African slaves), and European descendants, mainly with Portuguese, German, Italian and Polish backgrounds (LEITE, 1991). One group that stands out is

**Figure 1. Mosaic of Federal Coastal-Marine Protected Areas in the State of Santa Catarina, Southern, Brazil. APA = Environmental Protection Area; RESEX = Extractive Reserve; ESEC = Ecological Station; REBIO = Biological Reserve. ZA = Buffer zone. Source: ICMBio, 2014.**



the Azorean, descendants of immigrants from the Azores and Madeira islands, and from mainland Portugal, who maintain their own cultural traits and generally practice fishing and small-scale agriculture (DIEGUES & ARRUDA, 2001). Tourist flows have intensified in the region since the 1970s, accelerating the process of urbanization, which has altered local livelihoods (PEREIRA, 2003). The coast is the main point of reference for people who immigrate to Santa Catarina, coming from the countryside, from other Brazilian regions and from abroad (TURNES, 2008).

*Analytical domains*

Based on the literature, consulting researchers and PAs' managers, we identified five analytical domains that cover different aspects of people/PA interactions: economic, environmental, spatial, organizational and cultural. The economic domain involves the influence of the PAs in the income generating activities of the local people. It encompasses activities such as tourism (ZUBE & BUSCH, 1990; SEKHAR, 2003; KISS, 2004; KARANTH & NEPAL, 2012), animal and plant extractivism, plant cultivation, and raising animals for sale or consumption (ZUBE & BUSCH, 1990; MASCIA *et al.*, 2010; KARANTH & NEPAL, 2012; LELEU, 2012). The environmental domain refers to the awareness of the local people about the importance of the PAs for environmental quality, changes in the abundance and composition of species, and changes in the environments and landscapes (LELEU, 2012; RESSURREIÇÃO, 2012). This domain also covers environmental issues and potential conflicts between conservation and local activities. The spatial domain deals with the problems and issues related to territorial regularization, including the people's perceptions of the influence of the PAs in the use and occupation of the territory (ZUBE & BUSCH, 1990; LELEU, 2012). The organizational domain refers to the process of creation of the PAs, the performance of the managing agency in the communities, organization of the populations and their participation in the management of PAs (ZUBE & BUSCH, 1990; WELLS *et al.*, 1992; BROOKS *et al.*, 2006; GERHARDINGER *et al.*, 2009; ANDRADE & RHODES, 2012; KARANTH & NEPAL, 2012). The cultural domain covers aspects such as the influence of PAs in the cultural activities of the populations, and their importance as a source of information, education and training of local people (RESSURREIÇÃO, 2012).

*Documentary research*

We searched for papers, monographs, dissertations and theses in the databases Scopus (http://www.scopus.com/home.url), Scientific Electronic Library Online - SciELO (http://www.scielo.org/php/index.php) and in the theses databank of the Coordination of Improvement of Higher Education Personnel - CAPES (http://capesdw.capes.gov.br/capesdw/), in January 2013. We used the fields "title", "keywords" and "abstract" to search for PAs names in Portuguese and in English. Additionally, the PA's own databases were accessed for other documents, such as technical reports, produced at the request of the managers themselves.

