



Member's report on activities to ICRI

Presented by Brazil

Summary of Activities

- 1. Marine Protected Areas:** In Brazil, up to now, nine protected areas have been created over coral reef ecosystem, including three areas recognized by international acts (Ramsar and Natural World Heritage sites).
- 2. Legislation:** In 1998 the Law of Environmental Crimes was enacted including important articles for coral reefs such as the ban on anchoring and littering on coral reefs, the ban on buying and trading handicrafts made with corals, and the ban on fishing with explosives or chemicals. In 2000 the Law of the National System of Protected Areas was enacted, including support for the establishment and implementation of protected areas, which were divided into two groups of management categories: full protection and sustainable use.
- 3. Brazilian Society for the Study of Coral Reefs – CORALLUS:** was created in 1994, integrated by a group of researchers and students from several universities along the Brazilian coast, with the aim of studying and preserving reef environments in Brazil. In 1997 the society organized the international workshop “Brazilian Coral Reefs: Research, Integrated Management and Conservation”, which resulted in a declaration presented to the Brazilian Government emphasizing the importance of these environments and the significant impacts occurring, and the need for a national policy and specific legislation for coral reefs (Maida et al, 1997). As a result, the issue was addressed in the Law of Environmental Crimes the following year. A recommendation for the effective participation on agreements and international conventions such as the Convention of Biological Diversity, The International Coral Reef Initiative and the Year of the Reef was also issued.
- 4. Coral Reef Monitoring Programs:** Brazil is part of the South American node of the GCRMN. AGRRA initiatives started in 1999 and have been coordinated by Federal University of Bahia. Monitoring has been conducted in several reefs of the state of Bahia, including Abrolhos region. Reef Check Brazil started in 2000, coordinated by Federal University of Pernambuco, and since 2002 has been adopted as the protocol for the National Program for Monitoring Brazilian Reefs. Locations spread over more than 2000 km along the Brazilian coast have been monitored. As Marine Protected Areas of Full Protection and Sustainable Use were included, it was possible to carry out a comparison between different levels of use as well as an effectiveness assessment. A report with the first results was published and presented during COP 8 in 2006.
- 5. Program for the Conservation of Brazilian Reefs:** The Ministry of the Environment, in partnership with Brazilian Research Institutions and Universities, started in 1999 some initiatives to support management, monitoring and recovery of coral reefs. Coral reef mapping, a public awareness campaign, a monitoring program, gap analysis, and other projects described below are part of this initiative. In 2004, the Office created the Coastal and Marine Zone Division, responsible to integrate this specific program to other relevant initiatives for marine biodiversity.

