

Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

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Designation date

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Site Reference Number

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2. Date this sheet was completed/updated:

January 2009

3. Country:

Brazil

4. Name of the Ramsar site:

Abrolhos Marine National Park – Abrolhos ParNaM (Parque Nacional Marinho dos Abrolhos – ParNaM dos Abrolhos).

5. Designation of new Ramsar site or update of existing site:**This RIS is for:**

- a) Designation of a new Ramsar site ; or
b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

7. Map of site:**a) A map of the site, with clearly delineated boundaries, is included as (Annex I):**

- i) a hard copy (required for inclusion of site in the Ramsar List): ;
ii) an electronic format (e.g. a JPEG or ArcView image) ;
iii) a GIS file providing geo-referenced site boundary vectors and attribute tables

b) Describe briefly the type of boundary delineation applied:

The Abrolhos Marine National Park (ParNaM) is composed of two distinct areas. The larger part is representative of the external arch of distribution of the reefs, being comprehended by the Parcel dos Abrolhos and Abrolhos Archipelago. The Abrolhos Archipelago is formed by a group of five islands volcanic in origin (Santa Bárbara, Siriba, Redonda, Sueste and Guarita) (Annexes II, IIIa, and IIIb), located in the enlargement of the continental platform known as Abrolhos Bank, about 32 nautical miles from the extreme south coast of the state of Bahia. The smaller part representative of the internal coastal arch corresponds to the Timbebas reef – Recife de Timbebas (Annex IVa and IVb).

During the creation of the Park, a need to divide it into two parts - the Timbebas reef and the Parcel dos Abrolhos - was felt in order to exclude the Abrolhos channel, area of ship transit, and, by this way, preserve a significant sample of the coastal arch, which presents diverse characteristics from those of the external arch.

8. Geographical coordinates.

The two areas that form the Abrolhos Marine National Park are located between the Latitudes 17°23' and 18°15' South and Longitudes 038°33' and 039°06' West.

The first of the two composed by the Archipelago and the Parcel dos Abrolhos is delimited by the quadrilateral whose vertexes have the following geographical coordinates:

Vertex A: 17°43' Latitude S 38°45' Longitude W
Vertex B: 17°54' Latitude S 38°33,5' Longitude W
Vertex C: 18°09' Latitude S 38°33,5' Longitude W
Vertex D: 18°09' Latitude S 38°45' Longitude W

The second, Timbebas reefs is delimited by the irregular pentagon whose vertexes have the following geographical coordinates:

Vertex A: 17°25' Latitude S 39°2,7' Longitude W
Vertex B: 17°28' Latitude S 38°58' Longitude W
Vertex C: 17°32' Latitude S 38°58' Longitude W
Vertex D: 17°32' Latitude S 39°02' Longitude W
Vertex E: 17°29' Latitude S 39°5,4' Longitude W

9. General location:

The Abrolhos Marine National Park is located in the economic exclusive zone of the Brazilian territorial sea, east continental platform of Brazil, at the extreme south of the state of Bahia, Northeast geopolitical region. The district of Caravelas, Alcobaça, Nova Viçosa and Prado are located in its vicinity. The Abrolhos ParNaM main office is located in the city of Caravelas, which has a population of around 25,000 inhabitants and is located about 850 km from the district of Salvador, capital of the state of Bahia. The Park is located approximately 70 km from the Brazilian coast and 90 km from the city of Caravelas.

10. Elevation:

The area is comprehended mainly by the sea, with depths varying from 0 to 70 meters (mean ~ 20 meters). The Redonda Island in the Abrolhos Archipelago is the highest point, 36 m above sea level.

11. Area:

The Abrolhos Marine NP occupies an area of approximately 91,300 hectares, corresponding to the sum of the two polygons: the largest - Parcel and the Abrolhos Archipelago, with 233.60 square nautical miles/80,180 ha and the smallest - Timbebas reef, with 32.35 square nautical miles/11,120 ha.

12. General overview of the site:

The Abrolhos Marine NP is part of the Abrolhos Reef Complex that expands throughout an area of 56,000 km² at the southern coast of Bahia and comprehends a mosaic of marine and coastal environments bordered by reminiscences of the Atlantic Forest. This Complex includes coral reefs, bottoms of algae, mangroves, beaches and restingas. This area also comprehends a mosaic of different categories of protect areas (Annex V).

In its condition of marine park, Abrolhos encompasses all the waters, islands (except the island of Santa Bárbara), reefs and continental platforms within its limits, in its two distinct parts: a) Timbebas reefs and b) Abrolhos Archipelago and Parcel dos Abrolhos.

The definition of these two areas fulfills the objective of protecting a part of the islands coast that is of great faunal value and provides sustenance for the region, not to forget its social function. Such aspect is highlighted since only the Timbebas reefs, that are a part of the coastal reef arch, were isolated in national park, without including the remaining reefs that continue to function as fishing area for the local population.

This geobiological location contains a high level of endemism and represents the largest and most biodiverse environment of true coral reefs in the South Atlantic (Dutra *et al.* 2006). The Abrolhos reefs grow from a characteristic structure with the shape of a mushroom locally called "chapeirão", constructed by a coral fauna rich in endemic species (Leão, 1999). Many species threatened with extinction, like the Grouper fish, the Humpback Whale, turtles and marine birds, amongst others, find in the area a preserved and safe environment during critical phases of their biological cycle. Abrolhos ParNaM acts as a fishing repository in a region that is one of the most important fishing areas of Brazil, where more than 20,000 fishermen live. Its islands contain sceneries of exceptional beauty and its natural and historical attributes attract tourists from around the world to the state of Bahia, where tourism activities employ over 80,000 people.

13. Ramsar Criteria:

1	•	2	•	3	•	4	•	5	•	6	•	7	•	8	•	9
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14. Justification for the application of each Criterion listed in 13 above:

Criterion 1:

The reefs found in Abrolhos are significantly different from the reef models described in literature, having in sight its main constructing organisms, the type of sediment on the bottom and the morphology of the reef structures (Leão, 1999). The coral species, in their majority, are endemic, archaic, preserved in the marine regression occurred in the Pleistocene, isolated from a fauna of Tertiary age in which it became resistant to the stress caused by the periodical turbidity of Brazilian waters (IBAMA, 1991). Their typical reef structure, locally known as "chapeirões", display a characteristic form of mushroom-shaped pinnacles, which attain 5 to 25m in height and 20 to 300m across their tops.

Fringe reefs also occur at the border of the volcanic islands. These are formed by incrustation of calcareous organisms over the rocky substrate of the islands. On the internal coastal arch represented by the Timbebas reef, beyond the isolated chapeirões, there is an open ring reef formed by the lateral coalescence of the chapeirões that resulted in platform reefs.

Criterion 2:

Abrolhos ParNaM sustains vulnerable and endangered species that live together in a balanced ecological environment. According to IUCN Red List, the Leatherback Sea turtles (*Dermochelys coriacea*) and the Hawksbill turtle (*Eretmochelys imbricata*) are critically endangered, the Loggerhead Sea turtle (*Caretta caretta*) and the Green turtles (*Chelonia myda*) are endangered. These species are found in the calm and protected waters of Abrolhos, a safe place for food and reproduction.

Nearly 28% of the cetacea species registered in Brazil are found in Abrolhos, being that this percentage can be even higher. Many of them are vulnerable to extinction (IUCN Red List), like the Humpback whale (*Megaptera novaeangliae*) and the Southern Right whale (*Eubalaena australis*) (Martins, 2000).

The Goliath Grouper or Jewfish (*Epinephelus itajara*) has the coral reef environment as one of its habitats in Abrolhos, from where it moves to the adjacent mangroves in order to reproduce. The species is endangered nationally, as well as considered critically endangered by the IUCN, and its fishing and commercialization is prohibited in Brazil (Decree IBAMA 42 - 19/09/07).

Millepora nitida, a species of coral included in the Brazilian list of endangered species, is found in the internal coastal arch of Abrolhos (Decree IBAMA 1,522 -19/12/89).

According to IUCN criteria and results of the IBAMA Workshop (Brazilian Environmental Agency) 53 red-listed marine species were recorded in Abrolhos Complex

(Annex VI). Of the 22 species listed by IUCN: 9 are vulnerable, 5 endangered, 4 critically endangered, 3 near threatened and 1 lower risk (conservation dependent).

Criterion 3:

Though the number of coral species in Brazil is relatively low compared to other parts of the world, a large proportion of these species is endemic. The large majority of these coral species are present in the Abrolhos Complex. For instance, of the eighteen species of scleractinians corals identified in the Brazilian reefs, seventeen are reported in Abrolhos. Six of them (*Mussismilia braziliensis*, *Mussismilia hispida*, *Mussismilia hartti*, *Siderastrea stellata*, *Favia gravida* and *Favia leptophylla*) are endemic species, and are the most common corals in modern Brazilian reefs. Among these endemic species, *Mussismilia brasiliensis* is the coral that shows the greatest geographical confinement, being the most common coral in the Abrolhos reefs and occurring only along the coast of the state of Bahia (Leão, 1999). It is thought to be primarily responsible for constructing the "chapeirão", a reef growth form unique to Brazil (Annex VII).

