Template for Submission of Scientific Information

to Describe Ecologically or Biologically Significant Areas

Title/Name of the area: Abrolhos bank and Vitória-Trindade Chain

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Abstract

The Abrolhos Region is an enlargement of the Brazilian continental shelf located in the eastern shore of Brazil, in the southern of Bahia and northern of Espírito Santo States. It is composed by the Abrolhos and Royal Charlotte banks, comprehending an area of 56.000 km^2. It harbors the highest marine biodiversity in the South Atlantic, the largest coral reefs in Brazil, and relatively large populations of several endemic and endangered marine species. It presents a mosaic of different habitats, like mangroves, seagrasses meadows, rhodolith beds, submerged and emergent reefs, and a group of small volcanic islands. Abrolhos also has unique biological formations, such as the large mushroom shaped reef formations – "chapeirões", and unique geological formations, such as the "buracas" – distinctive depressions in the shelf plain (up to 20 meters deep and 70 meters large). The region is an important breeding and/or fishing site for several flagship species such as humpback whales, sea turtles and sea birds. Despite the biological relevance and uniqueness of this region, only 7% of it is within effective protected areas. Several factors put this great diversity in danger, such as large projects related to oil and cellulose.

The Vitória Trindade Chain, located on the central coast of Brazil, is composed of seven seamounts and island complex (Archipelago of Trinidad and Martin Vaz). The substrate of the mountains and ocean islands is composed of living reefs of coralline algae, which is also observed the presence of different species of corals, sponges and algae. The mountains and islands have a fauna of reef fish that still preserved, with a significant biomass and abundance of species, harboring many sharks and spawning aggregation phenomena of important fishery resources. Moreover, the fish fauna of the Vitória e Trindade Chain has at least 11 endemic species on their reefs. Also this area is the only breeding site for three endemic populations of seabirds, the Trindade Petrel Pterodroma arminjoniana, the Atlantic Lesser Frigatebird Fregata minor nicolli, and the Atlantic Greater Frigatebird Fregata ariel trinitiatis. In the meantime, this environment can be considered high uniqueness, importance for the life cycle of many species, important for endangered species, high sensitivity and high biological productivity, relatively well kept. Despite all this wealth and uniqueness, the increasing of fishing effort, which has already caused extinctions of species in several others Brazilian islands and now focuses on that region, that has threatens sharks and large carnivores. The threat scenario raises the need for protection of natural environments, and is recognized by the Brazilian government as extremely high importance and a priority area for biodiversity conservation

Introduction

The Abrolhos Region (56,000 km²) is a mosaic of marine and coastal ecosystems that encompasses the largest reef area and the highest marine biodiversity in the southern Atlantic, harboring a wealth of endemic and IUCN Red-listed marine species (Dutra et al. 2005). The unique "chapeirão" reefs in Abrolhos consists of mushroom-shaped pinnacles, built predominantly by Brazilian endemic species, covered with fans of fire coral and round knobs of brain corals (Leão et al. 2003). Many commercially valuable species of reef fish can be found in the region, including several threatened fish species (Francini-Filho and Moura, 2008).

The Abrolhos Bank corresponds to the main breeding ground for humpback whales in the western South Atlantic Ocean (Martins et al., 2001; Andriolo et al. 2010). Three species of small cetaceans (guiana dolphin; rough-toothed dolphin and bottlenose dolphin) use the Abrolhos bank for feeding and breeding throughout the year (Rossi-Santos et al. 2006). It's important to note that Abrolhos bank constitutes the only site along the distribution of guiana dolphin where this species occurs offshore. The southern right whale, a

species listed as Endangered , also uses the Abrolhos bank for breeding and calving (Engel et al. 1997). The Abrolhos Archipelago is also an important nesting site for marine birds, including the red-billed tropicbird Phaethon aethereus, the boobies Sula dactylatra and Sula leucogaster, the magnificient frigatebird Fregata magnificens and the migratory brown noddy Anous stolidus, as well as three IUCN Red-listed marine turtle species: the Endangered green (Chelonia mydas) and loggerhead (Caretta caretta) turtles, and the Critically Endangered hawksbill turtle (Eretmochelys imbricata).

