

# ECOLOGICAL CORRIDORS

Brazilian Initiative and the  
Continental Perspective

WORKING DOCUMENT

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## **Introduction**

In order to contribute with the tackling of global challenges, the Brazilian government has been advancing towards fulfilling goals established and agreed upon on the several multilateral accords in which Brazil has taken part in, therefore demonstrating our sense of responsibility and commitment. Those advances are being made through coordinated activities between the several secretariats and related institutions that compose the Ministry of the Environment and also through approximation and offering of support to Brazilian states and municipalities.

The Ecological Corridors Program, which is now receiving important input from the national academic sector, favors an amplification of database and information regarding this theme as well as its constant updating and a greater social involvement with the environmental issues, as envisioned by the National Environmental Policy. The scenario being unveiled, which is one of proximity between the social actors, allows for an amplification of the Program's governance, as well as the finetuning of policies to corroborate with new global realities that increasingly require synergy and cooperation on many levels.

This is merely the first step on a long journey towards the building of solid partnerships and of a wider outlook on the issue encompassing a continental perspective. The Ecological Corridors Program initiated by this Ministry's Secretariat of Biodiversity and Forests in collaboration with the Institute of Advanced Studies of the University of São Paulo, tackles environmental issues through an integrated approach and aims to strengthen cooperation between countries. Such a cooperation would allow for the management of vulnerabilities on climate and hydrological issues through effective actions to protect forests and socio-biodiversity in both South and Central Americas, thus promoting regional development and strengthening relationships between different peoples.

We welcome this document with great joy and enthusiasm. We shall work tirelessly so that the Corridors Program becomes an important instrument in enforcing the fulfillment of Brazil's commitment to the Conventions on Biological Diversity and Climate Change, made during the Rio-92 Conference as well as other fundamental references to ensure sustainable development.

José Sarney Filho  
**State Environment Minister**

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## **An Outlook on the Brazilian Ecological Corridors Program**

Executive Office

The Ministry of the Environment (MMA) incorporates, as a premise to its policies, initiatives and actions, sustainable development as the long term stepping stone for all other forms of development. Therefore, economic development, social inclusion and environmental protection must all walk side by side and support each other internalizing the definition of sustainable development as “a form of development that satisfies present needs without compromising the future generations’ capacity of fulfilling their own needs”.

Environmental policies must be conceived and implemented keeping the aforementioned premise in mind as well as taking into account the pressing need for economic growth and social inclusion in a country with dire social distortions and high demands for economic growth such as is Brazil. In the same way, all actions taken by the Government must reflect on and incorporate considerations of an environmental nature, not being restricted solely to actions and programs regarding environmental preservation. The key matter here is to find ways to systematically assess all programs’ environmental impacts, quantify them and integrate measures in order to limit any negative environmental impact.

It is within this concept that the Ecological Corridors proposed by the MMA are inserted. The Corridors are an initiative that, aside from being recognized from an environmental preservation standpoint, are also able to work in a constructive manner alongside other Government sectors and activities, promoting both economic and social gains.

Up until not very long ago, the main instruments used to provide biodiversity preservation (over which the State exerts a right of possession and control) were the public protected areas. The concept of Ecological corridors is relatively new and refers to a particular strategy of landscape management. In that sense, it encompasses all protected areas as well as everything intrinsic to them, promoting synergy between several instruments of Brazil’s environmental policy such as the National System for Preservation Units, the National System for Water Supply, the Forest Code, the Legal Amazon’s Deforestation Prevention and Control Plan, the National Climate Change Policy, amongst others.

Thus the idea of Ecological Corridors is characterized as an element for sustainable territorial development, an initiative promoting the conservation of Protected Areas and



Conservation Units and qualifying as well as valuing those areas' relationship with other contiguous areas that hold a role as productive sectors such as agriculture and cattle raising, transportation, energy, industry, and others. Within this perspective, Ecological Corridors are not political or administrative areas; they are areas characterized by coordinated activities, with the goal of protecting biodiversity in biome scale. Those actions involve the strengthening, expansion and connection between protected areas within the corridor, fostering low impact usage and creating incentives in order to engage different sectors of production and preservation.

Such unique features would naturally require, in order to be implemented, a high level of cooperation between institutions and stakeholders from several sectors. The Ecological Corridor concept symbolizes an alternative approach to the conventional manners of preserving biodiversity, seeing as it is an option that is both decentralized and participative.