Eight of the 16 reef corals commonly recorded in the Abrolhos Bank occur only in Brazil. The coral reefs of the Abrolhos Complex are the structural base of an ecosystem that is very productive and rich in species. The major reef building corals (six species) are endemic species from the Brazilian waters, with two species, *Mussismilia braziliensis* and *Favia leptophylla*, described only along the coast of the state of Bahia (Leão et al. 2003). Regarding Hydrocorals, of the three species of millepores reported from the Brazilian reefs, two are considered endemic, with *Millepora nitida* recorded only along the coast of the state of Bahia (Leão et al. 2003). These coral reefs support a large variety of fish and benthic species, much of them endemics. For instance, Abrolhos contains a representative sample of Brazil's endemic fish fauna, including approximately 80% of all fish species endemic to southwestern Atlantic reefs (Moura & Francini-Filho, 2006).

The most recent inventories of species register the existence of six marine mammals, 33 marine birds, 39 sea anemones from 21 families, 266 fish from 79 families, 100 algae from 31 families, 90 poliquetes of 37 families, 293 mollusks from 80 families and 535 crustaceans from 116 families (the most diverse crustacean fauna in Brazil). Of these, 17 species of mollusks and one of fish were verified to be new to science (Dutra et al. 2006). Coutinho et al. (1993) verified the existence of 128 species of marine plants.

Criterion 4:

The varied and biodiverse physiographic environment allows for shelter and sustenance to many species that uses Abrolhos ParNaM in critical phases of their biological cycle.

The Abrolhos Complex is an important nursery area for the Humpback whales (*Megaptera novaeangliae*), representing the largest breeding ground for the South Atlantic population of this species during the Antarctic winters. In Abrolhos, the population of the Humpback whales was estimated in 1,556 for the period of 1989–94 and 1995 and 1,100 for the period of 1995–96 (Bethlem et al. 1997).

Abrolhos is also an important feeding ground for at least four red-listed (IUCN) marine turtles: Hawksbill turtle (*Eretmochelys imbricata*), Leatherback Sea turtle (*Dermochelys coriacea*) Loggerhead turtle (*Caretta caretta*) and Green turtle (*Chelonia mydas*). The last two lay their eggs on the sandy beaches of the Abrolhos islands.

The offspring of the Goliath Grouper or Jewfish (*Epinephelus itajara*), the "Lord of the Rocks" use the coral reef protected area of the Abrolhos ParNaM for their development until the adult phase, when they return in groups to the estuary for their first reproduction. Abrolhos is one of the main locations of occurrence of these species in Brazil.

The islands of the Abrolhos Archipelago are nesting site for two migratory birds: Brown Noddy (*Anous stolidus*) and Sooty Tern, *Onychoprion fuscatus* (formerly *Sterna fuscata*) and feeding and resting site for at least other six species of the migratory birds: Whimbrel (*Numenius phaeopus*), Semipalmated Plover (*Charadrius semipalmatus*), Black-bellied Plover (*Pluvialis squatarola*), Ruddy Turnstone (*Arenaria interpres*), Spotted Sandpiper (*Actitis macularia*) and Wilson's Storm Petrel (*Oceanites oceanicus*).

From the 293 identified mollusk species, 38 are endemic from which 20 are newly described to science (Dutra, 2006).

Criterion 6:

In the Abrolhos Archipelago there are resident populations of four marine bird species, Red-billed tropic bird (*Phaethon aethereus*), Masked Booby (*Sula dactylatra*), Brown Booby (*Sula leucogaster*) and Magnificent Frigatebird (*Fregata magnificens*).

The global population number of the Red-billed Tropicbird (*Phaethon aethereus*) has been estimated to be of 5,000 -20,000 birds (BirdLife International, 2009). The Abrolhos population is the largest reproductive colony in Brazil, being estimated in roughly 520 birds, representing about 3-10 % of the global population.

Criterion 7:

Although the Brazilian coral reefs represent only 0.4% of global reef area, they present high percentages of endemism. Regarding fish fauna, approximately 20% of its reef fish species are endemic (Moura, 2003). Some of these species are numerically abundant in the Abrolhos region: Brazilian Basslet (*Gramma brasiliensis*), Barber Goby (*Elacatinus figaro*), Blue Parrotfish (*Scarus trispinosus*) and Gray Parrotfish (*Sparisoma axillare*).

The zoogeographic importance of the Abrolhos area rests in the fact that it represents the most meridional ecosystem in the Western Atlantic where ecological conditions allow for the establishing and sustenance of large and permanent populations of native fish. Crucial stages of the ichthyofauna biological cycle occur in its waters, being the interrelations between the species fundamental to the maintenance of a sound ecosystem.

Criterion 8:

Some fish species that occur in the Abrolhos Bank, such as the Black Grouper (*Micropogonias undulatus*) and the Dog Snapper (*Lutjanus jocu*), have a reproductive strategy that involves spawning aggregations. The greatest densities of adult groupers and snappers occur in the Abrolhos Marine NP and in the deep reefs near Itacolomis. Black Groupers could also swim great distances to aggregate to spawn in the Abrolhos Bank, because of its depth of only 40 m, despite the fact that it is isolated. However, the Abrolhos National Park and the deep reefs appear to be the most likely spawning sites (Moura *et al.* 2005).

Nonaka *et al.* (2000) recorded the occurrence of many reef-fish larvae along the Abrolhos shelf break. According to the authors, the reef fish larvae are transported southward by the main axis of the Brazil Current, most of them should be trapped in the Vitoria Eddy after passage through the Vitoria Channel. Consequently, they can be recruited at the southern margin of the Abrolhos Bank.

The abundant ichthyoplankton (growth strategy for fish larvae) in Abrolhos is exported to the neighboring areas, being indicative of the fishing potential of the region. From the ParNaM waters, among others, crustacean larvae and that of the Skipjack Tuna (*Katsuwonus pelamis*), the scombridae of greatest commercial importance in Brazil, are exported to surrounding fishing areas, demonstrating the significance of this ecosystem in the distribution of regional

ichthyoplankton. Recent researches identified fish larvae, a total of 60 families, being the most abundant the mesopelagic species of the Myctophidae, Gonostomatidae and Stomiidae families, which predominated in greater depths. The families of demersal fish like the Gobiidae, Scaridae and Serranidae were more frequently found closer to the coast.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

a) biogeographic region: Brazilian Marine Biogeographic Province

b) biogeographic regionalisation scheme (include reference citation):

The Abrolhos Bank is located in the Brazil Biogeographic Province (Briggs, 1974) and is the most meridional habitat of the Western Atlantic, where there is appropriate ecological conditions for the establishing of large and permanent populations of fish and coral reefs. Briggs (1974) was one of the first researchers to acknowledge differences in the Brazilian and Caribbean marine fauna and, based on the levels of endemism, he considered the Brazilian coast and its oceanic islands a distinct biogeographic province from the Caribbean. In a macro regional scale, the main barriers that influence bioregionalization are the Meso-Atlantic Barrier-Reef, the Rio Amazonas Barrier, and the Brazil and South Equatorial Currents.

16. Physical features of the site:

The rocky substrate of the Abrolhos Bank is made up of intrusive and sedimentary rocks associated to the Cretaceous Period. The Abrolhos Archipelago is composed of magmatic rocks constituting an Intrusive Volcanic Complex.

In relation to marine environment, Leão (1999) reported that the surface of the inner shelf of Abrolhos is flat and smooth. Narrow channels cutting the middle and outer shelves and sandbanks are common. The former topographic features were built during the last Pleistocene Regression when the Abrolhos shelf was sub-aerially exposed and its surface was deeply eroded by a fluvial drainage system discharging into the Abrolhos Depression (southern part of the complex), and terrigenous sediments were deposited. Later, this terrigenous sedimentation was replaced by a marine biogenic carbonate deposition (Vicalvi *et al.* 1978). These carbonate sediments are concentrated mainly on the middle and outer shelves and extend into the inner shelf around the reefs. Siliciclastic sediments are confined to the inner shelf (Leão, 1982).

The marine region is an enlargement of the southern part of the Eastern Brazilian continental shelf, which is irregular in width and generally narrow (average width 50 km). A broad continental shelf is limited in the north by shallow banks that emerge from great depths. From a width of 35 km in the northern part, the continental shelf widens up to 110 km near the Royal Charlotte Banks, narrows to 45 km between the banks, widens again to 190 km in the Abrolhos Banks area (Castro & Miranda, 1998; Leão, 1999).

