

Brazilian Atlantic Islands: Fernando de Noronha and Atol das Rocas Reserves

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Brazil

Inscribed in: 2001

Criteria: (vii) (ix) (x)



Peaks of the Southern Atlantic submarine ridge form the Fernando de Noronha Archipelago and Rocas Atoll off the coast of Brazil. They represent a large proportion of the island surface of the South Atlantic and their rich waters are extremely important for the breeding and feeding of tuna, shark, turtle and marine mammals. The islands are home to the largest concentration of tropical seabirds in the Western Atlantic. Baía de Golfinhos has an exceptional population of resident dolphin and at low tide the Rocas Atoll provides a spectacular seascape of lagoons and tidal pools teeming with fish. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

SIGNIFICANT CONCERN

A management system and legal provisions are in place to secure protection, but there is a lack of effective implementation in some areas. Resources and monitoring tools are insufficient to control the several of threats to the World Heritage site and the general state of some of the site's values is now of high concern. Industrial fishing in the vicinity of the site has been impacting on pelagic species in general and sharks in particular and large aggregation of boats have resulted in the introduction of exotic species, causing a potentially significant impact on the marine ecosystem stability of the site. Introduced exotic and invasive species are also having a significant impact on the native terrestrial flora and fauna of Fernando de Noronha, as well as on breeding seabirds, which are in long-term decline and some close to local extinction. Potential effects of foreseen climate change, such as sea-level rise, temperature increases and ocean acidification will impact the marine environment and low-lying Atol das Rocas.

FULL ASSESSMENT

Assessment information

Threats

Current Threats

High Threat

The most serious threats to the site's values at present are from tourism and urban growth, displacement of native terrestrial species on Fernando de Noronha. Illegal fishing also threaten several the site's marine species and habitats, and may be a threaten to its Outstanding Universal Value.

► **Oil & Gas exploration/development**

Low Threat

(Oil spills)

Inside site, extent of threat not known

This is a product of leaks and the pumping of bilges of passenger ships and fishing vessels; and the handling of fuels and oils in the harbor (ICMBio,2011b). The regular landing of fuel for the electricity plant in Fernando de Noronha poses further risks. After a major event occurred in 2000, there is no specific evidence of larger spills afterwards, although it remains a latent threat.

► **Invasive Non-Native/ Alien Species**

High Threat

(Threats from invasive species and displacement of native terrestrial species.)

Inside site, throughout(>50%)

Other invasive species names

Cats and dogs, brown and black rats, house mice, cururu-toad (*Rhinella jimi*), tegu lizard (*Salvator merianae*), little fire ant (*Wasmannia auropunctata*), rock cavy (*Kerodon rupestris*), river tamarind (*Leucaena leucocephala*), lantana (*Lantana camara*)

Clearing of vegetation and introduced species have had a significant impact within the site on Fernando de Noronha (ICMBio,2011b; UNEP-WCMC, 2011). Several research projects supporting management plans of invasive species are being currently undertaken in order to control effects, mainly on native flora, amphibians, ground nesting birds and sea turtles (Triade, 2015; Vieira, 2016; Russell et al., 2018; Abrahão et al., 2019; Micheletti et al., 2020). The role of invasive species is clearly now widespread across the island, and invasive mammalian predators such as cats and rats are present across the entirety of the main island, and only absent from the small percentage land area of small offshore islands. Important additional research on cat and rat impacts on native species has been undertaken recently (Gatto-Almeida, 2020; Russell and Taylor, 2019; Dias et al., 2017; Mello and de Oliveira, 2016). Biosecurity to prevent new invasions is now becoming critical (IUCN Consultation, 2020).

► **Fishing, Harvesting & Controlling Aquatic Species**

High Threat

(Illegal fishing)

Inside site, widespread(15-50%)

This includes commercial fishing in no take zones, and artisanal spear and blast fishing in coral communities (ICMBio, 2011b; UNEP-WCMC, 2011). Fishing has significant negative impacts on pelagic species, in particular sharks and benthic species, such as lobsters.. Enforcement of fishing regulations is insufficient, both at Fernando de Noronha and Atol das Rocas (IUCN Consultation, 2014). Artisanal fishing for self-consumption and community income is practiced in the Archipelago, as an alternative to tourism. *Thunnus albacares* and *Caranx lugubris* comprise most of the catch (Domínguez et al., 2015). Commercial fishing is forbidden since 1998 when shark species had declined by this pressure (García y Clapis, 2008).