- 6. Coral reef mapping:** The project “Studies of the Brazilian coral reefs: training and application of remote sensing mapping techniques” involved several managers and technical MPAs personnel who were trained in GIS tools for mapping and management of coral reef areas. Based on geo-referenced satellite imagery and subsequent field verification, shallow coral reefs located in protected areas were mapped using remote sensing data and geographic information system technology. This project was developed together with the National Institute for Space Research - INPE and the Coastal Reefs Project, with the support of *Wetlands for the Future*. The results were presented in the *Atlas of Coral Reefs in Protected Areas in Brazil* (1st and 2nd edition).
- 7. Public awareness:** The *Coral Reef Conservation Campaign* started in 2000, focusing on promoting public awareness regarding the importance of the conservation of coral reefs and raising awareness about the importance and fragility of coral reefs. The Campaign includes dissemination of a code of conduct to be adopted when visiting reef environments, and has produced posters, brochures, a booklet and a video (DVD) in Portuguese, English and Spanish.
- 8. Other relevant initiatives:** On the recovery and restoration front, the *Recifes Costeiros Project*, an integrated coastal management initiative which started in 1998, funded by IADB, has shown by demonstrative experiments in the Coral Coast MPA, the potential for recovery of reef areas by the creation of small no take areas¹. The *Coral Vivo Project*² under way since 2004 aims on the application of recent studies about reproduction, recruitment and distribution of corals from Brazilian reefs in the establishment of practices to recover coral populations of degraded reefs. The *FOCO Project* (Environmental Health Diagnostics of Coral Reef Ecosystems Based on Benthic Foraminifera) is mapping impact in the coral reefs of the continental shelf through the observation of bleaching and/or deformation of benthic foraminiferal tests. Conservation International, through its Brazilian branch, has developed several marine conservation initiatives in the Abrolhos Region, in addition to implementation of a regional MPA network.
- 9. Gap Analysis:** The Ministry of the Environment started in 1999 the process for assessment of Priority Actions for the conservation of biodiversity, and the marine and coastal zone was one of the biomes included. Others were Atlantic rain forest, Brazilian savannah and Pantanal, the Amazon region, and Caatinga. A separate workshop was held for each biome. During the Workshop “Assessment and Priority Actions for the Conservation of Biodiversity on the Marine and Coastal Zone”, the call for action on coral reefs issued by *Corallus* in 1997 was reinforced, and the results were priority areas recognized by Decree (n. 5092) in 2004. This process is now under discussion in order to incorporate more information, provide detailed mapping allowing for area based decisions, and refine the definition of priorities, in partnership with IBAMA (Brazilian Institute of the Environment) and The Nature Conservancy.
- 10. ICRI:** During the CDB COP-8 Brazil manifested its interest to become a member of International Coral Reef Initiative – ICRI.
- 11. COLACMAR:** The Latin American Conference on marine sciences will be held in Brazil in April, 2007, and will include a mini symposium on *Coral Reefs of Latin America: the state of art and the state of science*. The meeting aims to gather the Latin American scientific community to discuss results of research, conservation, policy, and the future scenario for coral reefs in Latin America.

Summary of pertinent points

Coral reefs in Brazil are distributed along 3,000 km of the Brazilian Northeastern coast, and represent the only coral reef ecosystem in the South Atlantic. Brazilian shallow coral reefs

¹ www.recifescosteiros.org.br

² www.coralvivo.com.br

contain 20 species of scleractinian corals, with 15 hermatypic zooxanthellate species and 5 azooxanthellate ahermatypic species. Five of the 15 hermatypic species are endemic to Brazilian waters. Of those, one species has an even more restricted distribution, only occurring on the reefs of Bahia State (Maida and Ferreira, 1996; Castro and Pires, 2001). The endemism is extended at the genus level, and includes relict forms only remotely related to recent Caribbean species (Laborel, 1970; Leão, 1983). The reef fish fauna, by contrast, is characterized by an endemism of about 13% (Rocha, 2003) but differences between the Caribbean and the Brazilian provinces are at the species or subspecies level, with no genus restricted to the south-western Atlantic (Joyeux *et al.* 2001).

Local populations depend largely on reef resources. In the northeast, over 18 million people live along the coast, one of the most densely occupied regions in the country. Overall, the human related activities that affect the Brazilian reefs are the same that threaten most coral reefs around the world, such as land use practices that increase sedimentation, domestic and agricultural pollution, overexploitation of reef resources, and uncontrolled tourism. Artisanal fisheries are a very important activity, both socially, economically and culturally, and also one of the bigger impacts. The tourism industry is growing every year, with numerous development projects for the region under way, representing in this scenario both a threat and an opportunity (Maida and Ferreira, 1996).

Considering the importance of these environments and their vulnerability to the various anthropic impacts occurring in the coastal zone, the Ministry of the Environment, has joined the ongoing efforts of universities and NGOs and started a series of actions that can be considered, in a whole, as Program for the Conservation of Brazilian Reefs.