Abrolhos region is characterized by the southward flowing Brazil Current (BC), a typical western boundary current regime (Castro & Miranda, 1998). The BC waters flow over the Abrolhos Bank with a general north to south direction. Because of the topographic impediment of the Abrolhos Bank, the main axis of the Brazil Current flows along the outer edge of the continental slope of the Bank and passes through the Vitoria Channel formed between southeastern edge and the Vitoria seamount at lat 20° 15' S. The meandering of the Brazil Current forms a cyclonic eddy (Vitoria eddy) to the south of Abrolhos. This eddy (larger than 70 km of diameter) has a nucleus with cold water and rich in nutrients that supporting a high biomass of the planktonic organisms. The depth of shelf break in this region is 100 m with isobathic lines 200 m and 1,000 m very close to it. Around the Abrolhos reefs the shelf is very shallow. Depths do not exceed 30 m and the shelf edge is only about 70 m deep. The average

shelf slope is in the order of 0° 08'. Depths between the coastal reefs and the coastline are less than 15 m. A deeper channel (Abrolhos Channel) (20-30 m) separates the coastal reefs from the Abrolhos Archipelago and the outer reefs (Leão, 1999).

The Abrolhos Archipelago is located in the southern part of the "Alíseos" winds and has its climate determined by the influences of three masses of air: i) the Atlantic Equatorial, dominant in the autumn and winter (when the prominent wind is southeastern) ii) the Tropical Atlantic, dominant in the spring and summer (when the predominant winds are northeastern or western) and iii) the Continental Equatorial, whose effects act in this area in the heat of summer, in January and February.

The coast along Eastern Brazil has a tropical humid climate with average air temperature ranging from 24°C during winter to 27° C in summer. July is the coldest month of the year and March is the warmest. Annual mean precipitation in the Abrolhos coastal zone is 1,750mm with March, April and May being the rainiest months, concentrating 35% of yearly precipitation (612mm) (Nimer, 1989 apud Leão, 1999). Average monthly sea surface temperature ranges from 24.5° C in August to 27.5° C in March (US Navy, 1978).

Salinities are usually in the range of 36.5-37.0. Salinity, according to Leão (1982), is high in the months of September and October, around 36.7%, dropping to a minimum of 36,5% in January and February. Tides are semidiurnal with maximum height of 2.3 m during spring tide and minimum of 0.5 m during neap tide.

During most of the year, the waters of Abrolhos are considerably turbid, making the diving and visibility underneath the surface harder. This is caused by the carbonatic particles originating from reefs or muddy sand from the benthonic zones, moved by the winds and currents. The period of clear waters in Abrolhos is in December and February, due to the calm seas, characteristic of the summer. This movement of the waters, elevating particles from the bottom and increasing the turbidity, occurs mainly during the wind changes and the spring tides. The opposite occurs during the neap tides, when, due to the small internal movement of the waters, present less suspended sediments, and, therefore, clearer.

Throughout the entire Park the bathymetry reaches an average of 15 to 20 m with a maximum of 30 m in its deepest points. In Timbebas the average depths are 10 m, while inside the archipelago they get up to 8 m.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

Does not apply

18. Hydrological values:

Local hydrographic conditions can be also important for reef fish recruitment: waters observed on the shelf are a result of mixing between three water masses: Tropical Water (TW), warm and salty, transported southward by the surface layer of the Brazil Current (BC), South Atlantic Central Water (SACW), cold and relatively fresh, which is located below the Tropical Water on the continental slope, and Coastal Water (CW), which is characterized by low salinities and high temperatures (Castro & Miranda, 1998). The natural barrier formed by Abrolhos Bank directs the BC water to circulate through the Abrolhos channel, resulting in a turbulence that act as mixers, contributing to the distribution of nutrients that are important for local fish stocks.

19. Wetland Types

a) presence:

Marine/coastal: **A** • **B** • **C** • **D** • **E** • F • G • H • I • J • K • Zk(a)

X X X X X

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •

Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance: **C** (coral reefs) with an approximate area within the Park of 25,694.18 ha, **A** (permanent shallow marine waters), **B** (sea grass beds), **D** (rocky coasts) and **E** (sand beaches).

20. General ecological features:

The various reef structures present in Abrolhos offer a great variety of habitats for the organisms that have part of their biological cycle in this area. The differences in light incidence cause different species of corals to prefer the inferior or superior parts of the chapeirões.

Most coral species are widely and almost uniformly distributed over the reef complex, such as *Favia gravida*, *Mussismilia harttii*, *Mussismilia hispida*, and *Phyllogorgia dilatata*. *Mussismilia braziliensis* and *Palythoa caribaeorum* are widespread over the reef complex, but the first is more abundant in the south, while the latter dominates the reefs closer to shore (Castro *et al.*, in press).

In the reefs of the Archipelago, the *Porolithom pachydermum*, known for attracting larvae from the corals and other invertebrates, is the predominant species. The marine vegetation of the Abrolhos ParNaM is very diverse and abundant. The coral algae, for example, are important primary producers, serving as food for sea urchins, wrasses and some mollusks (limpets and chitons) and as shelter and substrate for invertebrates, including corals.

In the shallow waters, the wrasses control the abundance of leafy algae and a large occurrence of minuscule species of filamentous algae occurs. In the deeper parts, the covering of the substrate is made by the leafy, brown colored macroalgae of the *Padina* genus, *Dictyota*, *Dictyopteris*, *Styopodium* and *Sargassum*.

The seagrass *Diplantera sp.* is an important food source for the marine turtles.

Noteworthy flora:

The algal flora is one of the most abundant constituents of the Abrolhos reef area, found in various conditions on the reef structures, particularly covering the reef bottoms. The crustose coralline algae (calcareous red algae) are amongst the major reef-framework builder organisms in Abrolhos, its abundance among the benthic organisms of the Archipelago reefs varies between 32 to 79%, and the surveyed community is apparently represented by four genera: *Lithothamnion*, *Lithophyllum*, *Sporolithon* and *Porolithon*. The brown algae dominate in some reefs of the coastal arc covering more than 90% of the reef surface (Amado Filho *et al.* 1997 apud Leão, 1999), but on the offshore reefs the percentages of this type of algae diminishes, possibly due to a higher herbivore activity (Coutinho *et al.* 1993 apud Leão, 1999). Among the identified species *Sargassum sp.* dominates, followed by *Padina sanctae-crucis*, *Dictyota cervicornis*, *Lobophora variegata* and *Dictyopteris plagiograma*. The genus *Halimeda* is the most abundant calcareous green algae, and one of the major sediment producers of the inter-reef bottoms. It can reach up to 20% of the coarse sand fraction of the sediment around the coastal reefs, and around 70% of the sediment surrounding the fringing reefs of the Abrolhos Archipelago (Leão 1982). The genus *Udotea* and *Penicillus*, also important constituents of the Abrolhos reefs flora, contribute to the production of the fine fraction (mud size) of the inter-reefal sediment (Leão, 1999).

Between Rodonda and Siriba islands, there are dense populations of macroalgae associated with seagrass (*Halodule wrightii*) beds. Forty nine taxa of macroalgae were found associated with the seagrass at the site. Nine macroalgae were recorded for the first time for the Abrolhos National Marine Park and four taxa area reported for the first time for Bahia State (De Paula *et al.*, 2003)

22. Noteworthy fauna:

Actually, many animal populations contribute to the conservation significance of the Abrolhos Complex. Abrolhos is the only area in the South Atlantic to which the Humpback whales (*Megaptera novaeangliae*) go in order to mate and give birth during the Antarctic winters. In Abrolhos, groups with newborns are more frequent in shallow waters near to archipelago, while others size classes appears no present use preferential areas (Martins, 2000).

Moura (2006), reported that the reef and shore fish fauna of the Abrolhos region consists of 266 species, belonging to 178 genera and 79 families. Most frequent species fish families recorded in reef habitats were Serranidae, Gobiidae, Labridae, Carangidae and Scaridae, accounting for about 30% of the total reef fish fauna. The fish community in this region is largely related to the Caribbean fauna and represents the southernmost permanent population of this coral reef-associated ichthyofauna (Leão, 1999). Abrolhos contains a representative sample of Brazil's endemic fish fauna, including approximately 80% of all fish species endemic to southwestern Atlantic reefs. All the commercially valuable species of reef fish in the South Atlantic can be found in the archipelago's surroundings, including red listed large predatory fish such as the Goliath Grouper (*Epinephelus itajara*), the Cubera Snapper (*Lutjanus cyanopterus*) and the Mutton Snapper (*Lutjanus analis*). In Abrolhos, Blue parrotfish (*Scarus trispinosus*) represents about 50% of the biomass caught by reef fisheries and 30% of the reef fishes (Francini-Filho, 2005).

The islands of the Abrolhos Archipelago are nesting site for two migratory birds: Brown Noddy (*Anous stolidus*) and Sooty Tern, *Onychoprion fuscatus* (formerly *Sterna fuscata*) and feeding and resting site for at least other six species of the migratory birds: Whimbrel (*Numenius phaeopus*), Semipalmated Plover (*Charadrius semipalmatus*), Black-bellied Plover (*Pluvialis squatarola*), Ruddy Turnstone (*Arenaria interpres*), Spotted Sandpiper (*Actitis macularia*) and Wilson's Storm Petrel (*Oceanites oceanicus*).

From the 293 identified mollusk species, 38 are endemic from which 20 are newly described to science (Dutra, 2006).