► **Recreational Activities**

High Threat

(Tourism impacts)

Inside site, widespread(15-50%)

Inappropriate tourism development has led to the degradation of both the marine environment (physical damage by anchors, novice divers, beach goers, harbors, and sewage) and to coastal and terrestrial environments (fauna disturbance, construction of infrastructure, introduction of exotic species, collection of fauna as souvenirs, trampling of vegetation, and damaging of scenic values) (ICMBio, 2011b; UNEP-WCMC, 2011; de Fretias Prazeres, 2011).

The increase in visitors suggests a significant threat to biodiversity conservation; offers such as low season discounts, lodging increase from 6% to 12% between 2009 and 2012 contributed to this (Zanirato, 2014).

The Fernando de Noronha is a good case for ecotourism in Brazil due to strict control of visitation based on a study of carrying capacity and sustainable tourism infrastructure that allows high standard visitor experience. However, powerful actors such as the area management and stakeholders potentially interested in the area for multiple purposes are a driving force that ultimately leads the area to develop according to their interests (IUCN Consultation, 2020).

The cultural differences between small hotels (owned mainly by island natives) and big hotels (owned by non-native Brazilians) make cooperation between both groups difficult. Larger hotels are dominant in Fernando de Noronha. Despite efforts to ensure environmental conservation, it can be observed that there are still problems, especially in the urban area of Fernando de Noronha including lack of basic sanitation, inadequate water treatment and waste disposal, etc. The carrying capacity study performed by a consultant firm was part of a contract between a private consulting firm and ICMBio. As a result, since 2002, the creation of new hotels is prohibited, yet the number of hotels continue to increase (IUCN Consultation, 2020).

The official number of visitors to Fernando de Noronha increased from about 62.500 in 2002 (the year after inscription on the World Heritage list) to 91.000 in 2016 (<http://www.brasil.gov.br/turismo/2017/01/fernando-de-noronha-registra-aumento-de-turistas-em-2016>) and reached over 106,000 per year in 2019. The management plan defines 89,000 tourists per year as optimal (Marinho, 2020). While tourism has exceeded its carrying capacity and causes environmental impacts, tourism also brings benefits to Fernando de Noronha as around 90% of the island's residents work directly or indirectly with tourism, primarily related to public services (de Araujo et al., 2018). Based on several indicators of highlighted impacts and threats, such as of the tourism carrying capacity and the disturbance of the dolphins' habitat, it can be inferred that the destination is at risk of loss of part of its biodiversity, if effective actions are not sufficiently implemented. There are, however, initiatives and efforts to reduce and control these risks (Zanirato, 2014).

► **Residential Areas, Recreation & Tourism Areas**

High Threat

(Urban growth)

Inside site, widespread(15-50%)

Urban development has led to the dumping of solid and liquid wastes, disturbance and displacement of native species, seabird collisions with aircraft; and the degradation of scenic values (ICMBio, 2011b; WDPA, 2011). Coral mortality has been identified in the southwestern and northeastern ends of the north shore of Fernando de Noronha and is associated with the harbor (northeast) and sewage outfall (southwest) (de Fretias Prazeres, 2011). Urban growth is poorly regulated.

Inhabitant population has increased between 1991 and 2010 by about 1000 individuals - residents only, visitors are not included in this number- (Santana et al, 2016). The increase is of great concern to experts as demographic density is 154.55 hab / km², within the 17 Km² of the main island (according to IBGE in 2010).

The Management Plan indicates that demographic density in the environmental preservation area is 290.1 hab / km² within 8 km², but only resident and visitation areas are to be considered, this number could reach the 1000 hab / km². In order to avoid future collapse of the island, supporting capacity studies suggest this number should be maintained (Santana et al, 2016).