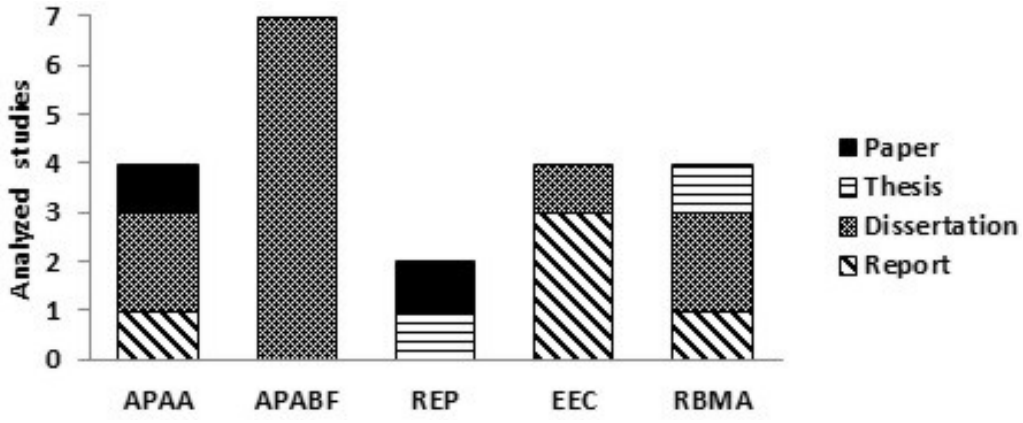
We selected the studies that fulfilled simultaneously three criteria: 1) contain information about social and environmental issues; 2) consider the perception and opinion of local people about the analytical domains; and 3) involve participatory methodologies, interviews or similar methods for data collection. For each study we systematized the following information: year of publication, authors, study type, title, journal/institution, PA, studied communities, accessed groups, number of informants, and the information related to each domain. Data were analyzed qualitatively, summarizing the description of each PA across the domains according to the perspective of the local people.

## Results and discussion

*Characterization of the studies*

We found a total of 47 studies, of which 27 were Masters Dissertations, 14 journal articles, four Doctoral theses and two monographs (only professional undergraduate monographs were considered due to limitations of the CAPES database). Although dissertations were most numerous, this number may be underestimated, because the information in the CAPES database is provided by the post graduate programs, which often fail to update consistently. Only 11 of the 47 studies fulfilled the selection criteria, and eight could be obtained. The search performed directly in the PAs' databases added 13 studies. Thus, we analyzed 21 studies (Figure 2).

**Figure 2. Distribution of the studies analyzed by Protected Area and according to study type. APAA = Anhatomirim Environmental Protection Area; APABF = Right Whale Environmental Protection Area; REP = Pirajubaé Extractive Reserve; EEC = Ecological Station Carijós; RBMA = Arvoredo Marine Biological Reserve.**



Access to the PAs' databases was essential to find studies that were not published in media with wider coverage or were unavailable in search systems. However, we emphasize that the PAs with management plans (EEC and RBMA) or more advanced in the creation process at the time of the survey (APAA) had more complete databases, since review of the studies about the PA is one of the steps of this document's preparation.

*Contributions and limitations of the literature*

The studies revealed that the topic of people/PA relationships is of interest to different areas of knowledge, as well as to the PAs' managers themselves. Together they covered all the analytical domains (Table 2). However, there are limitations to making comparisons among studies due to different methods of data collection, accessed groups and communities, and sampling effort. Furthermore, the process of scientific research, methodological choices and definition of objectives are closely related to the research questions (TONGCO, 2007) and to the area of knowledge and theoretical framework that supports them. Considering the choice of sampling method, for example, Bernard (2006) asserts that both individual data with probabilistic sampling and cultural data with intentional sampling are relevant for social sciences. Our sampled universe includes both studies of academic and technical natures, relating mainly to the social and biological sciences. All of them used non-probabilistic sampling – only the study by Bueloni (2012) used both sampling procedures.

Intentional or non-probabilistic sampling are useful in studies that aim to access more specific information or knowledge restricted to certain groups of people, or to local experts. When employing this approach it is essential to present the criteria for selection of informants, enabling other researchers to replicate the methodology and obtain comparable results (TONGCO, 2007), which also provides managers with greater detail to assist in decision making. In some studies we could not clearly identify such criteria nor the sampling effort (Table 2).

Two groups often accessed were the representatives and local leaders, especially the participants of the PAs' management councils. Among the 21 studies, 12 involved these informants (Table 2). The management council aims to facilitate and legitimize societal participation in the management of the PAs, with representatives from government agencies, civil society organizations, and, where applicable, representatives of the users of natural resources, the resident population and landowners of the PAs (BRASIL, 2011b). However, the presence of a given group on the council does not assure effective representation, which may be biased by representatives' individual opinions. Abramovay (2001) argues that council members may be selected by who is controlling the social life of the organization or the locality; thus, as occurs in various systems of representation, the councils are unlikely to encompass all local stakeholders. In addition, some systems can be designed to favor certain social groups. Morin (2001) analyzed the operation of four advisory councils of marine protected areas in the United States intended to assist the Secretary of Commerce and reported that these spaces are intended only for groups of resource users. Other groups which are also affected by decisions are excluded because they do not fit in predefined positions. In India and Nepal, the institutions for the manage-

