Atlantic Forest Southeast Reserves

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Brazil
Inscribed in: 1999
Criteria: (vii) (ix) (x)

The Atlantic Forest South-East Reserves, in the states of Paraná and São Paulo, contain some of the best and most extensive examples of Atlantic forest in Brazil. The 25 protected areas that make up the site (some 470,000 ha in total) display the biological wealth and evolutionary history of the last remaining Atlantic forests. From mountains covered by dense forests, down to wetlands, coastal islands with isolated mountains and dunes, the area comprises a rich natural environment of great scenic beauty.

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SUMMARY

2020 Conservation Outlook

SIGNIFICANT CONCERN

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Along with two other World Heritage sites encompassing the most valuable remnants of the Interior Atlantic Forest (Iguaçu National Park) and a cluster of the key fragments of the North-eastern Atlantic Forest (Discovery Coast Atlantic Forest Reserves), respectively, this serial site is the most encouraging response to the fate of the biome and recognition of its global importance. The establishment of protected areas within the remaining Atlantic Forest was an important step to prevent the irreversible loss of a unique and exceptionally diverse forest ecosystem altogether. However, many of the conservation units that make up the site are very small and vulnerable to outside influences. However, there are important continuous blocks including Carlos Botelho and Intervales State Park, which require increased protection to ensure long-term conservation of the area and remaining connectivity. Much of the implementation, in particular as regards coordination of efforts between actors and stakeholders, remains to be consolidated. Urgent action seems needed to improve integrity and mitigate the existing threats, including ongoing illegal resource extraction and land use. If predicted climate change is added to the factors, considerable degradation of important conservation values seems highly likely in the absence of major responses. At the same time, further declining budgets for protected areas across the country, raise serious concerns over the already limited resources to address these issues.
FULL ASSESSMENT

Description of values

Values

World Heritage values

► Exceptional natural beauty

The Atlantic Forest South-East Reserves World Heritage site is located in the states of Paraná and São Paulo. It contains some of the best and largest examples of Atlantic forest in Brazil. The 25 protected areas that make up this site (some 470,000 ha in total) display the biological wealth and beauty of the last and highly threatened remaining Atlantic forests that cover densely forested mountains with hundreds waterfalls and over 300 splendid caves down to wetlands, dunes, estuaries, marshes and mangroves, as well as numerous bays and coastal islands, the area comprises a very diverse natural environment of great scenic beauty. Two of the caves are specially interesting: Casa de Pedra with the largest opening in the world and Santana, with a beautiful ornamentation (World Heritage Committee, 2015; IUCN Consultation, 2014).

► Highly diverse forest region with high degree of endemism

Partially isolated, the Atlantic Forest has historically evolved into a highly diverse forest region. As a consequence of the high diversity of ecosystems (from mountainous to coastal and marine) represented in the area coupled by the relative isolation of this biome during millennia, its degree of endemism is extraordinarily high. It is estimated that 53% of the tree species are and 77% of other plants are endemic to this biome (Fernandes, 2003). Current knowledge indicates that this complex biome contains a species diversity higher than most of the Amazon forests (Colombo and Joly, 2010). As one of the most important conservation mosaics of the Atlantic Forest, the World Heritage site is of key importance for the conservation of the entire terrestrial biome, including its interlinkages with coastal and marine ecosystems nearby (World Heritage Committee, 2015).

► High diversity of mammal species

Fauna includes 120 species of mammals. Amongst the flagship species are the jaguar, ocelot and the bush dog (Speothos venaticus). The site is rich in primates, some of which are highly endangered, such as the woolly spider monkey (Brachyteles arachnoides), the largest primate in the Americas, and the little “black-faced lion” monkey (Leontopithecus caissara), recorded only in 1990 and endemic to the region (World Heritage Committee, 2015).

► Diverse avifauna

The avifauna is very diverse with 350 species recorded, including the blue-cheeked Amazon (Amazona brasiiliensis), classified vulnerable. The scarlet ibis (Eudocimus ruber), a large bird with bright red plumage, is a local symbol (World Heritage Committee, 2015).