According to the Associação de Pousadas there were 86 legally operating hotels on the island in 2016. Nevertheless, infrastructure is considered to be highly deficient on the island despite of the recent tourism development. The carrying capacity study defined limits to urban growth. Yet, the study resulted in the creation of many illegal hotels (IUCN Consultation, 2020).

Gestão Insular is an authority of the State District of Fernando de Noronha that is linked to the Secretary of Science and Technology and is financed by the state government and through its own resources (e.g., the TPA and the TLL). The TPA (Taxa de Preservação Ambiental) goes directly toward investments in infrastructure (e.g. waste disposal, hospitals, nursing care, etc.) while the TLL goes to the state

government, before being directed back to Gestão Insular. The funds are then invested in some form that benefits the population through activities such as garbage disposal treatment and road maintenance. The financial resources generated by tourism directly benefit the community, since the TPA goes to waste disposal (that is sent to the mainland) and urban infrastructure, while 70% of the money collected from entrance fees are re-invested in the park in the form of facilities (IUCN Consultation, 2020).

Despite efforts to ensure environmental conservation, it can be observed that there are still problems in the urban area of Fernando de Noronha; such problems include basic sanitation, adequate water treatment and waste disposal (de Araujo et al., 2018).

Potential Threats

High Threat

To date, there is little evidence of climate change impacting the site's marine environment, but sea temperature increases, oceanic acidification, and sea-level rise are expected to impact the site in the future. The threat of new species' invasions are perceived as very high due to the lack of both biosecurity to monitor for new invasions and capacity to respond to invasions.

- ▶ **Habitat Shifting/ Alteration, Ocean acidification, Temperature extremes**
(Climate change)

High Threat

Inside site, throughout(>50%)
Outside site

Climate change is causing sea temperature increases and ocean acidification, which leads to mortality of oceanic calcifying organisms (ICMBio, 2011b; WDPA, 2011). Some models also suggests that the distribution pattern of marine species could be affected by climate change (Boavida-Portugal et al., 2018). Sea-level rise caused by climate change will impact low-lying Atol das Rocas; however, no specific evidence of this or other changes resulting from severe weather is available, although changes in the regular temperature behavior were registered in 2015 in the South Atlantic ocean as result of El Niño events.

- ▶ **Invasive Non-Native/ Alien Species, Problematic Native Species**
(New species invasions)

Very High Threat

Inside site, throughout(>50%)

New species could be introduced to the main island of Fernanda de Noronha through human activities and connectivity, particularly via the port or airport. These species could have major unforeseen impacts on the biodiversity of the site. Currently there is no biosecurity to monitor for new invasions nor capacity to respond to invasions (IUCN Consultation, 2020). Biosecurity on offshore islets is required to stop species such as cats, rats and tegu arriving at them (Russell and Taylor, 2019).

Protection and management

Assessing Protection and Management



Some Concern

The Fernando de Noronha Archipelago National Marine Park, the Atol das Rocas Marine Biological Reserve and the Environmental Protection Area (APA) are administered by the Chico Mendes Biodiversity Conservation Institute (ICMBio). Management Plans were prepared by ICMBio for the Atol das Rocas Marine Biological Reserve in 2007 and for the Fernando de Noronha APA and National Marine Park in 2011 and address issues such as tourism, research, environmental education, protection and monitoring of the biodiversity. These plans guide management and conservation, and regulate boating and diving. Local artisanal fishermen are licensed to fish in the Fernando de Noronha Archipelago Marine Park. All fishing is prohibited in the Atol das Rocas Marine Biological Reserve. Migration to Fernando de Noronha is controlled at present levels and limited to relatives of the islanders (UNEP-WCMC, 2011; ICMBio 2011b). Enforcement of the no take zone around the Atol das Rocas was strengthened in 1991 when a research station was established, however enforcement is still insufficient. Management plans of both the national park and the protection area are no longer fulfilling the needs of regulation to the activities being

undertaken in the Archipelago, hence they are being updated in light of the new realities particularly, the growth in population -residents and visitors- (Santana et al., 2016); for the environmental protection area, the management plan was updated and signed in June 2017 (ICMBio, 2017).