**Table 2. Description of studies analyzed about Federal Coastal-Marine Protected Areas of the State of Santa Catarina, Southern Brazil.**

| PA* | Author (year) | Studied groups | Sampling effort | Type of data | Domains** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eco | Env | Spa | Org | Cul |
| APAA | 1. Fabris (1997) | Residents; nautical tourism entrepreneur | 5 residents and 1 entrepreneur<br>1 community | Semi-structured interviews | X | X | | | |
| | 2. Floriani (2005) | Residents; governmental and non-governmental actors | No information available<br>1 community | Consultations | X | X | | | |
| | 3. Ferreira *et al.* (2006) | Residents | 70 residents<br>1 community | Interviews | X | X | | | |
| | 4. Araújo (2009) | Residents; key informants | 18 residents and 7 representatives of community groups<br>8 communities | Interviews; participative workshops | X | X | X | X | X |
| APABF | 5. Fabiano (2004) | Residents; fishermen; key informants; chief of APABF | No information available<br>Forum of Agenda 21*** | Interviews; questionnaires | X | X | X | X | X |
| | 6. Rebouças (2008) | Artisanal fishermen | 17 fishermen; 43 informal talks and 14 participants of participatory mappings<br>9 communities | Semi-structured interviews; participant observation; participatory mapping | X | X | X | X | X |
| | 7. Macedo (2008) | Key informants | 77% of the management council members<br>Management council | Questionnaires; participant observation | X | X | X | X | X |
| APABF | 8. Adriano (2011) | Key informants | 19 interviews conducted by another study and 13 actors from public and private sectors and from civil society<br>Management council; Forum of Agenda 21*** | Semi-structured interviews; participant observation; rapid participatory diagnosis | X | X | X | X | X |
| | 9. Bonetti (2011) | Residents; users and tourists | 31 interviewees<br>1 community | Open interviews | X | X | X | X | X |
| | 10. Damazio (2011) | Key informants | 20 interviewees<br>1 community | Interviews | X | | | X | X |
| | 11. Bueloni (2012) | Residents; fishermen; key informants | 284 residents; 108 fishermen; 108 tourists; 8 ex-hunters of whales; 12 other key actors<br>3 communities | Semi-structured interviews | X | X | X | | X |
| REP | 12. Vizinho & Tognella-de-Rosa (2010) | Artisanal fishermen; women | 45 fishermen; 40 women<br>1 community | Interviews | X | X | | X | X |
| | 13. Spínola (2011) | Key informants | 9 members of management council; 1 extractivist; 2 chief managers<br>1 community | Direct observation of deliberative spaces; semi-structured interviews | X | X | X | X | X |
| EEC | 14. Machado *et al.* (2004) | Residents; representatives of residents' organization | No information available<br>1 community | Semi-structured interviews | | X | X | | |
| | 15. Cordeiro (2001) | Community organizations; EEC management team | No information available<br>4 meetings with an average of 3.5 hours duration<br>Community spaces | Rapid participatory diagnosis | | X | | X | X |
| | 16. Gutiérrez (2008) | Key informants | 7 community representatives; 14 representatives of other institutions<br>2 communities | Interviews; participant observation | | X | | X | |

| PA* | Author (year) | Studied groups | Sampling effort | Type of data | Domains** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eco | Env | Spa | Org | Cul |
| RBMA | 17. Instituto Carijós (2008) | Fishermen | 43 Interviews; 3 workshops (two of them with 7 and one with 4 participants) 1 community | Rapid participatory diagnosis; semi-structured interviews; workshops | X | X | X | | X |
| | 18. IBAMA (2004b) | Representatives of divers; embedded tourists; dive and schooner operators; artisanal and industrial fishers | No information available | Interviews; observation of artisanal fishermen's meetings | X | X | X | X | X |
| | 19. Vivacqua (2005) | Representatives of artisanal fishers; diving school; environmental NGOs; researchers; IBAMA; environmental police; industrial fishers | No information available Management council | Interviews; observations in field and of meetings | | | X | X | |
| | 20. Medeiros (2009) | Council members; fishermen; local and governmental institutions representatives | No information available Management council; IBAMA/ CEPSUL**** planning meetings of trawling shrimp and mullet fishing | Rapid participatory diagnosis; workshops; ethnography; research-action | | | | X | |
| RBMA | 21. Martins (2012) | Fishermen | 36 Interviewees 3 communities | Semi-structured interviews | X | X | X | X | |