It is with this particular goal that MMA proposes to develop this project: counting with ample participation, articulation and coordination between all sectors of society and Public Power instances, in such a way that this initiative distances itself from being restrictive and proves to be an agent for sustainable development promotion throughout all national territory. As this initiative is consolidated at a national level, it shall also allow for a vast set of international articulation between south American countries aiming to coordinate other initiatives of the same nature.

The aforementioned spirit of participation, articulation and coordination was, naturally, initiated between the Ministry of the Environment's Secretariats Units. The first discussion about the Project was held shortly after the inauguration of the present administration and aimed to follow this approach, in a meeting that counted with the participation of all secretariats and ministry related units. The Ecological Corridors concept includes multiple dimensions of protected areas preservation, in addition to biodiversity protection (including forest protection), water resources, climate change, urban environment management, sustainable rural development, as well as the Ministry's relationship with other Government organs, federal entities and society sectors.

It was the Biodiversity Secretariat's role to consolidate this proposal and conduct the following steps, which aim to structure the Project through general administration guidelines: integrating policies, working with all areas of the Ministry, identifying

common goals for greater efficiency and efficacy, and eliminating duplication and overlapping of efforts.

The present document constitutes the first overview of the Ministry's impressions about the project. Each Secretariat and Unit (within their own competencies and prerogatives) aimed to approach this endeavor as a shared project, exemplifying the sort of work they are proposing to develop, and the way those activities impact or are impacted by other environmental policies. Such an approach shall ensure the allocation of financial and human resources for the project, not within an organizational hierarchy perspective, but with the goal of optimizing the public administration's scarce resources. In the same way, it shall favor negotiations and joint construction with international resource donors and important Ministry partners, to whom we also aim to display desirable evidence of coordination, prioritization and strategic resource allocation.

The Ministry's Executive Office welcomes the Ecological Corridors proposal not just within its institutional competencies of supervision, coordination, monitoring and evaluation of the Secretariats composing the Ministry, or of articulation mechanisms particular to environmental public policies identification, but, above all, as an opportunity of interdisciplinary action between the Ministry and other Government sectors as well as the Brazilian society. The serious crisis Brazil currently faces requires structuring and less resource intensive solutions. In that sense, the Ecological Corridors project will be able to propose not only new paths to be trailed, but also other approaches for the conceptualization and implementation of public policies.

## **Ecological Corridors and the Role of Academic**

Institute of Advanced Studies of the University of Sao Paulo

Sao Paulo University's (IEA-USP) the role of fostering academic research and vanguard knowledge advancements within the scientific community. With that in mind, by bringing the theme of biodiversity and forests to the scientific community's attention as well as to the public eye, the Institute is not only proposing an advancement in the University's agenda, but also fulfilling a longstanding general desire in Brazil and Latin America.

IEA-USP has recognized the necessity of supporting and fostering the themes of land usage, climate change and forest protection in all regions, as well as the social and cultural changes related to those themes, shining a light on one of the most fascinating themes we have yet to tackle, which is the recognition of Brazil's valuable natural resources. Furthermore, we also realize the importance of the subject matter beyond national frontiers, and therefore encourage interaction and strategic synergies that may define the future we all wish for our planet.

Since 2009 a Research Group was formed at IEA-USP, culminating in the proposal of a proactive debate around the Latin American Ecological Corridors Initiative, which was launched as a program in May of 2016. The main intention behind this program is to get to know the multiple corridor initiatives already existing in the continent, therefore promoting a discussion locus that allows for the uniting of efforts and integration of goals.

This research group's existence has propitiated a fruitful debate with the Federal Government, which allowed for the strategic approximation of different interest groups, from researchers from different universities to Non-Governmental Organizations and the private sector. This dialogue has contributed with a common constructive view of a future where both preservation and sustainable usage of Brazilian land as well as different populations, territories and interest groups are able to peacefully coexist. Furthermore, an informal dialogue was initiated amongst several Brazilian Institutions with other Latin American countries. Through those steps and activities, the construction of an inter-regional perception was facilitated, establishing that nature and Ecological should be an essential part of the proposed solutions. It becomes evident that both codependent and independent relationships should be fully understood so that they can integrate regional and territorial necessities. At the same time, the continuity of ecological systems must be maintained and, consequently, the function of natural mechanisms that maintain those

ecosystems vital functions. Therefore, regions connected in ecological corridors, with their forests and preserved natural environments, must take into consideration human production and transformation activities, converging the development of nations with the future of Planet Earth as a whole.