The Abrolhos ecosystems are threatened by overfishing, climate change effects, and sedimentation (a result of coastal deforestation). Shrimp farming, and oil and gas exploitation are also threats, but they are fortunately not installed in the region, due to conservation efforts. Halting of illegal fishing in the region is one key challenge, as official enforcement is compromised by a lack of continuous government funding. The endemism and diversity of Abrolhos, combined with growing environmental threats, make Abrolhos a national and global priority for marine conservation. The area is also considered by the Brazilian government to be of "Extreme Biological Importance" because of its unique coral reefs and many threatened species (MMA 2002). Due to these characteristics the Abrolhos region was included in the limits of the Atlantic Forest Biosphere Reserve and the Abrolhos National Marine Park is now a Ramsar site, which are important international recognitions for its protection.

In 20 °S latitude of Western Atlantic is a chain of seamounts called Vitória-Trindade Chain (CVT). This chain starts 150 km from the coast and extends for 1,200 km to the islands of Trindade and Martin Vaz archipelago. In the islands, seven hills make up the chain all have volcanic origin, dating between 0.7 and 10 million years (Cordani, 1970, Fodor & Hanan, 2000; Almeida, 2006). The mountains and islands have their base up to 5,000 m deep, with some hills reach a few meters below the surface. The chain acts as a barrier underwater ocean currents, which contributes to the occurrence of oceanographic phenomena such as upwellings and eddies (Schimit et al., 1995). The Trindade and Martin Vaz Archipelago are breeding site for seven species of seabirds, including the endemic trindade petrel Pterodroma arminjoniana, and the endemic frigatebirds Fregata ariel trinitiatis and the Fregata ariel nicolli (Fonseca-Net 2004).

The substrate of the mountains and ocean islands is composed of calcareous algae reefs (Pereira Filho et al., 2012, Pinheiro et al., 2011) in constant growth, which is also observed the presence of different species of corals, sponges and algae. In the islands, another commonly found underwater landscape consists of rocky reefs composed of boulders and blocks of volcanic rock that broke off from the islands (Pereira Filho et al. 2011, Pinheiro et al., 2011).

The green turtle (Chelonia mydas) rookery on Trindade Island, is the seventh largest nesting colony of green turtles in the Atlantic (Almeida et al, 2011).

Location

The Abrolhos Region is composed by two marine banks: Abrolhos and Royal Charlotte. The Abrolhos Bank is located in the southern of Bahia and northern of Espírito Santo State. The continental shelf extends up to 200km off the coast line, in front of Caravelas municipality. Its northern limit is municipality of Prado (latitude: 16◦40'S) and the southern is the Doce River (19◦40'S). It has an extension of 409km of coast line, 257 in Bahia State and 152km in Espírito Santo State.
The Royal Charlote Bank is located in the north of the Abrolhos Bank, between the municipality of Prado (16◦40'S), and the Jequitinhonha River in the north (15◦50'S). Its area has about 10.000km², and the surface in plain with some channels 30 of 40 meters deep (Marchioro et al. 2005).

The Trindade Island (20°31'S, 29°19'W), along with Martin Vaz Archipelago (20°30'S, 28° 51'W) is the easternmost portion of the Brazilian territory. These points are located at the eastern end of a chain of seven

seamounts, called Chain Vitoria Trindade (CVT) (Figure 1), with more than 1000 km long (latitudes 19° and 21°S). The distances between the hills can be among 50 and 250km from each other, achieving minimum depths around 20 and 85m from the surface. The mountains and islands have a volcanic origin, the most recent having estimated ages is from 0.7 and 10 million years (Cordani, 1970, Fodor & Hanan, 2000; Almeida, 2006). The main island (Martin Vaz) has 600 m in length and 175 in highest point, while the island's North and South are much smaller, and distant from the main island 200 m and 1.200 m respectively (Luigi et al. 2009). The hills located at the ends of the chain are within the exclusive economic zone of Brazil, however, several hills are outside the jurisdiction of Brazilian, been an international area.