*PA = Protected Area; APAA = Anhatomirim Environmental Protection Area; APABF = Right Whale Environmental Protection Area; REP = Pirajubaé Extractive Reserve; EEC = Ecological Station Carijós; RBMA = Arvoredo Marine Biological Reserve. **Domains: Eco = Economic; Env = Environmental; Spa = Spatial; Org = Organizational; Cul = Cultural. ***Forum of Agenda 21: created in 2003 is a space for discussions and interventions related to social and environmental issues of communities around the Ibiraquera Lagoon. ****CEPSUL: Centre for Research and Management of Fishery Resources in the Coastal Southeast and South is a government agency, focused on marine conservation.

ment of natural resources, called participative, exclude women and reproduce other social arrangements where women are neglected (AGARWAL, 2001). In Brazil, Macedo (2008) observed that despite the managers' efforts to include different interests, the members of the council have on average greater income and more school years than other residents they represent in two Environmental Protection Areas councils, one of them being APABF.

Another limitation found refers to the communities included. Some PAs, such as APAA and REP, are better studied in terms of number of communities included in relation to all communities that each PA covers. The APABF, possibly due to its large size, is subsampled especially in its northern and southern regions. We emphasize that better spatial distributions of studies do not necessarily mean higher quality and more detail about the domains of analysis. The concentration of studies in a certain area can facilitate temporal diagnosis of the functioning of a PA. For example, also in APABF, the Imbituba and Garopaba communities have been studied since 2005 by one group at Santa Catarina Federal University. This region is considered by the group as a laboratory area, allowing greater temporal detailing of local issues, such as the use and management

of communal resources, sustainable land management and conflicts (FABIANO, 2004; MACEDO, 2008; REBOUÇAS, 2008; ADRIANO, 2011). In this sense, we must consider the dynamic nature of people/PA relationships and these cannot be interpreted without observing temporal and spatial scales (ZUBE & BUSCH, 1990), which in turn are also sources of limitations for comparisons among studies. Considering all these limitations, the qualitative synthesis of the studies allows us to observe the different analytical domains, providing clues about people/PA relationships (Table 3).

**Table 3. Qualitative synthesis of 21 studies about Federal Coastal-Marine Protected Areas in the State of Santa Catarina, Brazil, analyzed considering the perspective of local people and the domains: economic, environmental, spatial, organizational and cultural. The numbers indicate the references listed in Table 1.**