Thus, IEA-USP understands its responsibility of fueling the interlocutors' interests with substantiated information and at the same time performing the role of neutral forum for dialogue and convergence of society's interests. This aids the public authorities in fulfilling their leadership role and attends the expectations of the private sector, informing rational and consequent decisions in the best and most qualified manner and offers a perspective for a balanced and prosperous future, the future we want.

The outlook of this endeavor within the IEA-USP is to rely on existing experiences and take into account biodiversity's natural condition when it comes to water and the climate as well as its interaction with cultural and social components without which our goal cannot be met.

Traditional cultures related to Brazilian biomes must be preserved so that they are able to keep existing and performing activities and roles that establish a knowledge threshold always open to completion and addition. Therefore, IEA-USP intends to summon other advanced institutes in order to debate this theme, consolidating a comprehensive and inclusive proposal of multiple authorship and able to encompass the whole of the national territory. The following step would then be the seeking of new partnerships and contacts with the Advanced Studies Institutes of Central and Latin America, in order to hear their views on these issues.

Those partnerships were delineated during the International Union for the Conservation of Nature – IUCN; held in September 2016, in Honolulu – USA; there has been an introduction to this proposal which provoked great interest from several participants and Latin American representatives.

A similar proposal was presented by the Colombian representative during the event and the Argentine representative also provided the participants with inputs based on papers and research carried out on the country's corridors, this information has been included in the study and spatialization maps produced by IEA-USP.

Finally, other pertinent considerations were made by the Mesoamerican Corridor Project Coordinator, initiating the debate that should be carried out during CDB's COP 13 which will take place in Cancun in december of 2016.

## **Background**

Territorial planning is usually more effective the greater the consideration given to the environmental front in its definition. The word Environment is understood here in its broader sense, necessarily including the relationships and interactions between human activities and the biota, as well as the particularities of the territories in which those interactions occur.

The migratory movements that resulted in human distribution around the South American territory and in the formation of pre-Colombian civilizations may themselves be considered corridors, once they allowed for the occupation of territory by those civilizations and contributed to the distribution of several species of fauna and flora. Those human displacements also allowed for sociocultural exchanges that reflect in the way humans have appropriated the territory in the south of the continent and in the manner in which they relate to different environmental factors by turning them into knowledge.

Analyzing regionalization trends while elaborating public policies and conducting strategic planning leads us to the essential discussion around territorial division in environmental units and the retrieval of some sustainability concepts that have been in development since the 1970s and which have originated the corridor theories.

The Ecological Corridors concept as well as its theoretical basis were initiated in the 1960s with the studies developed by several researchers such as Preston (1962), McArthur (1963) and Wilson (1967) on the islands biogeography and the preservation of species efforts risk of failure should they be founded solely on the establishing of reserves. Thus, in the middle of the 1970s, based on the studies of Diamond, Wilson and Willis, arises the notion that gene flow amplifies the reserves' effectiveness through connected corridors or environments that are permissive to the transit of fauna.

As was pointed out by Thomas (1991) the term 'corridors' has been used to describe countless phenomena able to connect protected areas or natural reserves, thus diminishing species extinction rates, amplifying recolonization and augmenting the preservation value of those areas. However, the author points out the small number of papers produced with the goal of typifying or classifying those corridors in scientific literature, in spite of the fact that most works recognize ecological corridors as an important part of strategic territorial planning.

## Ecological Corridors Around the World

Among ecologists and landscape scholars, the approval of strategic results for the implementing of Ecological Corridors is widespread. In the early 1990s the New Zealand Conservation Department was already publishing its evaluations on the results and relevance of those initiatives in their territory, especially those grounded by studies and scientific research coordinated by Thomas (1991).

In Europe, the Pan-European Green Corridors Network was derived from the successful experience in implementing corridors that initially connected the Pyrenees to the Carpathians and now also encompass the Alps, the Massif Central and the Balkan Region. Discussions in the European continent point in the direction of three main goals, the connection between mountainous environments, the creation of corridors in riparian environments and the protection of unique species, particularly the large carnivores.

