WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

FERNANDO DE NORONHA ARCHIPELAGO/ROCAS ATOLL TROPICAL INSULAR COMPLEX (BRAZIL)

Background information: Fernando de Noronha National Marine Park was nominated by Brazil in 2000. IUCN in its evaluation report (2000) noted "*Fernando de Noronha National Marine Park has been nominated for inscription on the World Heritage List on the basis of all four natural criteria. The information that is provided in the nomination document is not sufficient to justify inscription*." The World Heritage Committee, as its twenty-fourth session in Cairns, Australia (December 2000), noted that the State Party requested postponement. In February 2001 the State Party submitted a serial nomination of Fernando de Noronha/Atoll das Rocas Tropical Insular Complex. This evaluation refers to this serial nomination.

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (10 references).

iii) **Additional Literature Consulted:** Bibby *et al*, 1992. **Putting Biodiversity on the Map. Priority Areas for Global Conservation.** Cambridge, UK; Stattersfield *et al*, 1998. **Endemic Birds Areas of the World: Priorities for Biodiversity Conservation.** Cambridge, UK; Biodiversity Support Program, Conservation International *et al*, 1995. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean.** Washington, DC; IUCN Tropic Forest Program/ World Conservation Monitoring Centre, 1998. **Brazil, Atlantic Coastal Forests: Conservation of Biological Diversity and Forest Ecosystems**; Davis, S.D. *et al* **Centres of Plant Diversity.** Vol. 3. IUCN Gland, Switzerland; Prance, 1987. Biogeography of neotropical plants. In **Biogeography and Quaternary History in Tropical America**. Whitmore and Prance, (eds) pp 46-65. Oxford: Clarendon Press; Kikuchi, R.K.P and Z.M.A.N. Leão, 1997. Rocas: An Atoll built primarily by coralline algae. In **Proceedings of the 8th International Coral Reef Symposium**, Vol.1, pp 731-736. UNEP/IUCN. 1998. **Coral Reefs of the World.** Vol. 1: Atlantic and Eastern Pacific. IUCN Gland, Switzerland and Cambridge, UK; GBRMPA/WB/ IUCN, 1995. **A Global Representative System of Marine Protected Areas.** Vol. 2: Wider Caribbean, West Africa and South Atlantic. Washington DC, USA; Elder, D. E. and Pernetta, J. eds., 1991. **Oceans.** London, UK; Sanches, T. M. and Bellini, 1998. C. Juvenile *Eretmochelys imbricata* and *Chelonia mydas* in the Archipelago of Fernando de Noronha, Brazil. In **Chelonian Conservation and Biology**, Vol.3, No.2. pp 308-311, Washington DC, USA.

iv) **Consultations:** 4 external reviewers, Fernando de Noronha National Marine Park, IBAMA, Secretary for the Environment of Pernambuco State, TAMAR Regional Project, Local Community Council, Local Association of Fishermen, Local Association of Tourism Operators, Aguas Claras Dive Centre, Golfinhos Rotadores Project.

v) **Field Visit:** Pedro Rosabal, February 2000 and August 2001.

2. SUMMARY OF NATURAL VALUES

This serial nomination includes Fernando de Noronha National Marine Park (FNNMP) and Atoll das Rocas Biological Reserve (AdRBR). These sites (FNNMP/AdRBR) are located in the Western South Atlantic Ocean, off the northeastern coast of Brazil (see Map 1). FNNMP, under the jurisdiction of the State of Pernambuco, includes a terrestrial area of 1,190ha, comprised of 70% of the main island of Fernando de Noronha, (excluding the island's urban nucleus), as well as 21 smaller offshore islands and islets. The marine area of FNNMP covers 9,580ha and is surrounded by a buffer zone that extends to the 2,000m isobar (see Map 2). AdRBR, approximately 150km to the west of FNNMP, is under the jurisdiction of the State of Rio Grande do Norte. AdRBR is an elliptical reef that includes two small islands, the 3.5ha Lighthouse Island (Ilha do Farol) and 3.2ha

Cemetery Island (Ilha do Cemitério). The marine part of this Biological Reserve covers around 7,500ha and it is surrounded by a buffer zone that extends to the 2,000m isobar (see Map 3).