The advisory councils of the Fernando de Noronha National Marine Park and the Fernando de Noronha Environmental Protected Area holds six meetings annually. Residents tend to be more involved in meetings related to the protected area because these are focused on the urban area of the island. ICMBio has made efforts to establish a participative management program through the advisory councils, but most of the residents leave the decisions to their “leaders” claiming their requests were never accepted. The dominant groups tend to have their own discourse and, because they are in a position of power, this speech becomes official, acting as true for the rest of the community. The less powerful actors in this context have no priority in the interests of more powerful actors and often have no means to fight for more support. Thus, the interests of minority groups are not popular, they do not become public and are not discussed as a possibility (de Araujo, et al., 2017).



Mostly Effective

Despite some existing threats, the component protected areas of this site appear to be relatively well protected. However, Fernando de Noronha National Park, Rocas Biological Reserve and the surrounding Environmental Protection Area are all seriously understaffed and underfunded, which hampers efficient law enforcement (IUCN Consultation, 2014).

The Atol das Rocas Biological Reserve is banned from public access and managed for the protection of species and for research. The Reserve benefits from surveillance by the Brazilian Navy and the Air Force, notably as concerns fishing and tourism activities, while the National Parks has a Sustainable Development and Ecotourism Management Plan, strictly controlling the development of tourism infrastructure and visits (SoUV, 2015).

The updating of the management plans (Santana, 2016; ICMBio, 2017) suggests adequate responses are being proposed by the PA authority to face the new challenges to control illegal activities and reinforce management.

EcoNoronha, ICMBio and Gestão Insular imposes fees on tourists and, therefore, influence their behavior due to intense monitoring. Migration control for tourists, residents and temporary workers is mandatory in the airport and port. These measures work in practice because the aforementioned actors hold the discourse of environmental conservation and carrying capacity that is subsidized by research. The redistribution of those payments for ecosystem services are invested in environmental protection posing as incentive for people to pay the entrance fee and TPA (IUCN Consultation, 2020).

The Fernando de Noronha National Marine Park has fenced-off beaches where visitors must show their previously paid “visitor card”, valid for ten days, in the PICs (control posts), where it is checked electronically in order to be granted access to these specific beaches within the park (de Araujo et al., 2018).



Mostly Effective

At the time of inscription the boundaries of the property were considered “adequate for conserving marine biodiversity” (IUCN Evaluation, 2011). It was also noted that all key terrestrial habitats were included in the property. However, some concerns exist about the awareness among the local population about the World Heritage status of the property and its boundaries (IUCN Consultation, 2014).



Some Concern

An overall framework for integration into national and state protected areas systems and tourism development activities exists (ICMBio, 2011b). However, in practice comprehensive integrated management could be improved (IUCN Consultation, 2014)



Some Concern

Tensions between tourism and conservation sometimes lead to major differences, but these differences should be worked out in the National Park Consultative Committee, and as part of the participatory process for the development of the property’s management plan (ICMBio, 2011).

Environmental NGOs take part in discussions about planning, community capacity-building and

monitoring, and act as facilitators (Estima et al., 2013).

However, as the majority of tourism-directed decisions are made by the hotel owners, ICMBio and Gestão Insular, many people outside of these organizations have given up on participating in the decision-making processes because their requests were never accepted (IUCN Consultation, 2020). Many of research opportunities have been outlined for Fernando de Noronha, but the suggested projects are never implemented. The dominant groups tend to have their own discourse and, because they are in a position of power, this speech becomes official, acting as true for the rest of the community. The less powerful actors in this context have no priority in the interests of more powerful actors and often have no means to fight for more support. Thus, the interests of minority groups are not popular, they do not become public and are not discussed as a possibility (IUCN Consultation, 2020).