This European initiative already has its goals delineated for 2020, involving a series of organizations also located outside of the Carpathians, which were adopted as a pilot area. This large scale European project, known as *Pan-European Green Corridor Network*, or simply as PEGNet, aims to reestablish connections extending from the Atlantic to the Black Sea and from the Artic Environments to the Mediterranean.

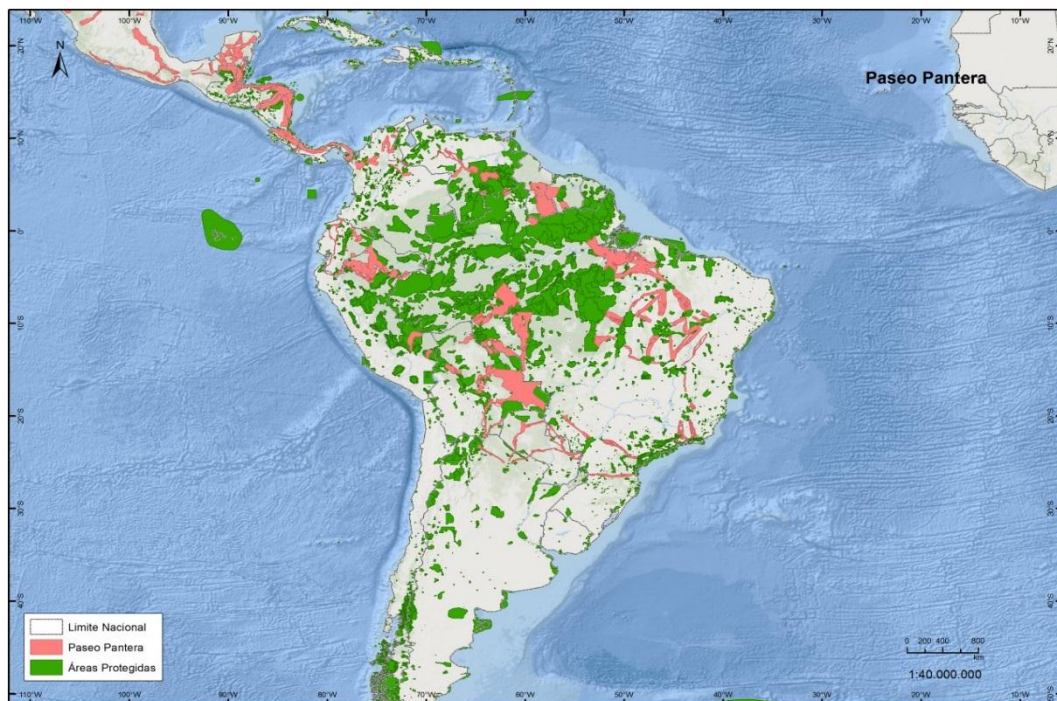
The European experience presents a different outlook from the one observed in New Zealand, once it encompasses landscapes that were heavily altered by human activity, especially by urban densification and public transport networks, which makes the project's influence area quite fragmented. PEGNet is held by its idealizers as an opportunity to recreate natural routes and connections in the continent, having at its core goals such as restoration in the gaps between protected areas, reintroduction and repopulating by wild species and socio-economical large scale benefits which should outlive generations.

The Mesoamerican corridor, greatly developed and studied, is pointed out by researchers as the "bridge" that permits connection between wild life and the North and South portions of the American continent. That fact demonstrates the importance of the region as a gene flow integrating factor due to the unique environments it contains and the estimated 7 to 10% unknown species housed in those environments. However, the Mesoamerican Ecological Corridor was not fully developed in the way it was initially envisioned. The portion yet to be implemented seeks to integrate different environmental

areas in a great functional continuum that allows for the connection to occur attuned with human activities and seeking its betterment through the incorporation of sustainability.

In the same way as Unesco’s Ecological Reserves Program *Man and Biosphere* – MAB, this corridor project is also supported by areas with greater or smaller restriction of human activities. The areas encompassed by the original project comprehended some states at the south of Mexico as well as the South American connection, in Panama. This corridor’s initial idea used to encompass four terrestrial biomes and 19 different ecoregions. The project was partially implemented in the Atlantic Coast with the support of institutions such as the World Bank – WB, the United States Agency for International Development – USAID, and the *Global Environmental Facility* – GEF, amongst others.

In the Americas, the first corridor experience was implemented in the Atlantic component of the originally called Mesoamerican Project and became known as “*Paseo Pantera*” (Figure 1), it was led by the *Wildlife Conservation Society* – WCS and supported by USAID.