Assessment information

Threats

Current Threats

Ecological and biological isolation of the various components comprising this World Heritage site remains the most significant threat to its values. However, this simply reflects the realities of the Atlantic Forest
biome, which has seen dramatic reduction of its original distribution. While no analysis has been undertaken specifically for the World Heritage site, it will be important to assess the degree to which it continued being affected by fragmentation in the years following its inscription on the World Heritage List. In the buffer zones of several components, agriculture, ranching, plantation forestry and infrastructure development have been noted as pressures in the past; however, no systematic assessment of these threats exists across the entire World Heritage site.

▶ **Housing/ Urban Areas, Tourism/ Recreation Areas**

*(Infrastructure in the buffer zones)*

Infrastructure in the buffer zones of different components of the site, such as settlements, mining, roads, tourism facilities, water impoundment, and drainages degrade and fragment natural habitats, impede habitat restoration, contribute to pollution and sedimentation, and impact wildlife (BirdLife International, 2012; UNEP-WCMC, 2011). However, no systematic assessment is available across all the components of this serial World Heritage site.

▶ **Other Ecosystem Modifications**

*(Biological isolation and fragmentation)*

This World Heritage site encompasses the biggest Atlantic Forest remnants in Brazil and is the biggest remaining block of the biome. Nonetheless, some of the protected areas, mostly the private ones, that make up the site are very small and vulnerable to outside influences. The isolation is being exacerbated by human interventions that further degrade and fragment habitats, and by climate change and will result in the loss of biodiversity over time (Birdlife International, 2012; UNEP-WCMC, 2011; WWF, n.d., Perry, 2011). Such anthropogenic pressures also have indirect effects in reducing biodiversity, as spatial species richness has been shown to decrease dramatically in landscapes where forest cover has fallen below 30% (Estavillo et al., 2013). It is important to note that since the inscription of the site on the World Heritage List, two state protected areas mosaics were declared by the State of Sao Paulo within the region and other Federal protected areas were created in the Parana state (IUCN Consultation, 2017). Nonetheless, fragmentation and biological isolation remain the most serious threats to the remnants of Atlantic Forest. Creation of ecological corridors is considered essential, as conservation units creted across the Atlantic Forest are considered insufficient to preserve the remaining biodiversity of this fragmented biome (Santos et al., 2018). While no analysis has been undertaken specifically for the World Heritage site, it will be important to assess the degree to which it continued being affected by fragmentation in the years following its inscription on the World Heritage List.

▶ **Hunting and trapping, Logging/ Wood Harvesting**

*(Illegal extraction of natural resources)*

Poaching, timber extraction, non-timber forest products, palm harvest, commercial and subsistence agriculture, and commercial fishing are significant threats for the protected areas, causing further fragmentation of habitats, and degrading wildlife populations. Within the region of the sites in Sao Paulo State, there is an increase of Pinus eliotti plantations, which is also an invasive species that is pressuring the Atlantic Forest remnants outside and inside protected areas (Birdlife International, 2012; UNEP-WCMC, 2011; Parks watch, 2002; WWF, n.d.; IUCN Consultation, 2017).

▶ **Tourism/ visitors/ recreation**

*(Impacts of tourism)*

Some areas experienced a tourism boom in late 1990s that threatened both their environment and their native communities with rapid unregulated development. Restrictions on developments and day limits for visitors have been introduced since then, along with infrastructure for visitor which helped organize the visitors flow. When well-structured, tourism and ecotourism activities are perceived by stakeholders as one of the best ways to support protected areas and to decrease pressures over the Atlantic Forest remnants (IUCN Consultation, 2017).
### Potential Threats

Climate change represents the most significant potential threat to the World Heritage site. Even though some impacts of climate can already be seen, further significant changes are predicted in the future, with dramatic reduction in the range of some species and overall redistribution of species composition due to a combination of factors, including increasing temperatures and changes in precipitation.

#### Habitat Shifting/Alteration, Temperature extremes (Climate change)

Several studies predict impacts of climate change on different groups of species in the Atlantic Forest. Some show not only a significant reduction in the potential distribution of the species, but also that the Atlantic Forest may be restricted to a more southern position in Brazil (Colombo and Joly, 2010). Other studies project that species in upper elevations in the Atlantic Forest are at risk from climate change as restriction to mobility towards less warm higher elevations will not be possible (Sodhi and Ehrlich, 2010). Predictions also exist for certain groups of species, for example, Lourenço-de-Moraes et al. (2019) conclude that 73.6% of oviparous species and 67.6% of viviparous snakes could lose at least half of their original range across the Atlantic Forest by 2080. The combination of increased temperature, changes in precipitation and soil moisture decline will result in significant changes in and redistribution of plant communities (Follador et al., 2019).