The nominated site is located on the Southern Atlantic submarine ridge. The Fernando de Noronha Archipelago represents the emerged peaks of this submarine mountain system that rises 4,000m from the ocean floor to an altitude of 323m ASL at Morro do Pico on the main island of Fernando de Noronha. Atoll das Rocas has been formed by the growth of reefs on the submerged peaks of the submarine ridge. Coralline algae have been the primary builders of the das Rocas with secondary deposition by coral. The site represents the first record of coralline algae as primary reef builders during the Quaternary period. It is also the only atoll in the South Atlantic Ocean and one of the smallest in the world. The coastline of FNNMP alternates between high cliffs and sandy beaches and its geology is characterised by a number of volcanic rock types, including pyroclastic deposits of tufa and breccia, lavas and formations such as volcanic plugs, dykes and domes.

There are less than ten oceanic island sites in the South Atlantic and FNNMP/AdRBR represents more than 50% of the ocean's islands in terms of surface area. The highly productive coastal waters around islands are used by many fish species for spawning and as a refuge for juvenile fish. The shallow waters also provide habitat for benthnic organisms (such as coral, sponges and algae). Oceanic islands therefore play a key role in the reproduction and dispersal of marine organisms, providing a staging point for the colonisation of other coastal areas and the surrounding ocean. Since FNNMP/AdRBR represents such a large proportion of insular South Atlantic coastal area, it is an important repository for the maintenance of biodiversity for the entire South Atlantic basin.

FNNMP vegetation is classified as Insular Atlantic Forest – a sub-type of Atlantic Rainforest which is considered the world's most threatened tropical forest. Insular Atlantic Forest is only found in FNNMP. To date over 400 species of vascular plants have recorded in FNNMP, including three endemics. FNNMP also contains the sole oceanic mangrove in the South Atlantic. The vegetation on Atoll das Rocas is mainly herbaceous, salt-resistant, and typical of sandy beaches where *Cyperaceae*, *Gramineae* and *Amaryllidaceae* species are predominant.

The nominated site contains the largest concentration of tropical seabirds, in terms of numbers and species diversity, to be found in the Western Atlantic. 55 migratory species have been recorded in FNNMP, 14 of which breed in the Park. Resident bird species include six natives, three of which are locally endemic, including the Noronho vireo or "sebito". The archipelago is considered a Global Centre of Bird Endemism (BirdLife International, 1998). In AdRBR 32 species have been recorded, of which 11 species regularly nest on the atoll. Approximately 150,000 birds utilise the atoll, including the largest South Atlantic colonies of sooty terns, brown noddies and masked boobies. Based on the diversity and number of individuals, AdRBR is considered the single most important site for tropical seabirds in the whole Atlantic (BirdLife International, 1998).

There is an abundance of marine fauna in the nominated area. Two species of marine turtles breed in the site: the hawksbill turtle – the world's second most threatened species – and the green turtle. AdRBR is considered Brazil's second largest reproductive area for green turtles after Trinidade Island. 15 species of coral have been recorded of which six are endemic to Brazil. 95 species of fish have been reported in FNNMP – including two species endemic to the archipelago – while 147 species of fish have been recorded from AdRBR. Research undertaken by the Brazilian Marine Turtles Conservation Project (TAMAR) indicates that AdRBR is an important feeding ground for juvenile hawksbill and loggerhead sea turtles during their migration to the Eastern Atlantic coast of Africa.

FNNMP has important scenic values associated with its diversity of coastal landscapes and their combination with an impressive gradient of colours of the surrounding waters. On the other hand AdRBR offers spectacular scenes associated with the tide regime. At high tide only two sandy islands and some isolated rock formations in the surrounding reef stand above water. The scene changes dramatically at low tide when the reef ring of the Atoll – a natural 1.5m wall bordered by several sandbanks – is exposed and several shallow lagoons and tidal pools are formed producing a spectacular and colourful landscape. In addition, large numbers of fish get trapped in tidal pools, transforming the atoll into a natural aquarium of great beauty. Underwater both sites present the best diving conditions of the South Atlantic and are considered among the 10 top diving sites of the world. This relates to the abundance of big fishes and sharks, the variety of submarine forms, and an exceptional visibility up to 50m and a light extinction depth of 87m.