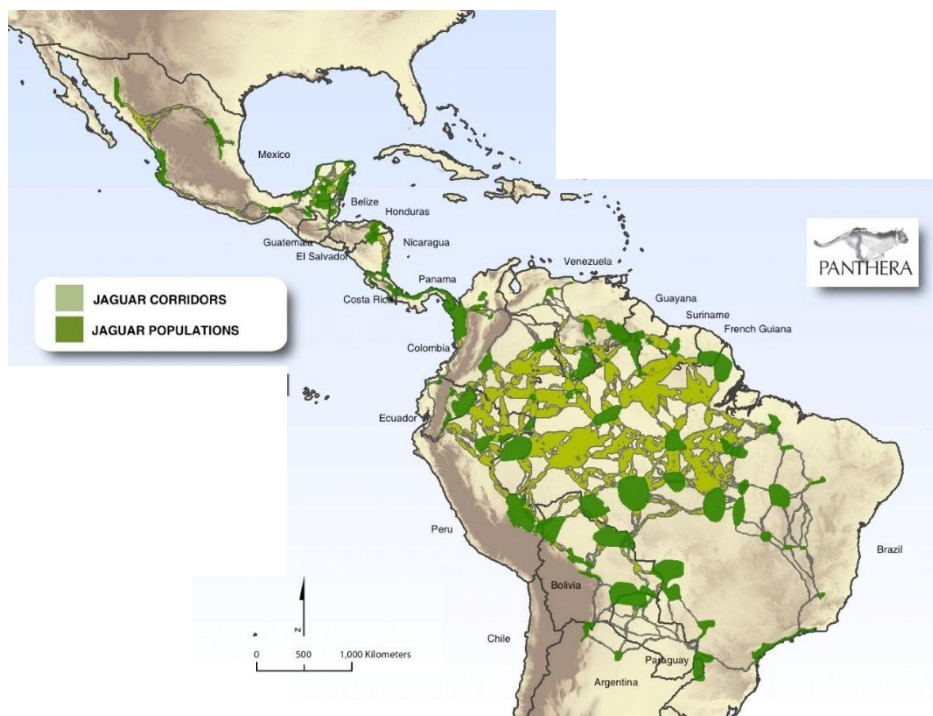
**Figure 1 – Mesoamerican Ecological Corridor – *Paseo Pantera***  
Source: IEA-USP



This corridor reestablished the connectivity between the remaining of the Central American forest, located in protected areas, as a way of reversing the great deforestation impulse observed in the region between the years of 1970 and 1990.

Similar to the Brazilian corridors, which will be discussed ahead, some difficulties were presented for *Paseo Pantera*'s implementation. However, those challenges found in Central America represent lessons learned in a context that mixes the less urbanized environment of New Zealand with the highly urban environment of the European Continent allied with the diverse cultural characteristics of the American Continent and its colonial history, which brings it closer to the Brazilian socio-cultural experience.

So important is the issue of the connectivity between natural environments that other studies and initiatives have arisen for the same region, considering the territorial extension necessary to the welfare of large wild carnivores. It is the case of the endeavor that aims to preserve the wild cats' genetic integrity in the territory comprehended between Mexico and Argentina, known as *Jaguar Corridor Initiative*.



**Figure 2 – Jaguar Corridor Initiative**

Source: [www.panthera.org](http://www.panthera.org) (Adapted)