| | Description | APAA | APABF | REP | EEC | RBMA |
|---|---|---|---|---|---|---|
| Economic | Extraction of fish resources as an important economic activity for residents | 1, 4 | 8 | 12, 13 | 17 | 18, 19, 21 |
| | Farming as an important economic activity for residents | | 8 | | | |
| | Tourism with incipient outcomes for residents | | 7, 9, 11 | | | 21 |
| | Both positive and negative impacts of tourism realized | 3, 4 | 7 | | | |
| | Recognition of the importance of protected species for tourism | 1 | 5, 6, 7, 8, 11 | | | |
| | Restrictions of the PA affecting local economic activities | 1, 2, 3, 4 | | | | 18, 19, 21 |
| | Targeted species for conservation generating losses to economic activities of residents | 2, 4 | 11 | | | |
| Environmental | Population decline or harm to species targeted for conservation | 1, 3 | | 12, 13 | | 18, 21 |
| | Population increase of species targeted for conservation | | 5, 11 | | | |
| | Disagreement with content of laws and ineffective design of PA for conservation of species | | | | 17 | 18 |
| | Negative environmental impacts | 2, 3 | 7, 9 | 12 | 14, 17 | 18, 21 |
| | Recognition of the importance of ecosystem protection | | | 12 | 14, 16 | |
| | Lack of basic sanitation | 2, 4 | 5, 8 | 12 | 14, 15, 17 | 18 |
| Spatial | Conflicts between users of the sea | | 5, 6, 7, 8 | | | 18, 19, 21 |
| | Irregular settlements | 4 | 5, 8 | | 14 | 18 |
| | Need to improve the demarcation and publication of the limits of the PA | 4 | | | 15 | 18, 21 |
| | Dispossessions and problems of regularization of land title | 4 | | | | |
| Organizational | Distancing of local residents and management of PA | 4 | 6 | 13 | 15 | 18, 19, 20 |
| | Illegal practices and ineffective law enforcement | 2, 4 | | | 15, 17 | 19, 21 |
| | Ignorance of laws, rules and responsibilities of the PA | 2, 3 | | | 15, 16 | |
| | Difficulties in local articulation among stakeholders | | 5, 7, 8 | 12, 13 | | 19 |
| | Recognition of the importance and implementation of actions to improve the management council | | 7 | | | |
| | Need for increased inclusion and empowerment of members of the management council | | 7 | | | |
| | Discussions about category change or creation of a new PA | | 10 | | | 19 |
| Cultural | Reduction in the practice of fishing/ disinterest of young people in fishing | 4 | 6 | 12, 13 | 17 | 18 |
| | Absence of environmental education activities and the need for disclosure about the PA | | 4 | | 15 | |
| | Presence of environmental education actions | | 7, 8 | 13 | 16 | 18 |

APAA = Anhatomirim Environmental Protection Area; APABF = Right Whale Environmental Protection Area; REP = Pirajubaé Extractive Reserve; EEC = Ecological Station Carijós; RBMA = Arvoredo Marine Biological Reserve.

Within the economic domain, the influence of the presence of the PA in the income of the residents was mainly perceived in the practice of fishing activities in all areas (FABRIS, 1997; IBAMA, 2004b; VIVACQUA, 2005; INSTITUTO CARIJÓS, 2008; ARAÚJO, 2009; VIZINHO & TOGNELLA-DE-ROSA, 2010; ADRIANO, 2011; SPÍNOLA, 2011; MARTINS, 2012). Marine PAs contribute to the food security of fishermen using different fishing gears (MASCIA *et al*., 2010). In the studied areas, the link with fishing activities suggests their relevance for income and subsistence. However, we found that the continuation of these activities is compromised by factors such as the reduction of fish stocks due to environmental impacts and the devaluation of the fishermen, aspects present in environmental and cultural domains, respectively.

Relations with tourism were observed in APAA, APABF and RBMA. In APAA and APABF both positive and negative aspects from tourism were perceived by local people (FERREIRA *et al*., 2006; MACEDO, 2008; ARAÚJO, 2009). Kiss (2004) criticizes community-based ecotourism, due to its often limited contributions to conservation and local economies, involving few people and depending on external funding and support for long periods. In APAA the activities focused on tourism are concentrated in some communities, while others are only places of transit for visitors (ARAÚJO, 2009). In APABF there are reports of small returns from tourism for the inhabitants of the south-central region (MACEDO, 2008; BONETTI, 2011; BUELONI, 2012), with an incipient movement towards the development of community-based tourism (MACEDO, 2008). In RBMA, tourism is not significant in terms of income for the fishermen of Tijucas Bay (MARTINS, 2012), but we did not found studies that captured the local people´s opinion about the tourism in other communities around this PA, where this activity is more present.

In the economic domain we also identified the relations of local people with the main target species of conservation. In the region of APABF, the right whale (*Eubalaena australis*) is both a tourist attraction (FABIANO, 2004; MACEDO, 2008; REBOUÇAS, 2008; ADRIANO, 2011; BUELONI, 2012), and a potential economic threat to fishermen, by accidentally damaging fishing nets (BUELONI, 2012). Similarly, in APAA, the dolphin *Sotalia guianensis* is seen by local people both as important for tourism (FABRIS, 1997) and as detrimental to fishermen, by competing with them for fish (FLORIANI, 2005; ARAÚJO, 2009). On the other hand, considering the environmental domain, tourism and fishing have negative impacts for dolphins, with reports of dolphins' aversion reactions towards tourist boats (FERREIRA *et al*., 2006) and accidental deaths in fishing nets (FABRIS, 1997; FERREIRA *et al*., 2006).