A significant natural feature of the site is the concentration of spinner dolphins in FNNMP. This species is commonly found in tropical oceans and is included in the category "insufficiently well-known but dependent on Conservation" in the IUCN Red List. Almost very morning, between 1000 and 1200 spinner dolphins come to

the waters of the Golfinhos Bay in FNNMP to rest up before returning to the ocean at night to feed. This high concentration of spinner dolphins in a relatively small area is an interesting natural phenomenon that attracts the attention of scientists and divers worldwide. Spinner dolphins marked in FNNMP have also been seen in AdRBR. Coloured dolphins, regular dolphins, flippers, melon-head dolphins, pilot whales, minke whales and humpback whales have also been recorded in the nominated area.

3. COMPARISON WITH OTHER AREAS

The nominated area is a biogeographic province of its own – Fernando de Noronha Island Biogeographic Province. According to the classification of Marine and Coastal Realms, the site falls within the Tropical Coastal Realm of the South Atlantic Marine Region. There are no World Heritage sites in either of these biogeographic regions.

Representing a submarine volcanic mountain system, FNNMP/AdRBR may be compared to other Atlantic volcanic islands such as Ascension, St. Helena, and Trinidade. However, its higher biodiversity and the occurrence of Insular Atlantic Rainforest, only to be found in this site, differentiate the nominated area from these islands. Moreover these other Atlantic volcanic islands have been substantially transformed by development and do not enjoy the degree of protection of FNNMP/AdRBR. There are a number of volcanic island World Heritage sites in the Pacific, such as the Galapagos (Ecuador), Cocos Island (Costa Rica) and Hawaii Volcanoes (USA) and East Rennell (Solomon Islands). The differences in oceanography and marine biodiversity between the two oceans make it difficult to compare these sites to the nominated area. This is also the case for Aldabra Atoll (Seychelles) in the Indian Ocean. However, in terms of flora, FNNMP with 400 species is more diverse than Cocos Island (235) and Aldabra Atoll (178).

Though Cocos Islands, Galapagos and the New Zealand Sub-Antarctic Islands have greater numbers of seabirds, the nominated area has relatively high seabird numbers when compared other Southern Atlantic sites such as Gough Island, or to other sites in the Tropical Coastal Realm of the South Atlantic Marine Region. In terms of fish species, Cocos Island has a greater diversity than the nominated area. However, FNNMP/AdRBR has larger populations of some shark species, particularly the lemon shark, than Cocos Island which is important for hammerhead and white-tip sharks. The lemon shark is the subject of ongoing research in AdRBR due to the presence of an increasing resident population, in contrast with the population depletion that is occurring in the Eastern Pacific and West Atlantic. In addition Cocos Islands and Galapagos Islands do not show the ecological linkages that the nominated site has in relation to the survival of marine turtles, dolphins, sharks and other marine species.

FNNMP has important scenic values related to the combination of high cliffs alternating with sandy beaches and an impressive gradient of colours in the sea around the archipelago. However, this is not as impressive as the scenery offered by Cocos Islands with its precipitous forest-covered slopes and waterfalls, or when compared with Hawaii, Galapagos or Gough Island. The scenic values associated to the pristine landscape of AdRBR, as described in section 2, are very high and so peculiar that they can stand by their own in comparison with other world heritage sites. A distinct feature of this nomination is the presence in FNNMP of a resident population of spinner dolphins. The only other known resident population occurs in Kealake'akua Bay, in Hawaii. The population in the nominated site exhibits a well-defined pattern of activity, including nightly feeding in deep ocean waters and AdRBR, followed by a return to Baía dos Golfinhos to rest. The dolphins arrive at the Bay with a remarkable punctuality, between 07:00-07:30hrs each morning and their arrival is spectacular due to the high number of individuals. This is one of the main attractions for visitors who can watch this phenomenon from the high cliffs surrounding the bay. According to the well-known underwater photographer and explorer Tim Burton "there is no other place in the world where you can see such a high concentration of dolphins in such a small area".

In sum, FNNMP/AdRBR has a number of features which differentiate it from other Island World Heritage sites. Being a Biogeographic Province on its own, as well as a Global Centre of Bird Endemism also makes this site quite distinctive.