23. Social and cultural values:

The name Abrolhos has its origin in the warning phrase "open your eyes", present in ancient nautical letters and relating to the dangers in the navigation in the area, due to submersed reefs that caused shipwrecks. The name was consecrated when historians named the combat that occurred in 1631 between the Luso-hispanic and Dutch fleets, 80 leagues from the Abrolhos Archipelago, Batalha dos Abrolhos (Abrolhos Battle). During the battle, the only vessels left standing were the Santo Antônio de Pádua, Prazeres Menores, Prinz Willen and Van Uytrecht. The National Museum confirmed the shipwreck of eight iron ships in Abrolhos, being that the Santa Catarina, Artemis and Rosalina vessels can be found inside the Abrolhos ParNaM and are georeferenced. Thus, due to the number of wrecks in the area, Abrolhos is an important archaeological site. In consequence of the shipwrecks, in 1861 the lighthouse was built in Santa Bárbara island. In this island, there is a small chapel built in honor of this saint to which the sailors ask for help when there is a storm or other dangers the sea brings. Its beaches were used by whalers that benefited from the captured whales before the fishing was prohibited in Brazilian waters.

Abrolhos Bank is the most important fishing area of the Bahia State, sustaining about 20,000 people, mainly artisanal fishermen. Shrimp, finfish and shellfish constitute the bulk of fish harvests, and the industry is organized under several fishing cooperatives. In 1998, the total fish production in the Bahia state was estimated in 40,945 ton (Bahia-Pesca, 1999). In 2002, the fisheries production was responsible by a yield nearly of 11,000,000 US dollars (Bahia-Pesca, 2003).

24. Land tenure/ownership:

a) within the Ramsar site:

The National Park, created through a federal Decree, includes four of the five islands (Redonda, Siriba, Sueste and Guarita) and all of the sea stretch delimited by it. The area is pertains to the national environmental agency Chico Mendes Institute of Biodiversity Conservation (ICMBio). The Santa Bárbara Island, although located inside the Abrolhos Marine NP, is not considered part of the national park and it is under the Navy jurisdiction.

b) in the surrounding area:

Brazilian jurisdictional waters.

25. Current land (including water) use:

a) within the Ramsar site:

According to the National System of Conservation Units (SNUC), national parks are a type of full protection conservation unit which has as objectives the conservation of ecosystems of great ecological relevance and scenic beauty, allowing for scientific research, educational activities, recreation and ecotourism being the case of Abrolhos ParNaM. In this Park navigation and nautical signalization is also allowed.

The island of Santa Bárbara is considered national security area and hosts some Brazilian Navy employees who live in the seven existing houses in the area. The Archipelago Lighthouse is located in this island.

b) in the surroundings/catchment:

As mentioned in previous items, the Abrolhos Complex is important for fishing, as well as being an important area for tourism. In the Park surrounding waters, some ship traffic (coasting navigation) controlled by the Brazilian Navy takes place.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

The anthropogenic agents that most threaten the reefs of Abrolhos National Park are illegal fishing. Apart to be a fully protect zone, illegal fishing boats can be seeing in the Timbebas reefs, and sometimes in the Parcel dos Abrolhos at night (Francini-Filho and Moura 2008).

The carrying capacity of land areas in the Park is reduced. The area is occupied by nests of the numerous bird species that use it to reproduce and it has stretches extremely susceptible to erosion. For such reasons, the number of visitors to the islands, as well as the locations that can be explored, have been reduced in order to lessen the impact on the population of local birds.

The diving areas near the islands are also very limited and, sometimes, overused. Marine tourism, is also an activity that requires concern in these areas (Amado Filho *et al.* 1997, Coutinho *et al.* 1993, Leão, 1994, 1996, Leão *et al.*, 1994).

Another problem that has been controlled is the litter piled up at the bottom of the sea, especially between and around the islands, caused by the presence of visitors. However, efforts to consolidate the Park have resulted in control over the tourist activities, with positive results regarding the litter disposal.

Another factor conditioning the management, in relation to the location of the Park is the cleaning of the ship ballast. Due to marine currents, spilling resulting from this activity reaches the Park, thus polluting it.

In the past, coral removal for use in handicrafts or for the production of limestone has occurred. Nowadays, sporadic cases of illegal fishing, ornamental fish trade and the stealing of parts from shipwrecked vessels are registered, these being the main existent risk factors.

(b) in the surrounding area:

The deforestation of continental zones adjacent to the Park initially occurred for agricultural purposes, and, during the past decades, for the growth of urban centers and the plantations of eucalyptus for industrial purposes. Nowadays, the area between Prado and Mucuri (cities of Southern Bahia) is almost totally disproved of the Atlantic Forest. The removal of the

Atlantic Forest weakens the coastal ecosystem, favoring the erosive processes with consequent intake of suspended materials, like sand and clay, which are hauled by the river waters and sent to the ocean, compromising the optical quality of the waters that reach the Park, elevating the turbidity and also affecting the coral reefs with the sedimentation process of these materials. Shrimp cultivation is another planned activity in the coastal region, especially in the mangroves in the districts of Caravelas and Nova Viçosa, which can bring similar consequences (Leão and Kikuchi, 2005; Dutra *et al.*, 2006).

In 2002, during the Fifth International Licensing Round for the Exploration of Oil and Gas in Brazil, the National Oil Agency (ANP) announced 243 blocks in coral reef areas, algae banks, grass banks and mangroves in Abrolhos. Under CI-Brazil coordination, the "Impact Evaluation of the Exploration and Production of Hydrocarbons in the Abrolhos Bank and Surroundings", subsidized the federal government's decision to exclude the Abrolhos region from the exploration of oil and gas auction, on August 2003 (Marchioro *et al.*, 2005).

Overfishing in the surrounding areas of the Abrolhos National Park are also of great concern (Dutra *et al.*, 2006)). An increasing number of fishing boats from Southeast and Northeast Brazil are moving to the Abrolhos Bank, as reef fisheries remains very productive in the region.

Urban development of the coastal zone, and pollution due to the installment of industrial projects are also anthropogenic agents that threaten the reefs of Abrolhos (Amado Filho *et al.* 1997, Coutinho *et al.* 1993, Leão, 1994, 1996, Leão *et al.*, 1994).

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

The Abrolhos Park is a conservation unit of full protection and was the first Marine National Park to be created in Brazil, through the Decree N° 88.218, of April 06, 1983, with the objective of conserving exceptionally rich samples of reefs, algae and ichthyofauna marine ecosystem, as well as to protect endangered species, especially the Marine Turtles, Humpback whales, Brain Corals.

The boundaries of the Ramsar site coincide with those of the Abrolhos National Marine Park.

The Abrolhos Park forms a part of the Atlantic Forest Biosphere Reserve and it is considered a core zone of it and, still, an Advanced Post of the Central Corridor of the Atlantic Forest, composing the marine arm of this Corridor. The Advanced Posts are centers for the spreading of ideas, concepts, programs and projects developed by the Atlantic Forest Biosphere Reserve.

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b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

The Management Plan, along with the ParNaM zoning, was developed in 1991 and revised in 1995, when some emergency actions were identified.

In 2003, the Park's Public Use Plan, which is part of the management Plan and defines the guidelines for visitors, including diving and whale and bird observation activities, was approved

The Park has a Consultant Council, created by the Internal Regulation from Ibama nº 150/02-N, in 2002. This group integrates several segments of the community, aiming to contribute to the action planning of the Park.

d) Describe any other current management practices:

The Reef Check is a global protocol used to monitor coral reefs, linked to the Global Coral Reef Monitoring Network (GCRMN), which is being carried out on 150 countries since 1997. The program is designed for volunteer-based data collection and the objective is to monitor coral health and relate the results to global events (such as climate changes) or local events (anthropic impacts such as fishing, pollution and tourism), as well as to suggest management solutions. Brazil initiated the program Reef-Check-Brazil in 2001, and the Abrolhos Marine National Park was one of the areas included in the national program. This program is coordinated by the Instituto Recifes Costeiros in partnership with the Federal University of Pernambuco, with support from the Ministry of the Environment (a CD-Rom with monitoring results is attached to this RIS).

28. Conservation measures proposed but not yet implemented:

The Buffer Zone-BZ of the Park was established in 2006, through an specific legislation, to guarantee the protection of the ecosystems of the region. The legislation also foresaw restrictions to major activities and actions which would potentially cause environmental damages, such as oil and gas exploitation. In order to define the boundaries of the BZ, the ecosystem approach was taken into consideration, reason why the BZ included the adjacent coastal mangrove area, considered the origin of the marine life of the Park. The measure resulted in opposition from some business sectors, such as shrimp farming and oil and gas. In June 2008, the Abrolhos BZ was suspended by justice, leaving the area vulnerable to potentially dangerous activities. Nowadays, it is being revised by entitled authorities.

Since 2001, Brazil has been proposing to the International Whale Commission (IWC) the creation of a whale sanctuary in the South Atlantic. This sanctuary would encompass the whole South Atlantic Area and would be limited in the south by the Antarctic Sanctuary. However, this proposal is still being discussed in the appropriate forum.