Regarding the environmental domain, we detected other reports of loss or reduced populations of threatened species. In REP, the construction of a road was responsible for reducing the population of "berbigão" (*Anomalocardia brasiliana*), white shrimp (*Litopenaeus schmitti*) and pink shrimp (*Penaeus brasiliensis*), putting an end to fishing for shrimp in the area (VIZINHO & TOGNELLA-DE-ROSA, 2010; SPÍNOLA, 2011). In RBMA, there were reports by fishermen of the intensification of fishing in breeding areas, since they were forbidden to fish in the interior of the reserve area (IBAMA, 2004b; MARTINS, 2012). They also questioned the objectives and the management approach, not agreeing with the ban on fishing for transient fish, since they do not breed inside the

reserve (IBAMA, 2004b). Disagreements with the laws concerning the conservation of species were also reported by fishermen in EEC, who do not agree with the area covered by the EEC because this PA does not protect the fish nurseries, thus not being effective for their conservation (INSTITUTO CARIJÓS, 2008). Perceptions of local residents reflect the acceptance of the PAs and also serve as tools to monitor their management (LELEU, 2012). The dissatisfaction with the design of the PA, the incoherence of the ban on fishing in certain areas (without a clear ecological function from fishermen's perspectives), the permission to use breeding areas, and the intensification of illegal fishing inside the PAs can be seen as reflections of the negligence of the local ecological knowledge in the formulation of management rules. Gerhardinger and colleagues (2009) point out that in Brazil the management of marine PAs continues to be guided solely by scientific knowledge, which is often incomplete even for major conservation targets. Local and scientific ecological knowledge should be seen as complementary in the process of managing these areas (LELEU, 2012).

Reports of environmental pollution caused by littering were also present in the environmental domain for APAA (FLORIANI, 2005) and EEC (MACHADO *et al*., 2004). The lack of basic sanitation and sewage treatment are common to all PAs (CORDEIRO, 2001; FABIANO, 2004; IBAMA, 2004b; MACHADO *et al*., 2004; FLORIANI, 2005; INSTITUTO CARIJÓS, 2008; ARAÚJO, 2009; VIZINHO & TOGNELLA-DE-ROSA, 2010; ADRIANO, 2011). Positive changes were reported for APABF, which were related to population increase of the right whale (BUELONI, 2012) and restocking of shrimp in the Ibiraquera Lagoon (FABIANO, 2004). The recognition by local people of the environmental importance of the PA for ecosystem protection was found in studies of REP (VIZINHO & TOGNELLA-DE-ROSA, 2010) and EEC (MACHADO *et al*., 2004; GUTIÉRREZ, 2008). Reports of environmental perceptions are important because they can serve as indicators of environmental benefits and weaknesses, corroborating measures adopted or pointing to priority demands for intervention. Social and environmental conditions can be considered deeply linked (ADAMS & HUTTON, 2007); thus investments in improving environmental quality produce direct impact on improving the local populations' quality of life. The lack of basic sanitation, identified for all PAs studied, indicates a priority demand towards the treatment of waste and sewer.

In the spatial domain we found information about land tenure regularization and dispossessions only for APAA (ARAÚJO, 2009). This information at first appears to be distorted because Environmental Protection Areas (category V by the IUCN classification system) are one of the most permissive categories in terms of space occupation. However, it is justified, due to the actions of the management agency of this PA in monitoring the compliance with more general environmental laws and regulations, including irregular occupancy in Permanent Preservation Areas.