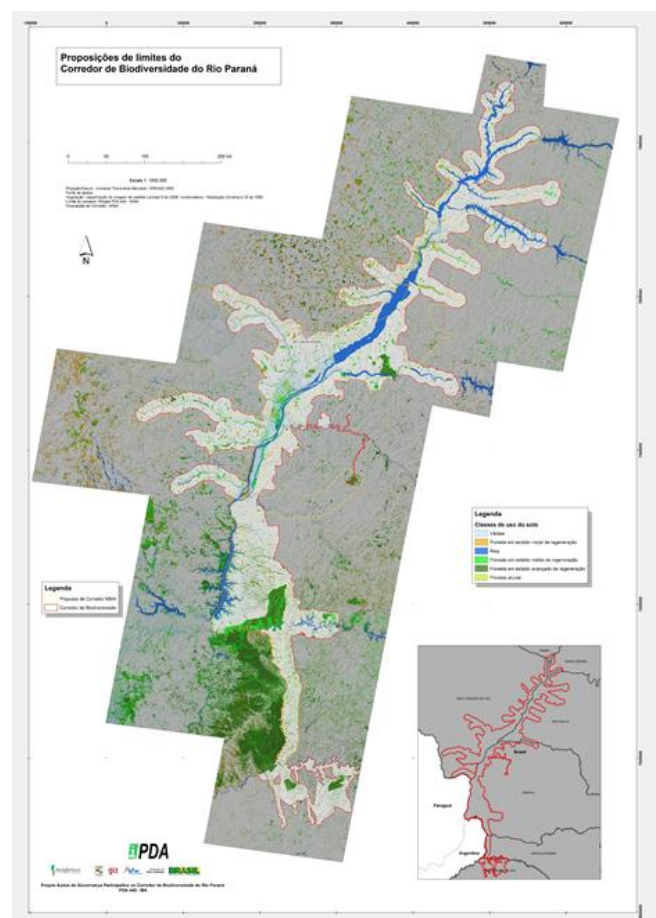
The initiatives of the Iguazu National Park Binational Corridor and the Iguazu National Park represent more recent success examples that extrapolate border issues in order seek joint action between different countries and institutions. Both of these protected areas are also recognized by Unesco and considered Biosphere Reserves. With the integration of

their coordination systems and handling plans, both parks have reached, in a very simple manner, their protection goals in a regional scale by respecting institutional and administrative differences particular to each country.

The goal of that Binational collaboration between Argentina and Brazil is to converge and act strategically so that the management of those protected areas is able to provide satisfactory results for preservation as sustainability once the harmonization of handling plans encompasses community involvement, enterprises and public policies that directly influence the results of those preservation activities.

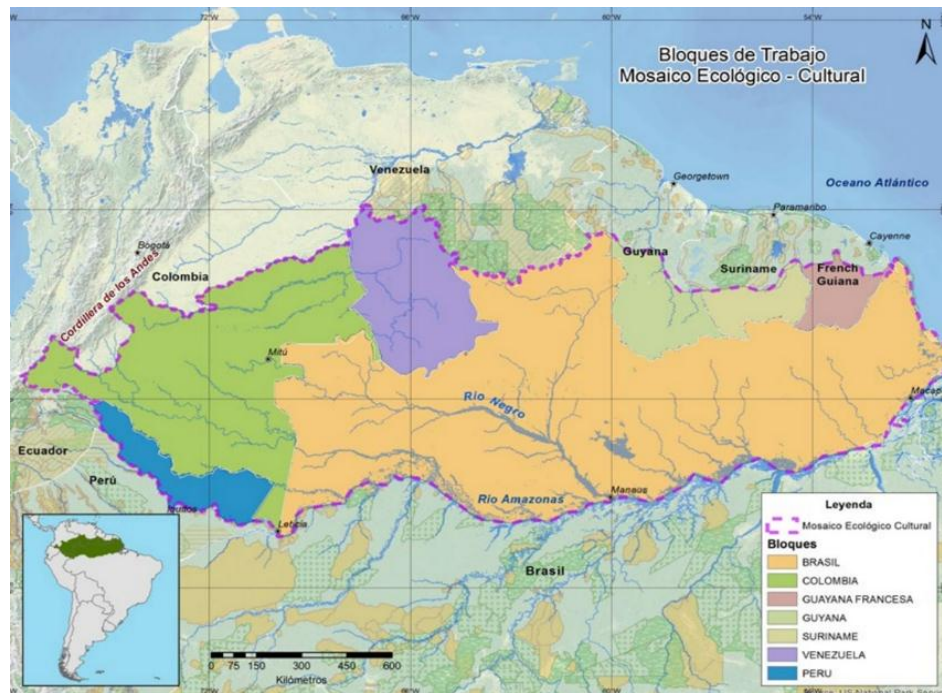
The Binational Corridor initiative, consolidates a successful partnership between authorities and researchers from both countries, reflected in the letter of intent that also formalizes the partnership between the Atlantic Woods Program (WWF-Brazil), and the Fundación Vida Silvestre, from Argentina, which has resulted in the proposal of preservation activities and the establishment of ecological corridors uniting priority areas.

From the binational experience, the Participative Governance Actions Program at the Rio Parana Ecological Corridor (**Figure 3**) was also idealized, involving resources from the governments of Brazil and United States, managed by Funbio in a project that searches to improve participative governance actions.