Conservation- In 1992, Brazil was the first country to sign the Convention of the Biological Diversity and this commitment has stimulated a series of conservation measures. As conservation biodiversity strategy the establishment of protected areas is considered one of the most important instruments. Of the total of 200 Marine Protected Areas that exist on the Brazilian coast, only nine encompass significant reef communities, three of them being already recognized as sites of international importance. Of these nine existing Marine Protected Areas, two are found in oceanic islands, the Biological Reserve of Atol das Rocas and the National Marine Park of Fernando de Noronha (designated as a Natural World Heritage site); and three are on continental shelf, the Manoel Luís Parcel State Marine Park, in Maranhão State (designated as RAMSAR site in 1999), Abrolhos National Marine Park and Ponta da Baleia Environmental Protected Area (BA). The others are found in more coastal areas: Recifes de Corais Environmental Protected Area (RN), Costa dos Corais Environmental Protected Area, Recife de Fora Municipal Marine Park (BA) and the Corumbau Marine Extrative Reserve.

Recently a buffer zone was created around the Abrolhos National Marine Park, the biologically richest reef in the South Atlantic. The area enacted involves nearly 95,000 square kilometers, and strong protection under Brazilian law would require special permits for any economic use while ensuring local communities can continue carrying out their means of livelihood through traditional fishing and eco-tourism activities.

Status- Sites surveyed during the National Program for Monitoring Brazilian Reefs using Reef Check revealed areas with high percentages of coral cover, comparable to those observed in other Atlantic regions (Hodgson and Liebler, 2002; Ferreira and Maida, 2006). According to Jacques Laborel, the coral cover in Brazilian reefs during the 1960s were never higher than 50% maximum, and around 25% in average. Reef Check method was efficient in revealing important patterns for Brazilian coral reefs. In relation to fishes and invertebrate species, fishing was the main variable driving the abundance of indicator species on Brazilian reefs. Indicator species of fish, including Lutjanids, Scarids, Serranids and ornamental species were significantly less abundant in areas where fishing and collecting were allowed. The same pattern was observed for commercially exploited species of lobster and octopus. Larger species of groupers were generally absent of all areas with very few exceptions (Ferreira and Maida, 2006). Reduced densities of carnivores have also been reported during AGRRA monitoring (Leão *et al.*, 2004). Effects of fishing and the potential responses to marine protected areas have also been reported by Floeter *et al.* (2005).

An English version of the report with the first results of the National Program for Monitoring Brazilian Reefs using Reef Check is now available for distribution, and will be handed during ICRI general meeting in Cozumel.

Bleaching- Since 1993 three events of mass coral bleaching were reported in Brazil, caused by thermal anomaly associated with El Niño events (Oliveira, 2004). In the summer of 2003, a synchronized event of bleaching was registered in four areas, spread over 2000 km. This event was of smaller proportion in terms of percentage of bleached colonies than the event in 1998, but was the first large scale event registered simultaneously in Brazil and shows the importance of large scale monitoring (Ferreira and Maida, 2006). Because no mass mortality has ever been reported, in Brazil, the Western South Atlantic coral fauna is considered as a resilient fauna (Oliveira *et al.*, 2004).

Coral Spawning - For the first time, the simultaneous spawning of an important reef builder, the Brazilian endemic coral species *Mussismilia hartti* was monitored both in situ and in aquarium, in sites located thousands of kilometers apart. Fertilizing experiments were successful, enhancing the hope of a recovery program for severely degraded areas (Coral Vivo Project) (Castro *et al.*, 2006)

Conclusion- In spite of all the efforts here translated in existing programmes and laws, much still remains to be done to the conservation of the reef environments in Brazil. The institutional structuring, as well as Brazilian legislation, needs greater effort in the networking necessary between the various sectors and actors engaged in coastal and marine management. In this context, the reef environment needs more attention. In addition, there is a lack of more effective implementation mechanisms and law enforcement, mainly when the issue is control (licensing) and surveillance (Prates and Ferreira, 2004). Coral reefs of Brazil are largely concentrated along the coast, so land based impacts are a major concern and have to be addressed. Little progress, however, has been made on this aspect, and the issue remains as one of the highest priorities. It is hoped that a future joint assessment of priorities for each major ecosystem division during gap analysis will enable progress in this area.

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