Feature description of the proposed area

Abrolhos Bank is a mosaic of different habitats, such as mangroves, coral reefs, rhodolith beds and oceanic islands, concentrating a high biodiversity, consequently being of great vulnerability. Abrolhos Bank is a unique reef ecosystem with relative turbid waters, under strong coastal/riverine influence. This reef complex is considered the largest and biologically richest coral reef area in the South Atlantic Ocean (Dutra et al. 2005). The total annual CaCO3 production by mesophotic Abrolhos rhodolith beds is comparable to that of the largest biogenic CaCO3 deposits in the world. The gigantic CaCO3 bio-factory reported from the Abrolhos Shelf accounts for approximately 5% of the world's total carbonate banks. These gigantic rhodolith beds, of areal extent equivalent to the Great Barrier Reef, Australia are a critical, yet poorly understood component of the tropical South Atlantic Ocean (Amado Filho et al., in press).

The expansion of the continental shelf is an exception in the Brazilian coast. This region is formed by submerse banks of Vitória-Trindade and Abrolhos chains, leading to a deviation in Brazilian current, disturbing the vertical stratification, bringing deep water to the surface. This causes the enrichment of the water, and explains the abundance of fisheries resources (MMA, 2010).

The complex topography derived from intense volcanic activity and tectonic fault line that forms a sequence of underwater mountains named Vitoria Trindade chain, which represents an important geomorphological feature in the South Atlantic Ocean to maintain biodiversity and fish stocks of southeastern Brazil. The isolation and distance from the coast to provide these islands the presence of natural fish communities, characterized by a high abundance and endemism. Recent research has discovered about 12 new fish species endemic to the shallow waters of Trinidad and Martin Vaz.

The substrate of the mountains and ocean islands is composed of living reefs of coralline algae (Pereira Filho et al., 2012, Pinheiro et al., 2011), which is also observed the presence of different species of corals, sponges and macroalgae. In the islands, another commonly found underwater landscape is rocky reefs, formed by boulders and blocks of volcanic rock that broke off the coasts of the islands (Pinheiro et al., 2011). The visibility of the water varies from around 50m and the temperature between 25 and 28°C. The fauna of reef fish on the island of Trindade still preserved and has a large biomass and a high abundance of species (Pereira Filho et al., 2011, Pinheiro et al., 2011) and a high proportion (Floeter & Gasparini, 2001 , Pike et al., 2009, Simon et al., submitted).

The chain Vitória Trindade also hosts a large number of species of sharks (Repinaldo Son, 2011), and be related to spawning aggregation of many commercial species (Agnaldo S. Martins, personal communication). Moreover, the fish fauna of the Vitoria Trindade chain has at least 11 endemic species of its reefs (Floeter & Gasparini, 2001, Pinheiro et al., 2009, Simon et al., Submitted), and recently described new species of parrot fish, soap fish, maidens, and others. Despite all this wealth and uniqueness, the increasing overfishing has threatened shark species and large carnivores in Vitória Trindade chain (Pinheiro et al., 2010, Pinheiro et al., 2011) and, as occurred in other Brazilian islands, there are a risk of

extintion of locally important species (Luiz & Edwards, 2011).

Feature condition and future outlook of the proposed area

The region counts with a good background information regarding its habitats and biodiversity, but there are still important knowledge gaps to be covered. One example is the "buracas", unique formations recently described by science (Moura et al. in prep.). In early 2012 a new expedition will take place to investigate additional aspects of these areas, coordinated by Conservation International in partnership with Rede Abrolhos research group (supported by MCT/CNPq, FAPES and Waitt Family Foundation).