Nevertheless, to express its commitment with conservation of cetaceans, Brazil has declared its marine jurisdiction waters as the Brazilian Whales and Dolphins Sanctuary (Decree 6.698, of December 2008) benefiting, though, conservation efforts at the Abrolhos Bank region, which is the largest points of concentration of Humpback whales during the reproductive period.

Also in advanced phase of negotiation is the creation of sustainable use conservation unit with 100,000 ha, called Cassurubá Marine Extractive Reserve, in the municipalities of Caravelas and Nova Viçosa. This PA should protect mangrove and reef areas, located at the estuary of the Caravelas River, preserving ecologic relations between this environment and the reefs.

29. Current scientific research and facilities:

The Park is a privileged area for research, and has been used by researches not only from universities located in the state of Bahia, but also several other national institutions.

The Research and Monitoring Center of Abrolhos ParNaM (NUPEM) has been running since 2003, and is responsible for the analysis of all research projects submitted to be developed in the Park (Annex VIII). Since 2004, the NUPEM, along with the Environmental Education Center, has been promoting lectures about the researches carried out at the PA. These lectures

are given by the researchers themselves, taking advantage of the period they are in town and they use the Visitors Park Center facilities for that.

The Park has accommodations for researchers located at Santa Bárbara Island, with 6 rooms. This dorm is provided by the Brazilian Navy. Since there is not enough room for all researchers, some of them rent liveaboard boats during the period of their research. The Park also has a boat to aid the researchers, taking them from Caravelas to the Park and also offering support during the collections and field research.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

For over ten years, through the Voluntary Internship Program, the Abrolhos National Marine Park counts on the participation of undergraduate students on the management activities, allowing interaction between teaching/research and environmental management institutions to happen. During their stay at the Archipelago, the students/volunteers give lectures about the Park rules, its ecosystems, and escort visitors through the trail of one of the islands, informing them about the avifauna and the islander environment. They are also responsible in helping the Park rangers on control, monitoring as well as on activities related to researches being developed at the National Park.

The Visitors Center of the Abrolhos ParNaM was inaugurated in 2004 and is open to public visitation from Thursday to Sunday, from 9h00 to 12h00 and from 14h30 to 19h30. At the Center the visitor can find a life-size replica of a Humpback whale; an exhibition room with information and images of the biodiversity of the region, as well as a library; a multi functional room for meetings, lectures, classes and projection and an arena theater. About 13,000 visitors from 180 cities around Brazil as well as tourists from 18 different countries have already visited the Center since the beginning of its activities in 2004.

31. Current recreation and tourism:

Visitation has been occurring from cities where boats accredited for tourists transportation to the Archipelago can be found. Traditionally, they come from Caravelas, from where the majority of the tourist boats leave. There are also boats leaving from the cities of Nova Viçosa, direct to the Archipelago, and from Alcobaça and Prado, directed to the Timbebas reefs. Tourism activities are developed at Abrolhos ParNaM with both recreational and environmental educational purposes. Upon arrival at the Archipelago, every boat is welcomed by an ICMBio staff member. Each visitor receives a brochure with basic rules of the Park, as well as a presentation on the environment and basic procedures.

From July to November, the main attraction is the Humpback whale watch in Abrolhos, where they stay during reproductive period. In the water, visitors can snorkel and dive, Abrolhos being one of the 10 hot spots for these activities. The months between November and February are the best for diving due to the transparency of the water. Divers can observe the underwater environment and explore shipwrecks and caves, in both day and night dives.

The maximum number of tourists – 225 visitors/day - was determined on a carrying capacity study. The mean annual visitors number is about 7,000, but more than frequently this number reaches 15,000 a year.

32. Jurisdiction:

The Abrolhos Marine National Park is under the jurisdiction of Bahia State and the Chico Mendes Institute of Biodiversity Conservation (ICMBio), without any impairment to national

security activities, under the responsibility of the Brazilian Navy. The Santa Bárbara Island is not considered part of the national park and is under Navy jurisdiction and control.

Instituto Chico Mendes de Conservação da Biodiversidade
Departamento de Unidade de Conservação de Proteção Integral
Julio César Gonchorosky, Diretor
SCEN trecho 2, Bloco A, Asa Norte
Brasília – DF – Brasil
CEP. 70.818-900
Phone: +55 (61) 3316-1163

33. Management authority:

Marcello Vicente Lourenço (Chief Manager of the Park)
Parque Nacional Marinho dos Abrolhos
Praia do Kitongo, s/n – Ponta de Areia
45.990-000, Caravelas, Bahia, Brasil
Phone: + 55 (73) 3297-1111

Joaquim Rocha Neto (Substitute Director)

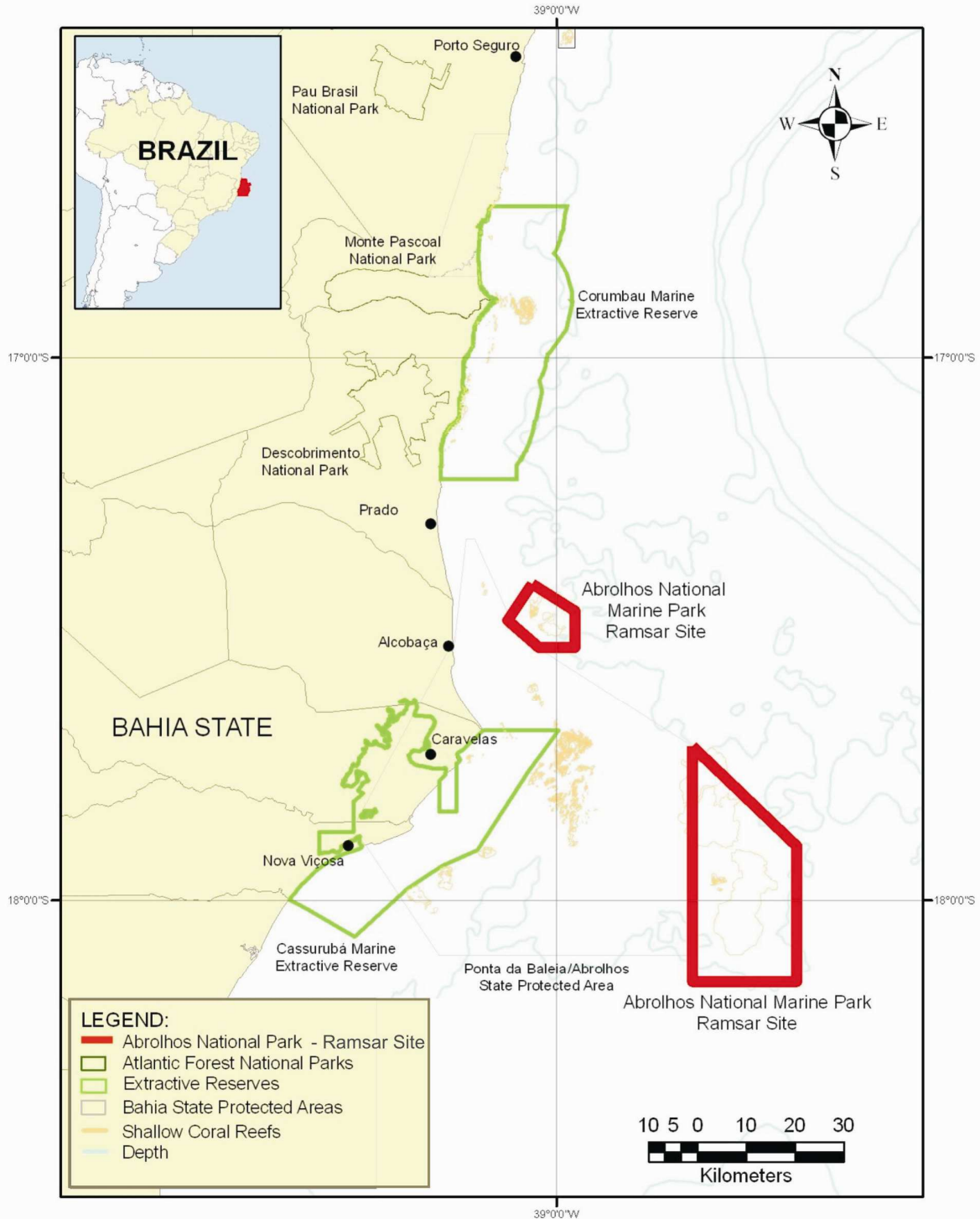
34. Bibliographical references:

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Annex I

Abrolhos National Marine Park – Ramsar Site

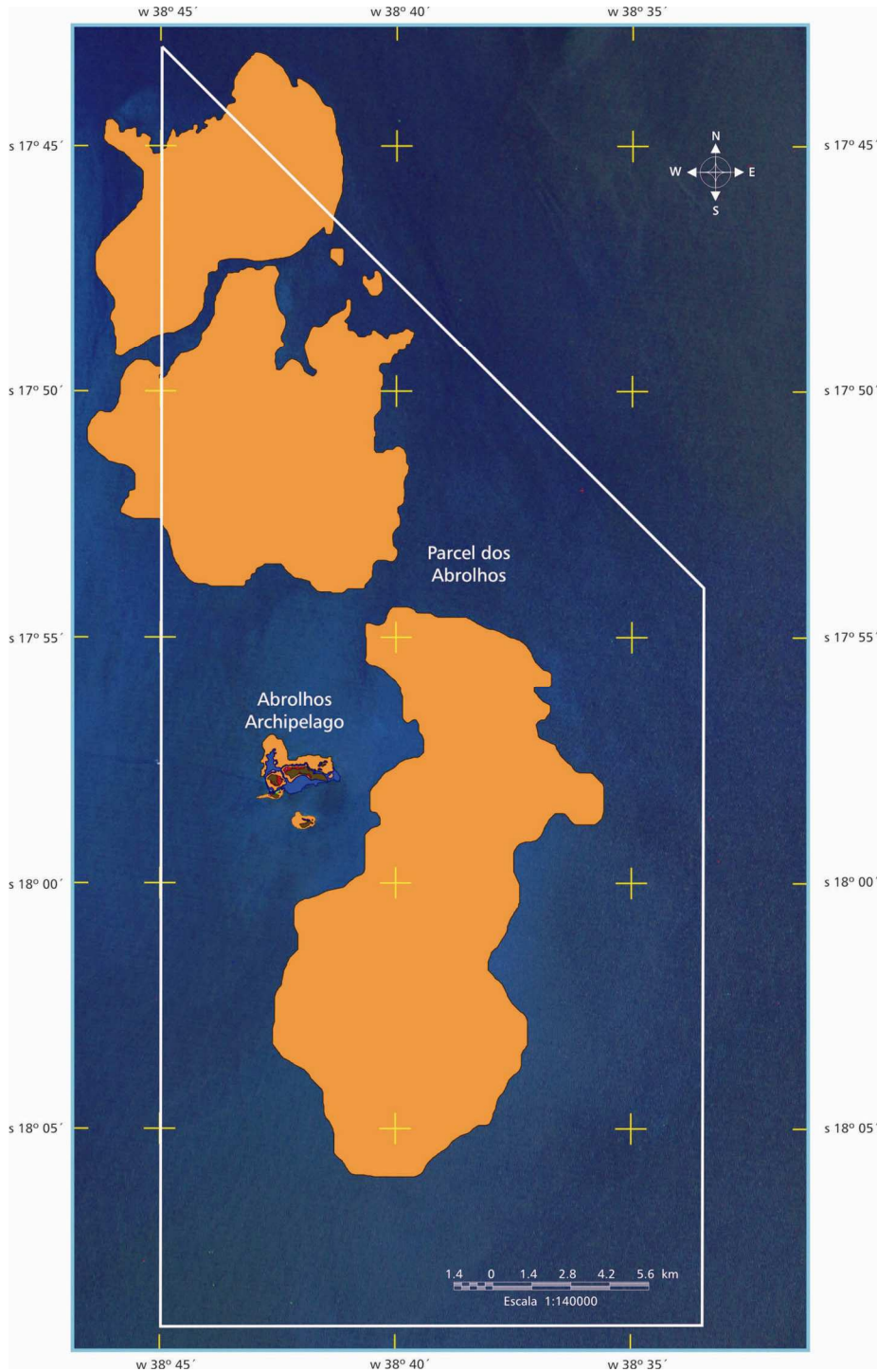


Annex II



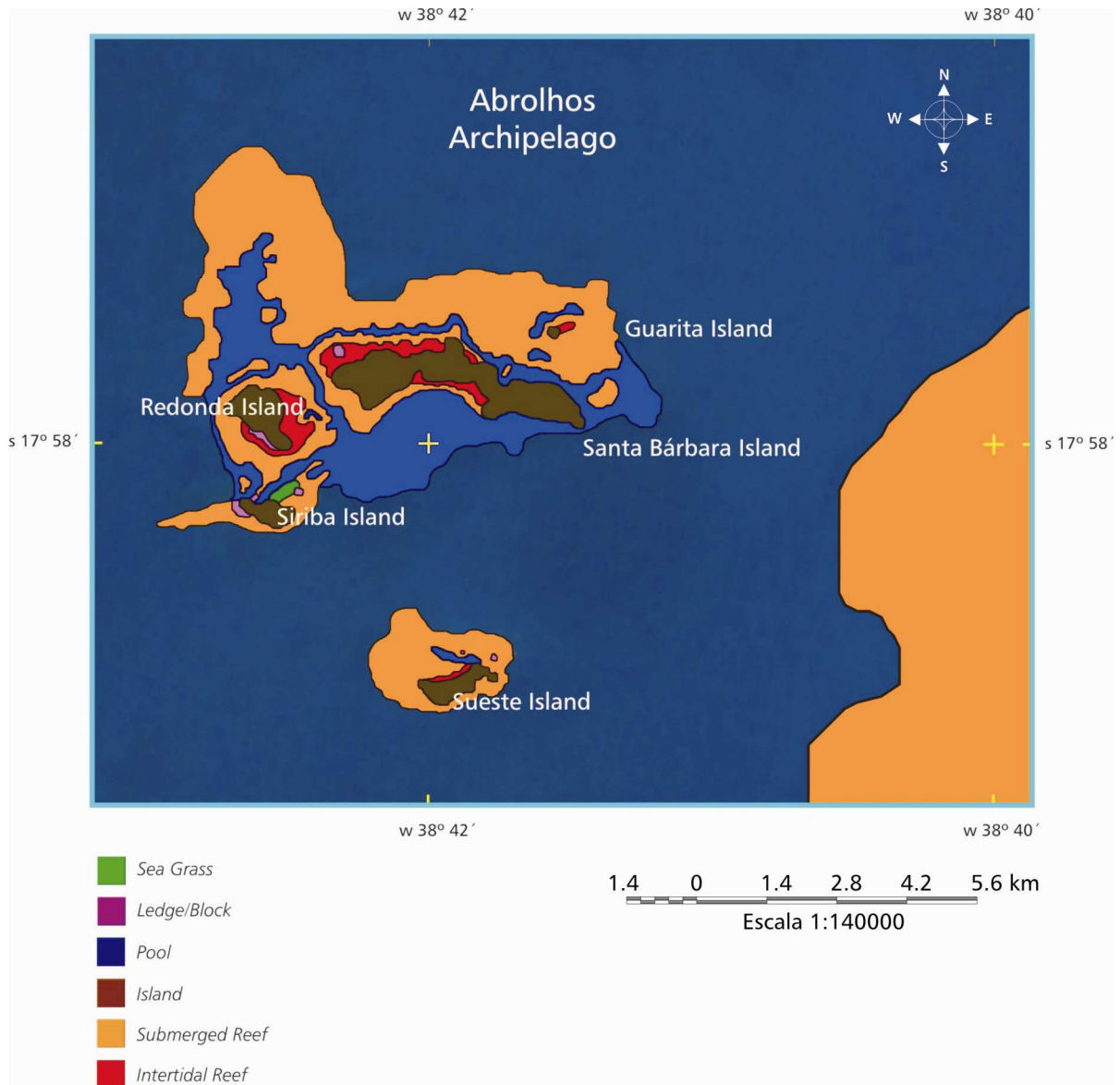
Aerial view of the Abrolhos Archipelago, Abrolhos Marine National Park –Ramsar Site
(Photo: Marcello Lourenço).