### Overall assessment of threats

The most significant current threats to the World Heritage site are the ecological and biological isolation of its various components and associated with it edge effect. In the buffer zones of several components, agriculture, ranching, plantation forestry and infrastructure development have been noted as pressures in the past; however, no systematic assessment of these threats exists across the entire World Heritage site. If predicated climate change is added to the factors, considerable degradation of important conservation values seems highly likely in the absence of major responses.

### Protection and management

#### Assessing Protection and Management

**Management system**

Management of the World Heritage site is divided among federal and the two concerned state protected area authorities, and the administration of the private reserve. The management of each protected area is guided by a management plan, though several are outdated and their implementation is limited by insufficient human and financial resources. (UNEP-WCMC, 2011; IUCN, 1999; de Oliveira, 1998; IUCN Consultation, 2014). The key concern is the coordination of management among the many protected areas that make up the site (UNEP-WCMC, 2011). More recently, progress has been made in the further development of the “conservation mosaic”, but this is has not been translated into the formal design of the World Heritage site as of yet. Besides the federal mosaic (Lagamar), other two mosaics were created in the State of Sao Paulo, due to the redesign of Jacupiranga Park and Jureia-Itatins ecological station boundaries (IUCN Consultation, 2017).

**Effectiveness of management system**

The ICMBio applied the RAPPAM method twice for its protected areas (2005-06 and 2010) and the State of Sao Paulo in 2004 for its PAs. Since 2015, besides RAPPAN, ICMBio is annually applying the SAMGE (Monitoring and Evaluation System) while the RAPPAN assessment is undertaken every 5 years. In 2015, ICMBio launched the SIGTerra - Protected Areas Territorial Information Consolidation System, whose
goal is to compile land tenure information of the federal protected areas. Independently of the results, brought about by those evaluation systems, the overall key challenge, continuous to be how to better coordinate management across the entire serial World Heritage site (IUCN Consultation, 2017).

▶ **Boundaries**  
Some Concern

This serial World Heritage site consists of 25 component protected areas and lies entirely within a much larger buffer zone of 1,223,557 ha which is managed as a UNESCO Biosphere Reserve (IUCN, 1999). Nonetheless, many of the conservation units that make up the site are very small and vulnerable to outside influences - of the 25 protected areas comprising the site, 12 cover less than 5,000 hectares each (World Heritage Committee, 2015).

▶ **Integration into regional and national planning systems**  
Serious Concern

The establishment of the individual protected areas and their consideration and nomination as one coherent World Heritage site represented an adequate attempt to increase the scale of conservation intervention. The fundamental challenge to promote more sustainable land and resource use in the broader landscape remains. The integration of the PAs planning into other regional and national plans continues to be weak (IUCN Consultation, 2017).

▶ **Relationships with local people**  
Some Concern

Relationships with local people continue to be strained. The Advisory Councils, set up by the management units, helped to solve many conflicts, but the lack of integrated and long-term plans to maintain the involvement of the stakeholders in the management jeopardize the gains achieved in some areas (IUCN Consultation, 2017).

▶ **Legal framework**  
Some Concern

The legal framework for the World Heritage site has been developed by a mosaic of 10 protected areas established by federal decree (1 National Park, 1 Ecological Station, 3 Wildlife Zones, 3 Environmental Protection Areas); as well as protected areas in Sao Paulo State established by state decree (State Parks, Ecological Stations, Wildlife Zone, Environmental Protection Area); and protected areas in the Parana State established by state decree (5 State Parks, 1 Ecological Station, and 1 Environmental Protection Areas); and 1 Private Natural Heritage Reserve. Some protected areas in S. Paulo were divided into other areas (Jacupiranga State Park and Jureia-Itatins Ecological Station), increasing the territory that was strictly protected and adding protected areas which allow sustainable use (UNEP-WCMC, 2011, IUCN Consultation, 2017).