Overfishing is causing general losses in the fish biomass and potentially threatening biodiversity. The present MPA network and the former fisheries management approaches have not demonstrated enough for maintaining the sustainable use of these resources. Aiming to change this scenario, an effort from the Brazilian Government in partnership with NGOs (e.g. Conservation International, Instituto Baleia Jubarte, SOS Mata Atlântica, Greenpeace) and Universities (UEM, UESC, UFPB, UFES, UFRJ, JBRJ, USP) is advancing in Systematic Conservation Planning Process for expanding the Abrolhos MPA Network during the next years.

Despite the unique characteristics, the Vitória Trindade chain has much of its length outside the Exclusive Economic Zone (ZEE) in Brazil, which comprises 200 nautical miles from shore, and has been targeted by industrial longline fishing and bottom line, without proper planning, since there are reports of an apparent decline in catches of sharks and large groupers. In addition, there are reports of fishermen on the activities of foreign vessels surrounding shoals and drag the top of seamounts, which can destroy in a few hours biogenic formations with thousands of years. This type of fishing, when there is no order, can cause, in a few years, a stock collapses of top predators such as sharks, which are responsible for controlling the population of other species. With this ecological balance compromised, the entire aggregate reef ecosystems and biodiversity is threatened, too much of the growth occurring more opportunistic species and the decline of the species with more specific ecological niches. The Trindade Island and the mountains is considered as a priority area of extremely high importance for biodiversity conservation, and set as a priority the creation of spatial fishing and fishing exclusion areas (MMA, 2010).
Since 1957 the archipelago hosts an oceanographic tour in Trindade island (POIT), manned continuously for more than 30 military. Thus, the participation of the Brazilian Navy is a key partner for the storage and maintenance of this island Brazil and currently works for a program to promote the research, called Pró-Trindade.

Another recent major initiative of the Board Sea Biosphere Reserve of the Atlantic Forest (RBMA) was the creation of the Working Group to connect Abrolhos and Trindade, with members from various governmental and non-governmental organizations that will focus on joint efforts to strengthen, plan and execute strategic actions aiming to increase the protection, conservation, sustainable use in the region.

Assessment of the area against CBD EBSA Criteria

CBD EBSA Criteria (Annex I to decision IX/20)	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Some**	**High**
Uniqueness or rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or				**X**

	ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features				

Explanation for ranking:

- *The Abrolhos Region have unique mushroom shaped reef formations ("chapeirões") – up to 50 meters large, and 25 meters high – Leão et al. 2003*
- *The Abrolhos Region have unique circular-shaped depression in the marine shelf ("buracas") – up to 70 meters large, and 20 meters deep – Moura et al. (submitted)*
- *Largest rhodolith (calcareous algae) in the world – (20,904 km^2 – Amado Filho et al., in press, Moura et al. submitted.)*
- *Largest coral reefs in the Southern Atlantic (8,844 km^2 – Moura et al.submitted)*
- *Large populations of endemic species: Mussismilia braziliensis (endemic of Bahia and Espírito Santo – Leão et al. 2003, probably more than 90% of the population in Abrolhos); and Favia leptophylla (endemic to Bahia State, Espírito Santo State and Parcel de Manoel Luiz – Leão at al. 2003)*
- *The seamounts in this region are important geomorphological features to the pattern of ocean circulation, and the point of separation of the Brazil Current, with a number of meso-scale oceanographic phenomena associated as upwellings and eddies.*
- *There are a least eleven endemic reef fish species at Vitória Trindade Chain.*
- *Has several species of shallow fishes.*
- *Along the River Sweet is the greatest diversity of octocorals central coast of Brazil in all ranges of depth (100 to 1000) (Castro et al., 2006).*
- *The Trindade and Martim Vaz Archipelago contains three endemic populations of seabirds: the Trindade Petrel Pterodroma arminjoniana, and the sub-species of Lesser Frigatebird Fregata arieltrinitiatis and Greater Frigatebird Fregata minornicolli.*
- *The Trindade Petrel P. arminjonia can be considered endemic of Trindade and Martin Vaz Archipelago (Birdlife 2012). Despite one of the Pterodroma petrels breeding on Round Island, Mauritus, in the Indian Ocean, has been considered as P. arminjoniana, there is much uncertainty about this, given that the close affinities of P. neglecta, P. heraldic and P. arminjoniana, the three species assumed to occurs on Round Island (Brooke et al. 2004). In addition, the two widely separated breeding populations may warranty specific status (Onley & Scofield 2007).*
- *Despite the Lesser and the Greater frigatebirds presents wide range through the tropical waters of the Indian and Pacific oceans, the Atlantic races F. minor nicolli and F. ariel trinitatis are definitely isolated from the indo-pacific races, and are endemic from Trindade and Martin Vaz Archipelago (Birdlife 2012, Harrison 1983). Given the strongly spatial segregation from the indo-pacific frigatebirds, the taxonomic status of the Atlantic races could change in the future from sub-species to true species (Luigi et al. 2009).*

Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				**X**

- *Explanation for ranking*
-
- *The occurrence of large colonies of coral reef builders, as Montastraea cavernosa, occuring up to 200 m depth, supports the hypothesis that the Vitória-Trindade Chain was a refuge area for the Tertiary shallow coral reefs builders, harboring populations of these species during sea level regressions (Castro et al., 2006).*
- *The Abrolhos Bank corresponds to the main breeding concentration of humpback whales (Megaptera novaeangliae) in the western South Atlantic Ocean (Martins et al., 2001; Andriolo et al., 2010) with nearly 80%-85% of the population occurring in this region. In addition, the southern portion of the Bank and the western end of the Vitoria-Trindade chain include the only known pre-migratory habitats for humpback whales (Zerbini et al., 2006; in press a).*
- *The Abrolhos Bank is the only known site of occurrence of guiana dolphin (Sotalia guianensis) further offshore (50nm) than the typical range of the species (Rossi-Santos et al. 2006).*

- *Area important for commercial fish species for long life cycle*
- *Thus, is a very important site of fish reproductive aggregation.*
- *Sustain high biomass and high functional diversity of herbivorous reef fishes, key species in reef systems.*
- *The Archipelago of Trindade and Martin Vaz and the Abrolhos Archipelago, as a whole, represents breeding and foraging sites for ten seabird species: Sula leucogaster, Sula dactylatra, Phaeton aethereus, Fregata magnificens, Fregata ariel, Fregata minor, Anous stolidus and Onychoprion fuscatus. Of these, Anous stolidus and Phaeton aethereus has it largest colonies in Brazil at Abrolhos Archipelago (Soares et al. 2000, Fonseca-Neto 2004, Alves et al. 2004).*
- *This area also comprises important foraging grounds (e.g. Abrolhos Bank) and migratory paths (e.g. Vitória-trindade Seamount Chain) for adult hawksbills (Marcovaldi et al. in press). Internesting and breeding habitats for adult leatherbacks (Almeida et al. 2011a), migratory paths and high use areas for non-breeding adults (Lopez-Mendilaharsu et al. 2009, Fosette et al. 2010). Additionally the island of Trindade and adjacent waters hosts one of the major green turtle breeding grounds in the Atlantic (Almeida et al. 2011b).*
- *The Trindade and Martim Vaz archipelago and adjacent waters are crucial for the survival of the endemic Trindade Petrel as well as the Atlantic races of Lesser and Greater frigatebirds.*
- *The Trindade Petrel breeds exclusively at Trindade Island, where the breeding populations was recently estimated in 1.130 pairs (Luigi et al. 2009). As other procellariiforms, Trindade Petrels shows a very pelagic habit, using Trindade Island only as breeding site. The oceanic distribution of Trindade Petrel remains poorly unknown. Vagrants can be found within a wide range, from Azores to South Georgia (Luigi et al. 2009), and accordingly to Patteson & Brinkley (2004), the Trindade Petrel occurs regularly on waters off North Carolina, especially between May and September. However, the distribution maps found in field guides and species factsheet (Harrison 1983, Onley & Scofield 2007, Birdlife 2012) suggests the oceanic waters of Southwest Atlantic as the area of regular occurrence of the specie. In fact, recent data provided by Leandro Bugoni available at the Birdlife Global Procellariiform Tracking Database (*www.birdlife.org/community/2010/09/the-global-procellariiform-tracking-database*), shows that 26 breeding Trindade Petrels tracked by geolocators forages manly south of Trindade and Martin Vaz archipelago, with great concentration of points in the Rio Grande Rise and north of it.*