4. INTEGRITY

4.1. Boundaries:

The terrestrial and marine components of the nominated area are well protected. The boundaries of the nominated area are considered adequate for conserving marine biodiversity. On the main island of Fernando de Noronha all key terrestrial habitats are included in the park and all the terrestrial areas of Atoll das Rocas are within the core zone of the protected area.

4.2. Management:

FNNMP/AdRBR has adequate legal protection from a number of Federal and State laws and regulations. IBAMA is the Federal Agency responsible for the management and conservation of the site. The site has two separate management plans, one for FNNMP and one for AdRBR. The management plan for FNNMP was prepared in 1990 that is being implemented with local government and IBAMA financial support. This plan is adequate and its implementation well resourced and supported by local people. The plan strictly controls tourism developments and visitation. Regulations also control migration to the main island so that the population cannot rise above the present level of 2,500 people. Commercial fisheries are forbidden but traditional fisheries are allowed subject to licenses and regulations. Licenses are granted only to the families of traditional fishermen. A management plan for AdRBR was prepared in 1992 and is under implementation. As only researchers are allowed visit AdRBR and all fisheries are strictly prohibited, the management plan is mainly focused on enforcement, research and monitoring activities.

FNNMP is patrolled by 11 rangers equipped with four vehicles and a speedboat. TAMAR also actively participates in management providing staff for land patrols and permanent observation points overlooking waters around the main island. A good relationship exists between the park and the local community and many local individuals and organisations such as divers, fishermen and tour operators assist park staff in monitoring for illegal activities. The combined efforts of the Park Administration, TAMAR and the local people provide a remarkable successful partnership to control and patrol this site. The Marine Park Authority and the District Council for the Environment actively promote the active participation of local people in conservation activities. In AdRBR there are two permanent staff whose monitoring efforts are assisted by the 3-4 researchers on the atoll. AdRBR staff are supported by the Brazilian navy who help maintain the base on the atoll. The navy also provides immediate backup with planes or coastguard boats when illegal fishing boats are reported.

The Federal Government provides a management budget of US$80,000 per year for FNNMP and around US$30,000 for AdRBR. Both sites receive additional funding for specific projects or conservation initiatives from the Ministry of the Environment's National Environment Fund. FNNMP receives additional funding from a Visitor's Tax and entrance fees. The level of funding and additional support is considered to be adequate for the management of the site.

4.3. Tourism

While tourists are not permitted in AdRBR, FNNMP is one of the most visited parks in Brazil (400,000 visitors in 2000) with diving being a big attraction. Regulations restrict the number of visitors to the main island to a maximum of 420 per day and the importation of non-recyclable material. The Regulations also restrict the amount of tourist accommodation on the island to its current level of approximately 1000 beds. Following the 2000 IUCN visit to FNNMP, the Sustainable Development and Ecotourism Management Plan has been finalised and is under implementation. The plan also covers the area outside FNNMP, the urban nucleus of the main island, which is subject to strict environmental regulations. This plan addresses the carrying capacity of different zones within the park and regulates boating and diving.

A good network of trails and well trained local guides help to reduce visitor impact. Annual training courses for local guides and diving operators are organised by tourism agencies with the support of IBAMA and the TAMAR Project. WWF-Brazil also provides technical and financial support for communication and interpretation. An interpretation centre is located on the main island and all visitors are requested to attend a presentation on FNNMP, which explains regulations and management. As nature-based tourism is the main source of income for local people there is a genuine interest in conserving the area's natural values. Tourism in FNNMP is well regulated and managed and IUCN did not detect any adverse impacts from tourist activities in the park.

4.4. Threats

Given the location of the site and its effective management and regulation there are few threats to its integrity. There is a potential threat from oil spills, however, this is considered very low. The port on Fernando de

Noronha island is well equipped to deal with accidents and existing shipping lanes are located far from the site where oceanic currents would disperse oil or waste before it could reach the site.