▶ **Law enforcement**  
Some Concern

The implementation of the individual protected areas management plans and surveillance of their buffer zones has become weaker. One reason is the shortage of staff and financial resources at all government levels. In the Parana state, the absence of the Environmental Police agreement with the state exacerbated the problem (IUCN Consultation, 2017).

▶ **Implementation of Committee decisions and recommendations**  
Some Concern

In the inscription decision, the Committee recommended that the State Party "should be encouraged to restore natural conditions in the Serra do Mar State Park, which potentially could be incorporated in the site". No action has been reported to this effect. Although the Serra do Mar State Park received a significant amount of investment since the inscription, and improved its natural conditions, there aren't initiatives or interest aiming at adding this protected area to the World Heritage site (IUCN Consultation, 2017).

▶ **Sustainable use**  
Some Concern

Conservation and research are the main uses of the protected areas that make up the World Heritage site, and in some areas, tourism and recreation are encouraged. In general, research activities are being
carried out in an adequate and sustainable manner; however, tourism and recreation are not well controlled in some areas and might become a source of new risks (IUCN Consultation, 2014). Infrastructure investments for public use in the PAs helped better organize public visitation and encouraged the development of local small sustainable businesses in the region. As an example, the Quilombolas, one of the traditional populations living within the site territory, developed community based tourism (IUCN Consultation, 2017).

**Sustainable finance**

Conservation of the Atlantic Forest is considered a very high conservation priority at the state, national, and global level, and over the years a large number of projects have been financed by multilateral and bilateral organizations, national and state governments, and international and national NGOs and foundations over the years to consolidate management (UNEP-WCMC, 2011; IUCN, 1999; de Oliveira, 1998). From 2010 to 2014, the Ministry of Environment (MMA) coordinated the Atlantic Forest Protection Program. From 2010 to 2015 the Program invested US$ 16 million, donated by the German government, for sustainable management and recovery activities to mitigate climate change effects. The FUNBIO, a Brazilian conservation trust fund, operated those resources. Significant support was provided by the Brazilian Foundation Boticário both in research and in situ conservation (IUCN Consultation, 2017). In 2017, however, the budget situation has worsened significantly with significant cuts of the Ministry of Environment budget (IUCN Consultation, 2017).

**Staff capacity, training, and development**

The severe staff shortages are of serious concern. Much higher levels of staffing are needed to ensure adequate management both of the individual protected areas comprising this serial World Heritage site and integrated management across the entire site (UNEP-WCMC, 2011; IUCN Consultation, 2017).

**Education and interpretation programs**

Past projects have given significant emphasis to environmental education, and a number of programs have been developed (UNEP-WCMC, 2011). However, in 2016 the Sao Paulo state government closed its Environmental Education programme (IUCN Consultation, 2017).

**Tourism and visitation management**

Forest conservation is the paramount aim of the reserves, so that visitation to many of the sites is restricted to certain areas or trails, as at the research stations. These latter do encourage ecotourism, ecological researchers and environmental education. The IDB signed two loan agreements with the SP State government. One in 2006 (US$ 15 million – 9 million from IDB and 6 million from the government) and another one in 2010 (US 165 Million from the bank and other similar amount from the state government). The first agreement helped the State to plan and develop public use infrastructure in 5 State Parks (Carlos Botelho, PETAR, Intervales, Caverna do Diabo and Ilha do Cardoso). Those PAs are well equipped, have information centres, with visitor facilities and good trails. The other agreement focused on the Serra do Mar mosaic (outside the World Heritage site) but included the Jureia-Itatins Mosaic, which is part of the World Heritage site (IUCN Consultation, 2017). Overall, tourism and its impacts are localized; however, their concentration in some areas might be too high and these areas become over-utilized (IUCN Consultation, 2017).