Several actors appropriate from the environmental discourse with diverse interests. This discourse is embedded in tourism practices and causes a devaluation of local knowledge, considered inferior to technical and scientific knowledge. The dominant information has therefore a crucial role in power relations in Fernando de Noronha because it determines who has the technical-scientific knowledge and its most appropriate form of disclosure or not, making the popular knowledge reduced to less important in the process of production of knowledge (IUCN Consultation, 2020).

The local culture was highly impacted by the establishment of protected areas and still suffers from interference of some external actors. The participatory process takes place in the context of advisory councils; however, the final decision is always made by the managing institution. According to the interviews undertaken, their only means of participation in decision-making with regards to tourism is through the advisory boards of the archipelago's protected areas. From the interviews, it was possible to identify that only those who are part of some civil organization have some representation and others prefer to delegate their participation to the leader of these organizations (de Araujo et al., 2017).

Additionally, the Sustainability Program or the FN Archipelago - Noronha +20, which is an interinstitutional pact aiming at the social and environmental well-being of the archipelago focuses on critical issues ranging from urban and public use to research, education and health (Programa de sustentabilidade Noronha + 20, 2011). Co-management mechanism processes between local fisheries and biodiversity-related institutions, particularly the PA system, seem counterproductive, as conservation activities are not fully integrated into small-scale fisheries as to provide benefits to these communities (Cantareli, et al., 2016).

- ▶ **Mostly Effective**
The property has adequate legal protection conferred by a number of federal laws and state regulations. The Chico Mendes Institute for Biodiversity Conservation (ICMBio), an autonomous federal agency under the Ministry of Environment, is responsible for the management and conservation of the site (SoUV, 2015). The Atol das Rocas Marine Protected Area was established in 1979 and later redesignated as the first National Biological Marine Reserve. In 1988 the Fernando de Noronha Marine National Park was created by Federal Decree 96.693 and in 1989 the entire archipelago and surrounding waters were declared an Environmental Protection Area of the state of Pernambuco by State Decree 13555 which forms the legal basis for the buffer zone around the Marine National Park. Law enforcement is incipient, hampered by lack of resources (IBAMA, 2006).
- ▶ **Data Deficient**
Law enforcement is hampered by lack of resources (IBAMA, 2006).
- ▶ **Data Deficient**
No Committee decisions have been taken since inscription of the property.
- ▶ **Data Deficient**
Lobster fishing is allowed in the Sustainable Fishing Zone of the environmental protection area, but no information is available regarding whether it can be considered sustainable.
- ▶ **Some Concern**

While 70% of the entrance fees go back to management of the park, finance is inadequate to manage the site as outlined in the management plans (ICMBio, 2012).

The annual increase in the number of tourists has impacted the island's environment, which has encouraged authorities to establish visitation limits. The ordinance 025/95 has set a 420-daily visitor allowance on Fernando de Noronha, according to the carrying capacity study (Widmer, 2007, p.118), and is further controlled by an admission fee of R\$51.40 per day, called "environmental preservation fee (Taxa de Preservação Ambiental - TPA)". The TPA is to be paid by tourists upon their arrival on the island via airport or seaport. This fee can be paid ahead of time through the island's website (Estima et al., 2014). Residents and temporary workers are exempted from paying the TPA. The fee is paid to the federal government of Pernambuco and is then returned to Gestão Insular, who decides where to invest the money.

In order to provide ecotourism services to the public, an entrance fee was established to allow entrance to specific areas of the Fernando de Noronha National Marine Park for up to 10 consecutive days: for Brazilian citizens, this fee is R\$81.00, while foreigners are required to pay R\$162.00. Brazilian citizens over 60 or under 11 years of age, legal inhabitants and their relatives, public servants and researchers working on Fernando de Noronha are exempted from payment. Both the TPA and the entrance fee are mandatory for visitors to the island. Although the fees are expensive considering the cost of living in Brazil, visitation numbers have increased since their establishment (de Araujo et al., 2018).

Payment for ecosystem services schemes in Fernando de Noronha are valuable for preserving ecosystem services through ecotourism in protected areas if the revenues are re-invested into the preservation of the site, which is the case with the Fernando de Noronha National Marine Park (de Araujo, 2018).