- *The Atlantic races of Lesser and Greater frigatebirds occurs exclusively on Trindade Island, and both taxa are sedentary, foraging manly around the islands. Despite both species were reported breeding on Trindade Island from 70s to 90s, there are no recent records of reproduction there. In 1975 there were colony of Great Frigatebirds with 15 pairs in Trindade Island, and the total population in was estimated at 50 birds.*
- *The last reports of reproduction of Great and Lesser frigatebirds at Trindade date from 1987 to 1992, and actually the sights of these species are limited to flying birds.*
- *The Vitória-Trindade Chain is also a passage region used by Puffinus puffinus and Calonectris borealis during its transequatorial migration (Onley & Scofield 2006).*
- *High diversity of malacofauna in the Abrolhos region and Vitoria-Trindade chain, with a endemism estimated at 15% in this area (Absalão et al., 2006).*
-

Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.				**X**

Explanation for ranking

- *The Vitória-Trindade Chains are at least 35 fish species considered threatened by IUCN red list or Brazilian red list (endangered or risk of overexploitation)*
- *Scarus trispinosus: endangered following IUCN criteria: represents 28% of total fish biomass in*

Abrolhos, and has shown 50% decline in the past five years - Francini-Filho and Moura 2008. This reef fish species is endemic to Brazil, and the majority of its population seems to be in Abrolhos (where the majority of the Brazilian coral reefs are).

- *Megaptera novaeangliae: the Brazilian population of the species was reduced to less than 5% of its pre-exploitation size (Zerbini et al in press b) and despite its current recovery is still relatively low (32%) compared to the population size before whaling. According to the National Action Plan for Aquatic Mammals (ICMBIO 2011) the humpback whale is still listed as vulnerable by the government of Brazil and demands the conservation of its habitat to maintain the recovery process.*
- *One of the major coral reef builder endemic to Bahia and Abrolhos Bank (Mussismilia braziliensis) was recently included in the Brazilian Endangerous Species List and classified as Vulnerable. Other species (Mussismilia hartttii) also endemic to Brazil was also included in the list. The region still harbors populations of giant anemones (Condylactis gigantea), which is also in the list and is functional extinct in other areas of the Brazilian coast.*
- *The Trindade Petrel Pterodroma arminjonianais listed as "Vulnerable" by both Global (IUCN 2012) and National (Silveira & Straube 2006) red lists. The Trindade Petrel has a very small breeding range and population on Martin Vaz. An unidentifed Pterodroma species breeding on Round Island in the Indian Ocean may refer to this species. If so, the species's status would require re-evaluation.*
- *The Lesser Frigatebird and the Greater Frigatebird are listed as "Least Concern" by the Global Red List (IUCN 2012), while it are considered as "Critically Endangered" in the Nacional Red List (Silveira & Straube 2006). This discrepancy occurs because the IUCN did not consider the sub-species. These both endemic sub-species of frigatebirds, which suffered drastic population reduction and actually with no record of reproduction, represents the two most threatened seabirds of the tropical South Atlantic (Fonseca Neto 2004)*
- *Occurrence (e.g. breeding and foraging grounds) of leatherbacks (Dermochelys coriacea), hawksbills (Eretmochelys imbricate) and green turtles (Chelonia mydas).*
- *D. coriacea and E imbricata listed both as Critically endangered by Global and National red lists (IUCN 2011, Almeida et al. 2011c, Marcovaldi et al. 2011), and C. mydas listed as Endangered by the IUCN (2011) and as Vulnerable by the National red list (Almeida et al. 2011d).*