Also in the spatial domain, we found reports of illegal occupations in all areas except REP. There were reports of restrictions on access to beaches in APAA (ARAÚJO, 2009), in APABF (FABIANO, 2004; ADRIANO, 2011) and around RBMA (IBAMA, 2004b). These restrictions are criticized by residents who attribute the illegal occupation to the ineffectiveness of the management of the PAs, and usually question the spatial limits of

the PAs. The need to improve the demarcation and to inform residents and fishermen about the limits of each PA was pointed out in APAA (ARAÚJO, 2009), EEC (CORDEIRO, 2001), and RBMA (IBAMA, 2004b; MARTINS, 2012). Allowing continuation of traditional practices and access to resources that only exist within PAs are ways that can produce more positive people/PA relationships (ZUBE & BUSCH, 1990). Restrictions generating conflicts in the use of marine space were reported in APABF (FABIANO, 2004; REBOUÇAS, 2008; MACEDO, 2008; ADRIANO, 2011) and RBMA (IBAMA, 2004b; VIVACQUA, 2005; MARTINS, 2012). These conflicts point to the need to promote discussions, to present the justifications for restrictions, and even the adequacy of norms and rules so that the rules are in fact enforced.

In the organizational domain, some studies report the occurrence of illegal practices and ineffective law enforcement inside and/or around APAA (FLORIANI, 2005; ARAÚJO, 2009), EEC (CORDEIRO, 2001; INSTITUTO CARIJÓS, 2008) and RBMA (VIVACQUA, 2005; MARTINS, 2012). The ignorance of laws, management plans, rules and responsibilities of the PA were identified in APAA (FLORIANI, 2005; FERREIRA *et al*., 2006) and EEC (CORDEIRO, 2001; GUTIÉRREZ, 2008). For all PAs, the information indicated a gap between local groups and the management of PAs (CORDEIRO, 2001; IBAMA, 2004b; VIVACQUA, 2005; REBOUÇAS, 2008; ARAÚJO, 2009; MEDEIROS, 2009; SPÍNOLA, 2011). These scenarios probably reflect the top-down creation and/or elaboration of PAs' rules. Even in REP, whose creation was promoted by local extractivists and which has a deliberative management council, there were reports of imposing decisions. The negligence of the rights of the extractivists to participate in the decisions about the construction of a road around the PA was an important event that contributed to distrust in the operation of REP (SPÍNOLA, 2011). It is important to consider that even though all PAs have management councils, local people do not always have representatives or are prepared to act in these spaces. Reports on difficulties of promoting strengthening of local groups were found in APABF (FABIANO, 2004; MACEDO, 2008; ADRIANO, 2011), REP (VIZINHO & TOGNELLA-DE-ROSA, 2010; SPÍNOLA, 2011) and RBMA (VIVACQUA, 2005). For APABF, the need to empower and increase participation of council members was also identified (MACEDO, 2008). The challenge of promoting more participatory management is enormous, requiring effort and political will from PAs managers and also from local groups.

In the cultural domain, only for REP was religious festivals mentioned, without a clear relation to natural resources, (VIZINHO & TOGNELLA-DE-ROSA, 2010). In the other studies, although there is some information about cultural festivities, these were derived from secondary data. Environmental education activities have been reported in APABF (MACEDO, 2008; ADRIANO, 2011), REP (SPÍNOLA, 2011), EEC (GUTIÉRREZ, 2008), and RBMA (IBAMA, 2004b), and were oriented to specific audiences. The need to perform these activities for the communities was mentioned for APAA (ARAÚJO, 2009) and EEC (CORDEIRO, 2001). Changes in cultural activities have been reported associated with fishing activity in all PAs (IBAMA, 2004b; INSTITUTO CARIJÓS, 2008; REBOUÇAS, 2008; ARAÚJO, 2009; VIZINHO & TOGNELLA-DE-ROSA, 2010; SPÍNOLA, 2011). These studies reported on the search by new generations

for more profitable activities, also due to the lack of interest in teaching the traditional crafts and skills from older to younger generations. The reduction of the number of young fishermen is verified in Brazil at the national level (BRASIL, 2012). The depletion of fisheries and new job opportunities are factors that contribute to disinterest in fishing. In the region of APABF, Capellesso and Cazella (2011) pointed out that the decline of artisanal fishing activity is due to a reduction of resources and conflicts with industrial fishing. These conflicts are exacerbated by the lack of effective mechanisms for controlling access to fish resources (CAPELLESSO & CAZELLA, 2011), and when occurring within a PA they may be considered evidence of inefficient management and failure to meet the conservation objectives of these areas.