**Figure 3 – Paraná River Ecological Corridor**  
Source: MMA/PDA-445 MA, *Projeto Ações de Governança Participativa no Corredor de Biodiversidade do Rio Paraná*, 2012.

As aforementioned, during the UICN conference in Honolulu, several representatives presented their country’s studies, proposals and experiences related to the implementing of corridors in South America, referring preliminarily consolidated information by the IEA-USP. That is the case of Colombia, where a study about a ecological and cultural corridor known as “*Camiño de las Anacondas*” (**Figure 4**) is currently under development.



**Figure 4 – Cultural Ecological Corridor - *Camiño de Las Anacondas* (Colômbia)**

Source: Presentation of IEA-USP in Honolulu

Other initiatives were also presented by the Argentine and Paraguayan representatives. The complementarity of existing proposals is extremely relevant to the connectivity and conservation of ecosystems and environmentally sensitive areas in the continent’s south portion. That fact provides evidence to the pertinence of the connection between existing proposals throughout the Rio Parana basin which extends over Sao Paulo’s territory.

The Argentine proposal encompasses the *Chacos* region, amplifying preservation efforts concerning important wetlands (**Figure 5**), the Paraguayan proposal connects to the existing initiatives for the Paraná River basin, providing evidence of the joint action opportunity between the countries and of the continental initiative proposed by Brazil (**Figure 6**).



This overview of international experiences proves the importance and possibility that countries might increasingly act in a joint manner so that the global goals for biodiversity preservation, reduction of poverty and greenhouse gas emission are met.



**Figure 5 – Ecological Corridor de la Región Chaqueña (Argentina)**  
Source: Secretaria de Ambiente y Desarrollo Sustentable de la Nacion (2015)



**Figura 6 – Paraná River Basin Ecological Corridor – Visión de Biodiversidad (Paraguay)**  
Fonte: Red Paraguaya de Conservacion em Terras Privadas – [www.conservacionprivadapy.org](http://www.conservacionprivadapy.org)

## **Ecological Corridors in Brazil**

Brazilian Ecological Corridors experiences include successful initiatives developed both independently by the states and jointly with the Federal Government. Some scholars and researchers already pointed out in the decade of 1970, the relevance and appropriateness of adopting strategies for biodiversity preservation that are able to amplify the benefits of creating protected areas.

In that sense, some important milestones for preservation of areas extremely threatened by economic development and urban expansion were achieved in the 70s, with particular emphasis to the current metropolitan regions of Santos, Sao Paulo, Campinas, Rio de Janeiro and Curitiba.

Due to studies developed by researchers, territorial planners and ecology and landscape scholars, the initiatives for creation of the Serra do Mar State Park in Sao Paulo (1977), of the Serra do Mar APA (1984) and of innumerable other Preservation Units – PUs were successful in that area, drawing attention to the necessity of protecting the forest remnants of the Atlantic Woods biome and the importance of local involvement and action. Those studies were consolidated in the corridors proposal.

The creation of several different types of PUs stimulated the organized civil society's participation and involvement, which later constituted in several mosaics of protected areas ranging from *Ceará* to *Rio Grande do Sul* reinforcing the importance of preserving sociocultural aspects that represent the connection of men and environment and recovering the necessity of a holistic view on landscape planning.

All of those efforts were crowned by the creation of the Biosphere Reserves and the recognition of other corridors by society. The Ibero-American Network for Biosphere Reserves permits the identification of similar organization as well as usage and occupancy patterns in other Latin American countries, such as *Camiño Inca*.

### PP-G7 Corridors

The first draft of a ecological corridor plan within the MMA, focused on initiatives for the protection or recovery of connectivity between Brazilian Tropical Forests, which is the main goal of the Pilot Program for the Preservation of Brazil's Tropical Forests – PP-G7. In spite of using the term 'corridors' the Brazilian initiative had a distinct strategy

from the Mesoamerican initiative (Fonseca *et al.*, 2004) and was unprecedented in the existing projects.

The initial project held at its core the idea of great preservation areas, capable of maintaining or incentivizing the connectivity between protected areas by using a set of strategies that are currently incorporated to the National Preservation Units System (Fonseca *et al.*, 2004).