Vulnerability, fragility, sensitivity, or slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.				**X**

Explanation for ranking

- *The coral reefs are fragile habitats, vulnerable to a source of threats such as overfishing, sedimentation, and climate change effects. The recovery to these threats is normally slow.*
- *Mangroves and coral reefs are also extremely vulnerable to oil spill effects.*
- *Presence of deep coral habitats*
- *The region has many indications of fish spawning aggregation*
- *Due the long distance far from the continent, the seamounts and oceanic islands are isolated environments and haven't a normal biological connectivity with the populations of the shore. This feature reduces the resilience of the populations, leaving more fragile.*
- *The tree endemic populations of seabirds from Trindade Island are very sensitivity to human perturbation, specially at the breeding sites. The deforestation of the Trindade Island and the introduction of goats, which contributed for this process, plus the introduction of predators (cats and rats), are the causes of the drastic population decline of the Trindade Petrel, and the Lesser and Greater frigate birds, as many other seabirds and landbirds that inhabit the Trindade Island (Fonseca Neto 2004, Silveira & Straube 2006, Luigi et al. 2009).*
- *For the frigate birds, the military activities, specially the helicopter activities and marksmanship operation opening fire against the cliffs, may be important causes of disturbance that affect the breeding activities.*

Biological productivity	Area containing species, populations or communities with comparatively higher natural			**X**	

	biological productivity.				

Explanation for ranking

- *Some areas of comparatively high biological productivity are described in the region, including: the northern parts of the Abrolhos and Royal Charlotte Banks, where permanent upwelling systems seems to occur; the southern of the Abrolhos Bank where a seasonal upwelling system seems to occur ("Giro de Vitória")(Gaeta et al., 1999, Campos et al., 2000;, Nonaka et al., 2000, Schimidt et al., 1995; Signorini, 1978)*
- *The region harbors one of the high fisheries production in the Northeast Brazil.*

Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.				**X**

Explanation for ranking

- *The Abrolhos Region is recognized as the area with the highest marine biodiversity in the Southern Atlantic (Werner et al. 2000, Dutra et al. 2005), and diversity of habitats is one of the reasons for this. The region has a high diversity of marine and coastal habitats, including different coral reef formations (e.g."chapeirões", platform reefs, fringe reefs, mesophotic reefs), rhodolith banks, muddy and sediment bottoms, seagrasses, estuaries, mangroves, beaches.*
- *Area of greatest species richness of corals of Brazil (shallow and deep)*
- *Area of species richness of birds.*
- *Presence of many endemic species of reef fish.*
- *The oceanic islands (Trindade and Martin Vaz) one of the higher diversity of reef fish species of all oceanic islands of South Atlantic, and a high number of endemic species too.*
- *High diversity of malacofauna in the Abrolhos region andVitoria-Trindade chain, with a endemism estimated at 15% in this area (Absalão et al., 2006).*

Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.			*X*	

Explanation for ranking

- *Part of the habitats in the eastern part of the region is in a relative low level of degradation. It can be observed by the high fish biomass still observed in these areas (Francini-Filho and Moura, 2008).*
- *Trindade and the chain have a high biomass of reef fishes, being considered preserved. However, fishing activities already threatened its fauna, mainly sharks and big grouper species.*

Sharing experiences and information applying other criteria (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Some**	**High**
Add relevant criteria					
Explanation for ranking					

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