Mostly Effective

The EPA management plan has a capacity building program for environmental guides, local population for better management of tourism and other activities for both management and technical staff (ICMBio, 2017). The ICMBio currently runs ACADEBIO, the state-owned academy aimed at strengthening capacities of all the Chico Mendes staff in the county.

ICMBio is a government-based organization that is responsible for managing federal protected areas within Brazil and, thus, manage the Fernando de Noronha National Marine Park and the Fernando de Noronha Protected Area. ICMBio is financed by the federal and state governments and was founded in 2007. ICMBio had 50 employees and 8 volunteers on Fernando de Noronha in 2016 (de Araujo et al., 2017).



Mostly Effective

Sporadic educational activities are carried out, but financing is insufficient to fully implement the environmental education program outlined in the management plan (ICMBio, 2011a; ICMBio 2011,b; ICMBio, 2011c; ICMBio 2008, IBAMA, 2006). The awareness among local people of the World Heritage status of the property is very low (IUCN Consultation, 2014). Environmental NGOs participate in tourism discussions to guide measures and monitoring with local communities (Estima et al, 2013).

Centro Golfinho Rotador is an NGO that was created to protect the Rotador Dolphin, but has extended its efforts towards environmental conservation as a whole and has also focused on social welfare. Centro Golfinho Rotador is funded by donations from both public and private institutions (IUCN Consultation, 2020).

Centro TAMAR is a cooperation between a government agency and a non-government-based institution with 22 bases throughout Brazil aiming at conserving endangered marine turtle species. The organization is being financed by Petrobrás (Oil Company), CELPE (Electric Company) and revenue from souvenir stores on the island. Their main action towards tourism is the Ecotourism Program, which consists of three initiatives:

1. Assisted intentional capture: tourists can watch turtles being safely captured every Monday and Thursday.
2. Tartarugada: monitoring of Leão Beach to mark nests and female turtles. Only four people can participate in this initiative due to small living quarters.
3. Nest opening: baby marine turtles release (de Araujo et al., 2018).

There is also Noronha + 20, a 20-year program built with civil society, the production sector and the

government aimed at preventing environmental degradation in the Archipelago. The environmental protection area has helped making human presence and nature conservation more compatible, contributing to environmental education through direct contact with different forms of life and the interaction with nature (Santana, 2016).

The new management plan has an education and interpretation program (ICMBio, 2017), but its effectiveness is still to be assessed.



Some Concern

There is a good network of trails with well trained local guides and there are riding, fishing and boat rides. Dolphin viewing is very popular. There is concern, however, that the mass tourism model that has developed on Fernando de Noronha is inappropriate, and that an eco-tourism model is needed to assure conservation of the property's OUV (ICMBio, 2011a; ICMBio 2011,b; ICMBio, 2011c). The National Park has an interpretive centre at its headquarters where environmental education talks are given several evenings a week (UNEP-WCMC, 2011). Carrying capacity in land and marine areas must be reviewed/updated.

As a result of the unorganized growth of the tourism activity, the increase of the lodging infrastructure without proper sanitary conditions, the expanding erosion and degradation process of drainage and water basins and overall degradation of natural ecosystems, capacity of the ecosystem to preserve species and face disturbance is being compromised. The intense visitation of boats facilitates the spread of exotic species from several parts of Brasil and the world (ICMBio, 2017).

The National Park has a Sustainable Development and Ecotourism Management Plan, which was implemented with the support of local people, strictly controlling the development of tourism infrastructure and visits, and also covers the urbanized areas located outside the property (SoUV, 2015). Fernando de Noronha now has strict control of visitation, based on study of carrying capacity and sustainable tourism infrastructure that allows high standard visitor experience, as well as prioritizing the environment preservation. EcoNoronha holds the concession of the National Marine Park of Fernando de Noronha since 2010 and have since established an entrance fee in certain areas of the park regulating the entry of visitors (de Araujo et al., 2017). Nevertheless, the island has been experiencing an increase in number of visitors, to which both Gestao Insular and EcoNoronha acknowledge the issue since for the past four years the official number of visitors increased from 90,000 per year in 2015 to over 106,000 per year in 2019. The management plan defines 89,000 tourists per year as optimal (Marinho, 2020). A number of illegal lodging facilities and illegal tourist entrance should be strictly monitored and addressed (de Araujo, 2018).