**Monitoring**

Despite monitoring being carried out in many of the site's components, an overall monitoring system for the entire World Heritage site remains absent. Since 1985, the SOS Mata Atlantic Foundation and the National Institute for Space Research (INPE) monitor the Atlantic Forest remnants in all 17 states where it occurs. Between 2015 and 2016, 130.973.638 hectares (93%) of the total area under the Atlantic Forest Law were evaluated. The deforestation in that period was 29.075 ha. Compared with the previous period of 2014 and 2015, an increase of 57.7% in the deforestation was registered (IUCN Consultation, 2017).
Research

Mostly Effective

There are 6 Ecological Stations in the World Heritage site that have research facilities. Their great value lies in the preservation of genetic resources and good samples of Atlantic forest biodiversity, for research into speciation and into the future of sustainable exploitation of indigenous species, especially for their medical uses (UNEP-WCMC, 2011). Significant research is funded by a number of foundations, such as Boticario Foundation, which invested in the Lagamar region (PR and SP states) the amount of US$ 982,540.09 in the last 5 years. Another example is the Project to conserve the Red Tailed Parrot (Amazona brasiliensis) which changed the classification of the species from threatened to almost threatened (IUCN Consultation, 2017).

Overall assessment of protection and management

Some Concern

The establishment of protected areas within the remaining Atlantic Forest was an important step to prevent the irreversible loss of a unique and exceptionally diverse forest ecosystem altogether. However, some of the protected areas, mostly the private ones that make up this serial World Heritage site, are very small and vulnerable to outside influences. However, there are important continuous blocks including Serra do Mar, Carlos Botelho and Intervales State Park which urgently require increased protection to ensure long-term conservation of the area and remaining connectivity. Much of the implementation, in particular as regards coordination of efforts between actors and stakeholders, remains to be consolidated. Urgent action seems needed to improve integrity and resilience given the increasingly unfavorable conditions in the wider landscape. At the same time, the recent budgetary cuts in federal budgets in Brazil, including for protected areas, raise serious concerns over the already limited resources to address these issues.

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

Serious Concern

Overall, the components of this serial World Heritage site remain under serious pressure from threats originating from outside their boundaries due to the overall fragmentation of the Atlantic Forest region. Many components are located in close proximity to cities or rural areas and are under particular pressure. Functional buffer zones are therefore considered to be of particular importance for this site.

State and trend of values

Assessing the current state and trend of values

World Heritage values

Exceptional natural beauty

Low Concern
Trend: Stable

The Atlantic Forest South-East Reserves World Heritage site remains an area of exceptional natural beauty with a high variety of landscapes (World Heritage Committee, 2015).

Highly diverse forest region with high degree of endemism

Critical
Trend: Deteriorating

Only about 16% of the original Atlantic Forest remains (Ribeiro et al., 2009); what remains is isolated and fragmented and largely occurs in small isolated patches (Alexandrino, 2016). Some more recent studies, based on new remote sensing data, conclude that up to 28% of the native vegetation of the Atlantic Forest might remain and that there is potential to further increase through conservation actions and restoring connectivity (Rezende et al., 2018). The establishment of protected areas in this crucial area of the remaining Atlantic Forest which form part of the World Heritage site halted a longstanding
process of deforestation and forest degradation just in time to prevent the irreversible loss of a unique and exceptionally diverse forest ecosystem altogether. The establishment as such, however, will not ensure the long-term maintenance. Further investments in management and coordination are needed in addition to more environmentally-friendly land use in the broader landscape, including forest restoration.

▸ High diversity of mammal species ▸ High Concern

The fragmentation and isolation of protected areas that make up the World Heritage site continues to pose a serious threat to the long-term conservation of some species. However, there is a lack of consolidated data on the current state of key species populations and their trends. While systematic data on key species across the entire serial site is not available, some data indicate that many have been declining, for example the jaguar (Panthera onca) whose population decreased by 80% in the last 15 years in the Atlantic Forest biome and whose remaining population in the entire Atlantic Forest area was estimated at 250 individuals in 2012 (Gonçalves Morato et al., 2013; Beisiegel et al., 2012). For many species, it is also predicted that their distribution across the remaining Atlantic Forest will also be significantly affected by climate change in the future (Lourenço-de-Moraes et al., 2019; Follador et al., 2018).

▸ Diverse avifauna ▸ High Concern

While no specific assessment across the component protected areas comprising the World Heritage site is available, recent studies note that out of 223 bird species identified as endemic to the Atlantic Forest, 31% are considered threatened or extinct (Vale et al., 2018), while an earlier study concluded that 98 endemic bird species were threatened with extinction (Bencke et al., 2006). Overall, key threats are the same as those affecting other species in the Atlantic Forest - fragmentation and isolation of protected areas. Several studies have also argued that small remaining fragments are of high importance for conservation of bird species, as, while they themselves cannot support viable populations of birds in the long-term, they reduce distances between larger habitat remnants (Barbosa et al., 2017).