4.5. Serial Site

When IUCN evaluates a serial nomination it asks the following questions:

a) What is the justification for the serial approach? Though separated by 150km, both clusters occur on the Southern Atlantic submarine ridge. Together they represent more than half of the insular Southern Atlantic and are extremely important for the dispersion of benthnic larvae and the maintaining and re-population of fish stock in the surrounding oceanic waters.

b) Are the separate elements of the site functionally linked? There is a clear connection between FNNMP and AdRBR in relation to biological and ecological processes. The benefits from sharing the same marine currents and oceanographic regime that influence the ecological processes occurring in both sites. They are clearly linked in an ecological corridor on which a number of species such as marine turtles, dolphins, and sharks survival depends. In the case of marine turtles the linkages go beyond the South Atlantic as these species use this site in their migration to the Western Coast of Africa.

c) Is there an overall management framework for all the units? The two clusters of this site have separate management plans and management regimes. For practical and logistical reasons it is difficult to have an integrated management plan for both sites are they respond to different management objectives (FNNMP is a Category II protected area while AdRBR is a Category Ia protected area according to IUCN, 1994). However they do implement in a coordinated way a number of research projects on key species such as marine turtles, sharks and birds.

5. ADDITIONAL COMMENTS

FNNMP has an interesting history of human occupation represented by a number of sites within the park. The archipelago was once of strategic importance for controlling access to Brazil which prompted the construction of a system of fortresses -- nine of them on the main island. Considering the limited size of the main island – 17 km^2 – this is probably the highest density of military construction worldwide. Also of cultural value is São Miguel Palace, formerly the administration centre of the penitentiary, but now housing the administrative headquarters of the State District of Fernando de Noronha. In AdRBR there are a number of shipwrecks around the atoll of great interest for underwater archaeology. Some of them have been partially studied and mapped but much more work remains to be done.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

This serial site has been nominated for inscription on the World Heritage List on the basis of all four natural criteria.

Criterion (i): Earth's history and geological features.

FNNMP/AdRBR represents volcanic islands that are the surface manifestation of a submarine mountain system but is does not represent the process of formation of this system. There are many volcanic World Heritage island sites so the nominated are cannot be considered unique in this respect. Atoll das Rocas is a good example of an atoll constructed primarily by coralline algae in the Quaternary period. It is also the only atoll in the South Atlantic Ocean and one of the smallest in the world. However, there are existing atoll World Heritage sites and there are sites in the Pacific Ocean which would better represent this phenomenon. The site also has ongoing coastal geomorphological processes but these are common to coastal zones throughout the world. IUCN considers that the nominated serial site does not meet this criterion.

Criterion (ii): Ecological processes.

FNNMP/AdRBR represents over half the insular coastal waters of the Southern Atlantic Ocean. These highly productive waters provide feeding ground for species such as tuna, billfish, cetaceans, sharks, and marine turtles as they migrate to the Eastern Atlantic coast of Africa. An oasis of marine life in relatively barren, open ocean,

the islands play a key role in the process of reproduction, dispersal and colonisation by marine organisms in the entire Tropical South Atlantic. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Superlative natural phenomena or exceptional natural beauty.

Baía dos Golfinhos is the only know place in the world with such a high population of resident dolphins and Atoll das Rocas demonstrates a spectacular seascape at low tide when the exposed reef surrounding shallow lagoons and tidal pools forms a natural aquarium. Both sites have also exceptional submarine landscapes that have been recognised worldwide by a number of specialised diving literatures. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species.

FNNMP/AdRBR is a key site for the protection of biodiversity and endangered species in the Southern Atlantic. Providing a large proportion of the insular habitat of the South Atlantic, the site is a repository for the maintenance of marine biodiversity at the ocean basin level. It is important for the conservation of endangered and threatened species of marine turtles, particularly the hawksbill turtle. The site accommodates the largest concentration of tropical seabirds to be found in the Western Atlantic Ocean, and is a Global Centre of Bird Endemism. The site also contains the only remaining sample of the Insular Atlantic Forest and the only oceanic mangrove in the South Atlantic region. IUCN considers that this serial nomination meets this criterion.

7. RECOMMENDATION

That the Bureau recommends to the Committee the **inscription** of Fernando de Noronha Archipelago/Atoll das Rocas Insular Complex on the World Heritage List under natural criteria (ii), (iii) and (iv). The Bureau may also wish to recommend that the State Party take steps to control potentially adverse activities in the ecological corridor between the two island components of the site. IUCN would like also to recommend that, for easy reference, this site be inscribed under the name of the Brazilian Atlantic Islands.