Annex IIIa



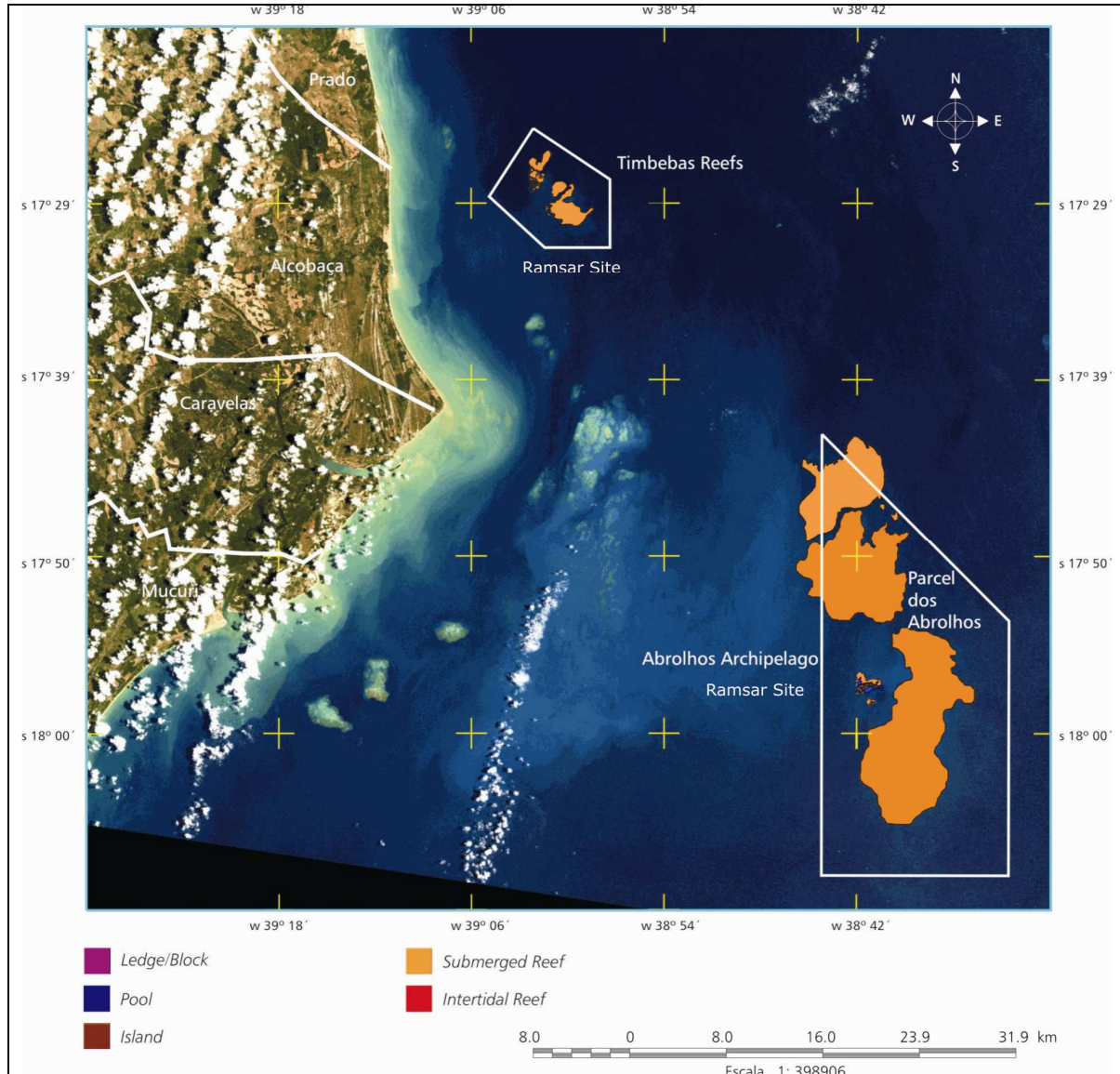
Part of Abrolhos National Marine Park - Parcel of Abrolhos – Ramsar Site

Annex IIIb



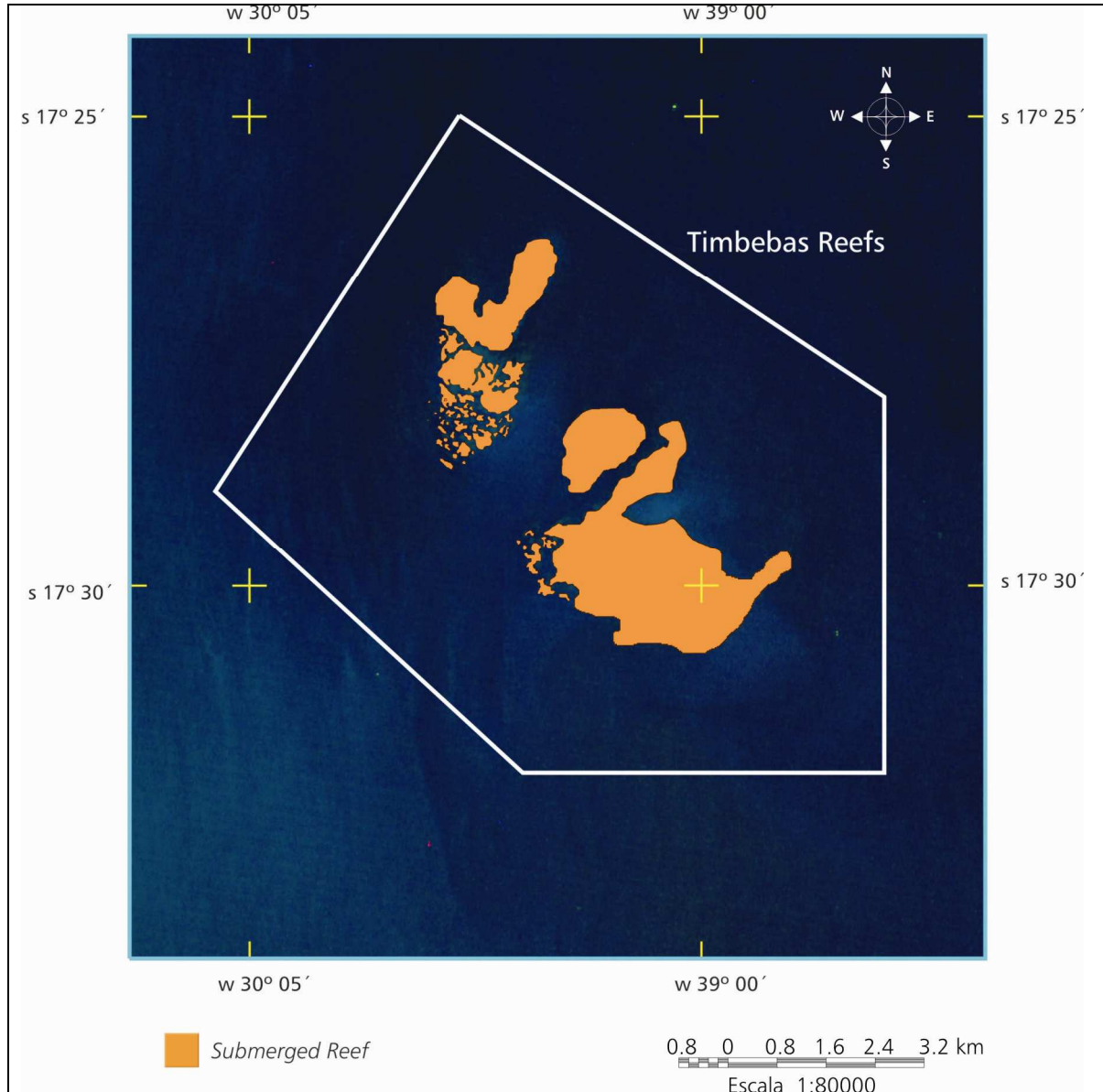
Inside of Parcel of Abrolhos - Abrolhos Archipelago – detail of Annex IIIa

Annex IVa



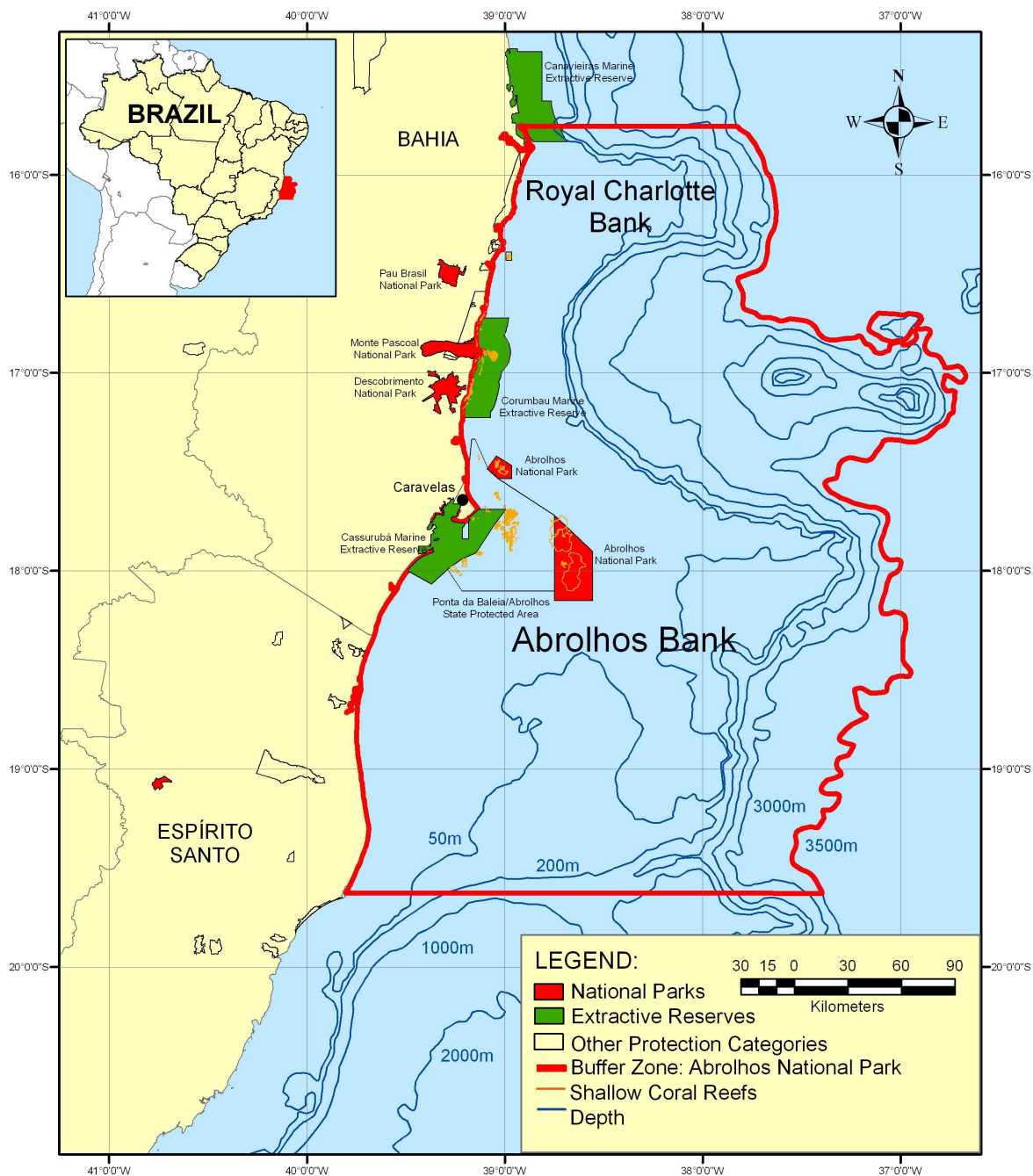
White line: Abrolhos Marine National Park – Ramsar Site