Serious Concern

A comprehensive monitoring system has not been developed for the entire World Heritage site. However, the Brazilian National Reef Monitoring Program has monitored coral coverage and condition in the property since 2002 (Rodriguez-Ramirez, et al, 2008). Plans are underway for development of a specific monitoring system for recreational diving in order to reduce damage to coral communities (Luiz, 2012).

Fishing data indicate the need to elaborate a joint resource management plan that results in the valuation of the artisanal fisherman and the sustainability of the fishing activity, including a monitoring strategy (Domínguez et al, 2015).

The Noronha +20 Sustainability Observatory is a proposal of management and monitoring instrument to follow up actions in the Plan, organize and collect information and disseminate actions and results (Programa de sustentabilidad Noronha + 20, 2011).



Highly Effective

Since the 1970s, the Federal government has organised scientific expeditions and research today is regularly conducted, particularly on spinner dolphins (Project GOLFINHO ROTADOR) and nesting marine turtle populations (Project TAMAR) on Fernando de Noronha, where the main nesting beaches of the green turtle have been monitored since 1987. These projects are however highly dependent on external funding from PETROBRAS National Oil Company and other sources. On the Atol das Rocas regular studies have been conducted since 1990 on migratory and resident seabirds, as well as on migrating hawksbill turtles, fish, crustaceans, coralline algae and benthic organisms (WDPA, 2011). Long-term research on

reef fishes has received more attention in the recent years, as a means for evaluating overfishing effects and for comparing pristine vs coastal areas under urban impacts (MCTI/CNPq, 2012). Research facilities have been developed on Fernando de Noronha (TAMAR Project since 1984), Atol das Rocas (University of North Rio Grande since 1991), and in the Sao Pedro e Sao Paulo Archipelago (since 1998) (ICMBio, 2011b). Several projects have been led by the ICMBio and research institutions e.g. sharks project on participatory monitoring (Gracia y Clapis, 2008), the Tamar Project for marine turtles and the Spinner Dolphin Project (SoUV, 2015; Mohr et al., 2009).

Overall assessment of protection and management

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Some Concern

Threats originating outside the property include inappropriate tourism development, urban growth in the town of Vila dos Remedios on Fernando de Noronha, novel invasive species and climate change. Environmental impacts from cruise tourism need to be more investigated.

State and trend of values

Summary of the Values

► Assessment of the current state and trend of World Heritage values

Trend: Stable

Additional information

Benefits

Understanding Benefits

- Tourism is the driver of the economy of Fernando de Noronha. Revenue from tourism are also Raising funds for conservation initiatives.

Factors negatively affecting provision of this benefit :

- Overexploitation Impact level - High, Trend - Continuing
- Habitat change Impact level - Moderate, Trend - Continuing

Land use change: Increasing number of hotel, deficient urban infrastructure, insufficient provision of water.

Over exploitation: Conflict of interests regarding tourism development options on the part of stakeholders.

► Outdoor recreation and tourism

In 2019, over 106,000 tourist visited the property. There is a good network of trails with well-trained local guides and there are riding, fishing and boat rides. Dolphin viewing is very popular. However, an eco-tourism model is needed to assure conservation of the property's OUV.

► Contribution to education

ICMBio, Golfinho Rotador and TAMAR provide opportunities for environmental education through guided visitation, lectures, demonstrations and various actions throughout the island. Local schools provide environmental conservation activities for students and community (de Araujo, 2018).

Summary of benefits

At the national and global level, conservation is the main benefit of the property, while on the island of Fernando de Noronha, tourism is considered the main benefit of the property.