## Conclusions

Comparisons of studies in Federal Coastal-Marine PAs of Santa Catarina allowed for the identification of gaps in academic knowledge, consonants points and particularities of the areas, showing demands for both the managers of the PAs (and their councils, where appropriate) and by researchers. Considering the analyzed domains, we suggest the following actions to improve the relationships between local populations and PAs: to expand basic sanitation services; to include the local ecological knowledge in the development of rules and management plan for PAs; to increase the participation of local groups in the management council of the PAs; to expand environmental education; to intensify the measures to protect artisanal fisheries.

We found that although different studies have addressed the relationship between the local population and the PAs, their access is limited because many are not published or are restricted to the PAs' databases. The contributions of the literature are not uniform, both among the five PAs, as within a given PA. Our study demonstrates that systematic analyzes involving secondary data need to be careful, because the studies are based on different theoretical frameworks, having different methodologies and have occurred at different time points; however, this analysis allow the construction of a general scenario.

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# COASTAL-MARINE PROTECTED AREAS IN SANTA CATARINA UNDER THE LOCAL PEOPLE'S PERSPECTIVE: CONTRIBUTIONS OF THE LITERATURE

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***Abstract:*** Understanding the relationship between local people and protected areas (PAs) is essential for improving the management of these areas. The local peoples' perspectives of their relationship with PAs were analyzed based on secondary data. We focused on five Federal Coastal-Marine PAs in the state of Santa Catarina and five analytical domains: economic, environmental, spatial, organizational and cultural. We analyzed 21 studies that together contemplated all domains. Fishing was the most important economic activity for local peoples. For all PAs, negative environmental impacts were registered. Conflicts in use of space, distance between local people and PAs management, and decline of fishing activity were also reported. The comparison of the analytical domains allowed us to identify gaps in the knowledge to be investigated and important points to be addressed by the managers of the PAs.

***Key words:*** Literature review; local perceptions; protected area management; marine conservation.

***Resumo:*** A compreensão das relações entre populações humanas locais e unidades de conservação (UC) é crucial para a melhoria da gestão das áreas. As perspectivas das populações locais sobre as relações população-UC foram analisadas com base em dados secundários. Para tal, foram consideradas cinco UC Federais Marinho-Costeiras de Santa Catarina e cinco domínios analíticos: econômico, ambiental, espacial, organizacional e cultural. Foram analisados 21 estudos que conjuntamente contemplavam todos os domínios. A pesca destacou-se como atividade economicamente importante para as populações. Para todas UC foram registrados impactos ambientais negativos. Conflitos no uso do espaço, distanciamento das populações com a gestão das UC e declínio da atividade pesqueira também foram relatados. A comparação dos domínios analíticos permitiu identificar lacunas do conhecimento a serem investigadas e pontos importantes a serem trabalhados pelos gestores das UC.

***Palavras-chave:*** Revisão bibliográfica; percepções locais; gestão de áreas protegidas; conservação marinha.

***Resumen:*** Comprender la relación entre las poblaciones humanas locales y las áreas de conservación (AC) es crucial para mejorar la gestión de estas áreas. Las perspectivas de las poblaciones locales acerca de las relaciones población-AC's fueron analizadas com base en datos secundarios. Fueron consideradas cinco AC Federales Marino-Costeras de Santa Catarina y cinco temas analíticos: económico, ambiental, espacial, organizativo y cultural. Se analizaron 21 estudios que conjuntamente contemplaban todos los temas. La pesca fue la actividad económicamente más importante para las poblaciones. Para todas las AC fueron registrados impactos ambientales negativos. Conflictos en el uso del espacio, distanciamiento de las poblaciones con la gestión de las AC y el declive de la pesca, también fueron reportados. La comparación de los temas analíticos permitió identificar brechas de conocimiento por investigar y puntos importantes para ser trabajados por los administradores de las AC.

***Palabras claves:*** Revisión bibliográfica; percepciones locales; gestión de áreas protegidas; conservación marina.