Annex IVb



Part of Abrolhos Marine National Park - Timbebas Reefs – Ramsar Site

Annex V



Protect Areas Mosaic

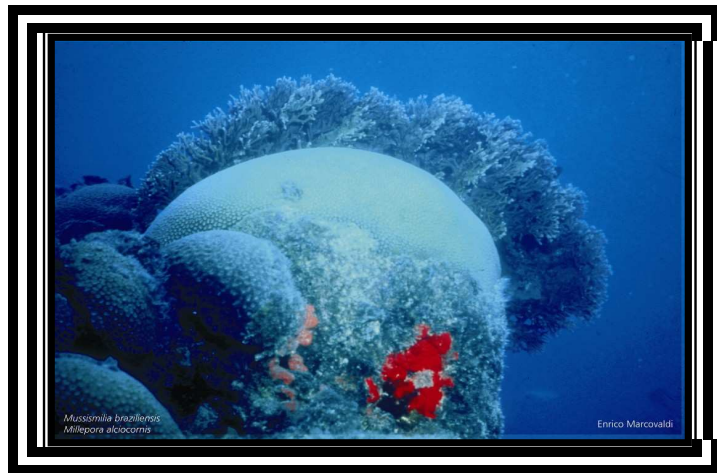
Annex VI

Red-listed marine species (53) recorded in Abrolhos*

Taxonomic Group	Common Name (Species)
Corals, Sea-anemones and Allies	Hydrocoral (<i>Millepora alcicornis</i>), Giant anemone (<i>Condylactis gigantea</i>)
Polychaetes	Fire worm (<i>Eurythoe complanata</i>)
Molluscs	Goliath conch (<i>Strombus goliath</i>)
Crustaceans	Blue land crab (<i>Cardisoma guanhumi</i>), Mangrove crab (<i>Ucides cordatus</i>), Porcelain crab (<i>Minyocerus angustus</i>)
Starfishes, Sea-urchins and Allies	Fine spined sea star (<i>Coscinasterias tenuispina</i>), Sea star (<i>Astropecten marginatus</i>), Sea star (<i>Astropecten cingulatus</i>), Armored sea star (<i>Luidia clathrata</i>), Sea star (<i>Luidia ludwigi scotti</i>), Sea star (<i>Luidia senegalensis</i>), Sea star (<i>Echinaster (Othilia) guyanensis</i>), Thorny sea star (<i>Echinaster (Othilia) echinophorus</i>), Sea star (<i>Narcissia trigonaria</i>), Cushioned star (<i>Oreaster reticulatus</i>), Slate pencil urchin (<i>Eucidaris tribuloides</i>), 3-rowed sea cucumber (<i>Isostichopus badiotus</i>)
Sharks	Lemon shark (<i>Negaprion brevirostris</i>), Blue shark (<i>Prionace glauca</i>), Oceanic whitetip shark (<i>Carcharhinus longimanus</i>), Bonnethead shark (<i>Sphyrna tiburo</i>), Nurse shark (<i>Ginglymostoma cirratum</i>), Whale shark (<i>Rhincodon typus</i>), Night shark (<i>Carcharhinus signatus</i>), Smalltail shark (<i>Carcharhinus porosus</i>)
Fishes:	Lined seahorse (<i>Hippocampus erectus</i>); Seahorse (<i>Hippocampus reidi</i>), Barber goby (<i>Elacatinus figaro</i>), Brazilian basslet (<i>Grama brasiliensis</i>), Brownstripper grunt (<i>Anisotremus moricandi</i>), Goliath grouper <i>Epinephelus itajara</i>), Tiger grouper (<i>Mycteroperca tigris</i>), Cubera snapper (<i>Lutjanus cyanopterus</i>), Mutton snapper (<i>Lutjanus analis</i>), Rainbow parrotfish (<i>Scarus guacamaia</i>), Queen Triggerfish (<i>Balistes vetula</i>)
Sea Turtles	Green (<i>Chelonia mydas</i>), hawksbill (<i>Eretmochelys imbricata</i>), loggerhead (<i>Caretta caretta</i>), Olive ridley (<i>Lepidochelys olivacea</i>), Leatherback (<i>Dermochelys coriacea</i>)
Marine and shore birds:	Royal tern (<i>Thalasseus maximus</i>), Red-billed tropic bird (<i>Phaethon aethereus</i>), White-tailed tropic bird (<i>Phaethon lepturus</i>), Black-browed albatross (<i>Thalassarche melanophrys</i>), White-chinned petrel (<i>Procellaria aequinoctialis</i>), Spectacled petrel (<i>Procellaria conspicillata</i>)
Marine Mammals	Humpback whales (<i>Megaptera novaeangliae</i>), Southern right whale (<i>Eubalaena australis</i>), Fin whale (<i>Balaenoptera physalus</i>), Sperm whale (<i>Physeter macrocephalus</i>)

* sources: IUCN and unpublished results of IBAMA Workshop (2003)

Annex VII



Coral reefs in the Abrolhos National Park. Detail of “chapeirão” with *Mussismillia Brazilienses*. (Photo: Enrico Marcovaldi).

Annex VIII

Main current research activities at Abrolhos Marine National Park

- i) **Productivity, Sustainability and Use of the Ecosystem of the Abrolhos Bank Project** - investigates the functioning and maintenance of the Bank ecosystem and makes an inventory of small, medium and large scale regulating processes. It is conducted by a consortium of 14 of the main research institutions in Brazil;
- ii) **Brazilian Coastal and Marine Protected Areas Network Program** – aims for the development of the environment control through improvement of infra-structural conditions and personnel training. The program shall be starting next year. There are two experimental areas in Brazil being Abrolhos one of them.
- iii) **Fishing Management at the Buffer Zone of the Abrolhos Marine National Park Project** – monitors the fishing efforts in the region.
- iv) **Project Groupers of Brazil**– studies the endangered species *Epinephelus itajara* (goliath grouper) at Abrolhos Bank;
- v) **Marine Management Area Science Program – MMAS**, organized by the Conservation International - Brazil. Its purpose is the support of the design, diagnosis, and monitoring of the effectiveness of marine management areas.

Main current monitoring programs at Abrolhos Marine National Park

- i) **Humpback whale Project**- developed in 1988, is one of the main projects in the area; photo identification of the whales; catalog of tail fins, with 1,626 identified whales until 2002; observation of the structure and composition of groups and natural behavior of these animals, as well as environmental information projects and tourism monitoring.
- ii) **SEAGRASSNET** – Global monitoring program of sea grass; aims for the production of global comparative data on the distribution and condition of the habitat of sea grass. In April 2002, a comparative study with a bank of *Halodule wrightii* (shoalgrass) was initiated in Abrolhos ParNaM.
- iii) **Diversity and Function of the Limestone Algae in the Abrolhos Reef** - ParNaM was selected in light of the large amount of limestone algae found on the top part of the reefs and of the relevance in representing the south limit of distribution of these coral communities.
- iv) **Atlantic and Gulf Rapid Reef Assessment (AGRRA)** – Initiated in 2000, has as objectives assess: i) vital condition of the corals, the main organisms responsible for the construction of the reef structure; ii) algae community composition iii) estimate the ichthyofauna composition, and iv) level of recruitment by the corals, as well as the extension of the degraded waters and the operating processes (geological, oceanographic and biological) in the ecosystem.

v) **Monitoring of the Diving Activity in ParNaM** – the Structuring the Carrying Capacity for Different Public Use Activities Project started in 2003, aiming to minimize the impacts of these activities in the MPA. Researchers participate in the dives and evaluate the experiences and abilities of the diver.

vi) **The impact of tourism on the *Sula dactylatra* (Birds: Pelecaniformes) in the Abrolhos Archipelago**– This project aims to evaluate possible tourism impact on the reproductive success of the birds as well as to define strategies to minimize the negative impacts.

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