Summary of the Values

▸ Assessment of the current state and trend of World Heritage values ▸ High Concern

The establishment of protected areas in this crucial area of the remaining Atlantic Forest halted a longstanding process of deforestation and forest degradation just in time to prevent the irreversible loss of a unique and exceptionally diverse forest ecosystem altogether. The establishment as such, however, will not ensure the long-term maintenance. Further investments in management and coordination are needed in addition to more environmentally-friendly land use in the broader landscape, including forest restoration. While systematic data on key species across the entire serial property is not available, some data indicate that many have been declining, for example the jaguar (Panthera onca) whose population decreased by 80% in the last 15 years in the Atlantic Forest biome and whose remaining population in the entire Atlantic Forest area was estimated at 250 individuals in 2012. For many species, it is also predicted that their distribution across the remaining Atlantic Forest will also be significantly affected by climate change in the future.

Additional information

Benefits

Understanding Benefits

▸ Outdoor recreation and tourism

The World Heritage site is located in the vicinity of Sao Paulo, South America's largest city and
metropolitan area suggesting a touristic potential in attractive areas, in particular near the coast.

► **Importance for research**

As the last remnants of the southern Atlantic Forest, the site is of great value for researchers as it provides an opportunity to study the great biodiversity of this region in the last unaltered natural expressions of the biome.

► **Water provision (importance for water quantity and quality)**

All remaining areas of the Atlantic Forest are important for water provision (Joly et al., 2014).

Factors negatively affecting provision of this benefit:
- Climate change: Impact level - Moderate, Trend - Increasing
- Habitat change: Impact level - High, Trend - Increasing

► **Fishing areas and conservation of fish stocks**

Although no specific information is available, many areas of Atlantic Forest cover probably affect the productivity of adjacent estuarine areas and coral reefs, therefore supporting subsistence and commercial fisheries along the Brazilian Atlantic coast (Hanazaki et al., 2009).

Factors negatively affecting provision of this benefit:
- Habitat change: Impact level - High, Trend - Increasing

► **Collection of wild plants and mushrooms**

Many wild plant species form an important part of the diet of local and traditional people (Joly et al., 2014).

Factors negatively affecting provision of this benefit:
- Habitat change: Impact level - Very High, Trend - Increasing

► **Carbon sequestration**

Even though, only patches of the Atlantic Forest remain, they remain extremely important for carbon sequestration.

Factors negatively affecting provision of this benefit:
- Habitat change: Impact level - Very High, Trend - Increasing

**Summary of benefits**

The benefits of the World Heritage site for conservation and for knowledge generation are highly valued at the state, national, and global levels. Even though only patches of the Atlantic Forest remain, they remain extremely important for carbon sequestration and all remaining areas of the Atlantic Forest are important for water provision.

**Projects**

**Compilation of active conservation projects**

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<th>№</th>
<th>Organization</th>
<th>Brief description of Active Projects</th>
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<tr>
<th></th>
<th>FUNBIO</th>
<th>Atlantic Forest Conservation Fund which aims to contribute to the protection, sustainable management and recovery of the Atlantic Forest. The fund seeks to support the identification of stakeholders and the establishment of Conservation Units (CUs) and Private Natural Heritage Reserves (RPPNs); stimulate projects on Payments for Environmental Services (PES) and the creation of a system of monitoring for the biome. The Project is part of the International Initiative for Climate Protection (ICI) of the Ministry of Environment, Nature Conservation and Nuclear Safety of Germany (BMU), which provides financial support through KfW Entwicklungsbank (Development Branch of the German Reconstruction Bank), through FUNBIO.</th>
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<td>Fundação Grupo O Boticário Foundation continuously invest in many research projects the Lagamar region (PR e SP), including the management of the Salto Morato Private Reserve.</td>
<td><a href="http://www.funbacao.org.br">http://www.funbacao.org.br</a></td>
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<td>Sociedade de Pesquisa da Vida Selvagem e Educação Project to conserve the Red Tailed Parrot (Papagaio da Cara Roxa) - Amazona brasiliensis.</td>
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