Projects

Compilation of active conservation projects

| Nº | Organization | Brief description of Active Projects | Website |
|----|--|---|---|
| 1 | Reef Check Brazil | RC Brazil has received funding from PROBIO, a division of the Brazilian Ministry of Environment, to monitor the 3,000 km of reef along the Northeastern coast. Four pilot locations have been selected: Abrolhos Reef, Fernando de Noronha Archipelago, the Coral Coast MPA and the Maracajaú Reefs. | Dr. Beatrice Padovani Ferreira, Departamento de Oceanografia, Universidade Federal de Pernambuco |
| 2 | Brazilian National Coral Reef Monitoring Program | Started in 2002, and includes all major reef areas in Brazil, including Fernando de Noronha and Atol das Rocas (Rodríguez-Ramírez et al., 2008). | Institutions supporting the monitoring/survey efforts: Atol das Rocas-ICMBIO; Noronha-ICMBIO and Atlantis Divers; |
| 3 | Project GOLFINHO ROTADOR | Research on the spinner dolphin, provision of visitor information on the species, advice for conservation policies and efforts towards achieving sustainability for human activities at Fernando de Noronha. | Dr. José Martins da Silva Jr., Ph.D., Spinner Dolphin Center |
| 4 | Project TAMAR | Research and protection of nesting marine turtle populations on Fernando de Noronha. Maintenance of a visitor center with facilities for environment-related lectures and events used by several other institutions on a regular basis. | . |
| 5 | Fernando de Noronha's shark project, Brazil: Participative fisheries monitoring | Capacitate the fishermen for to implement a participative fisheries monitoring in Fernando de Noronha Archipelago and to incorporate the local community as the main agent of the shark management program. | José Garcia Júnior - Project Leader Ricardo Clapis Garla - Co-leader |
| 6 | Impact assessment of teiú (<i>Salvator merianae</i>) to health and biodiversity conservation in the Fernando de Noronha Archipelago | Understand the sanitary situation state of teiús populations in FN and their interference in the health of the ecosystem. | Carlos Roberto Abrahão, Paulo Rogerio Mangini, Jean Carlos Ramos Silva e Ricardo Augusto Dias |
| 7 | Sanitary, reproductive and conservation assessment of mabuia (<i>Trachylepis atlantica</i>) in the Fernando de Noronha Archipelago | Risk analysis to health of the mabuias populations posed by introduced species mainly the lagarto lizard, in the Fernando de Noronha island. Impacts of feral cats. | Vinicius Gasparotto, Paulo Rogerio Mangini e Ricardo Augusto Dias |
| 8 | Impact assesement of the mocó (<i>Kerodon rupestris</i>) in the Marine National Park and the environmental protection area of Fernando Noronha | (I) access the dynamic structure of the moco population (II) their general health condition (III) understand the relation between the residents and tourists of the Island and the species (IV) identify dietary components (V) identify costs and benefits of different management options to control mocó populations (VI) point to those more adequate options for the protected area (VII) ongoing work on rat eradication on offshore islets of Noronha. | Tatiane Micheletti e Paulo Rogerio Mangini. |

| Nº | Organization | Brief description of Active Projects | Website |
|-----------|--|---|---|
| 9 | Structure of lobster populations in Atoll das Rocas and Connectivity and recruitment patterns of the lobster populations that inhabit the oceanic islands and the continental shelf of the Brazil. | (I) identify lobsters populations structure and the habitat use by them in Atol das Rocas; (II) update the list of lobsters from Rocas Atoll; (III) to provide information on distribution and density of all lobsters across the various habitats in the ecosystem of Rocas Atoll, meant to constitute an initial step toward identification of the population structure and habitat use of the several lobster species there present; (IV) assess the patterns of genetic connectivity among <i>Panulirus echinatus</i> oceanic island populations; (V) to evaluate sanitary status in <i>Panulirus echinatus</i> populations that could be infected with virus (WSSV, PaV1) and other pathogens which are known to cause disease and mortality in other spiny lobster species. | Juliana Gaeta (Universidade Federal do Ceará –UFC e Fundação Cearense de Apoio ao Desenvolvimento Científico e Tecnológico - FUNCAP); Raúl Cruz (UFC e FUNCAP) Rodrigo Maggioni (UFC); Annie Machordom (Museo Nacional Ciencias Naturales de Madrid, Spain) |

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