Initially developed by an extensive group of collaborators from several national and international institutions, the Project presented at the time, aimed to consolidate basic guidelines for the Parks and Reserves component. After that first initiative, which underwent several revisions, around 29 new proposals for the creation of corridors appeared. Some of those were implemented with participation from the Federal Government, State Governments, NGOs and also the Private Sector.

Following the Mesoamerican example, not all of those favorable areas for the implementation of corridors were effectuated. However, the projects that were partially implemented, or even the ones that were subject to several adaptations, present important learning opportunities to be observed and incorporated in the new initiatives being currently discussed.

#### MMA Implemented Corridors

Initially the PP-G7 Ecological Corridors Project used to include the Amazonian environment and, only later, did it incorporate the Atlantic Woods, seeking the protection of Brazilian Tropical Forests. As was pointed out by Paulo Nogueira Neto (*in* Ayres, 2005), Márcio Ayres' (idealizer of the Mamirauá Wildlife Station) innovative idea about the ecological corridors in Brazil.

As is also highlighted by Nogueira Neto (*in* Ayres, 2005), even with the Brazilian Environment Institute (Ibama) and the World Bank's support, the megaproject idealized by Ayres and his collaborators, denominated "cinturões verdes" (green belts) ended up being performed in a much less extensive (but not less relevant) area, ranging from the north of Manaus to the west portion of the Amazonas state, bordering Colombia and Peru. The Central Atlantic Woods Corridor has also later received important incentives from PP-G7 (currently G8) in order to be consolidated in 2014 by MMA, led by the Protected Areas Department of the Biodiversity and Forests Secretariat, which now retrieves those important concepts borrowed from previous experiences and adds newfound values to its

current initiative, now consolidated as a Program, and to the strategies and commitments assumed by the Federal Government in developing its Environmental Agenda.

### MMA Recognized Corridors

In addition to those corridors directly implemented by MMA with support from international donors and the execution of pilot-projects, we can also observe the existence of legally recognized corridors at state, federal and international levels. That information is consolidated in the following table, however its mentioning does not necessarily imply in the recognition of its effectiveness or in the usage of tools capable of measuring or guaranteeing, at this point, that its objectives have been integrally fulfilled.

Ecological Corridor	Legal Act of Recognition
<b>Federal (recognized by MMA)</b>	
Capivara-Confusões Corridor	Decree N. 76 March 11th of 2005
Caatinga Corridor	Decree N. 131 May 4th of 2006
Santa Maria Ecological Corridor	Decree N. 137 October 9th 2001 (IBAMA)
<b>State*</b>	
Chapécó Ecological Corridor	State Decree (SC) N. 2,957/2010
Timbó Ecological Corridor	State Decree (SC) N. 2,956/2010
Quarta Colônia Ecological Corridor	Decree N. 143/2014 (RS)
<b>Internacional</b>	
Brazilian Biosphere Reserves	UNESCO – MAB Resolutions

**Figure 7 – Formally Established Corridors**

## **A Ecological Corridors Proposal Considering a Continental Perspective**

Based on the new scenario, composed by internationally agreed upon sustainable development goals and also by the Brazilian goals for biodiversity in 2020 (related to the Aichi Goals established in the Biologic Diversity Convention – BDC), the Advanced Studies Institute of the University of Sao Paulo – IEA-USP has developed in the latest years, studies related to the integration of protected areas, considering surrounding environments so as to maintain its structure and ecological and socio-cultural functions.

The guidelines that govern this initiative are supported by scientific, ecologic, social and cultural criteria capable of proving the validity of actions directed to targeted species that can allow for the restauration of gene flows as well as augment or guarantee the connectivity between different populations as habitats. A study of the results obtained with the creation of Ecological Corridors on an international level and, especially, the results obtained from Brazil's own experience proves that this is an effective way of minimizing fragmentation and natural habitat destruction caused by forest conversion and primary threats to several species, especially considering climate change.

Ecological Corridors may be understood as portions of land that connect fragments of native vegetation or as preservation units interspersed by human activity affected areas, which has as its main goal to provide possibilities of movement of fauna between isolated areas, guaranteeing the genetic exchange between species, without which the ecosystem's integrity as well as the local biosphere's functions are put at risk.

The Ecological Corridors Project in a continental perspective is an Advanced Studies Institute of the University of Sao Paulo (IEA-USP) initiative, carried out by the Ministry of the Environment, aiming to develop concrete actions for establishing new corridors in Brazil as well as strengthening those still under developed or even consolidated, always considering a continental perspective.

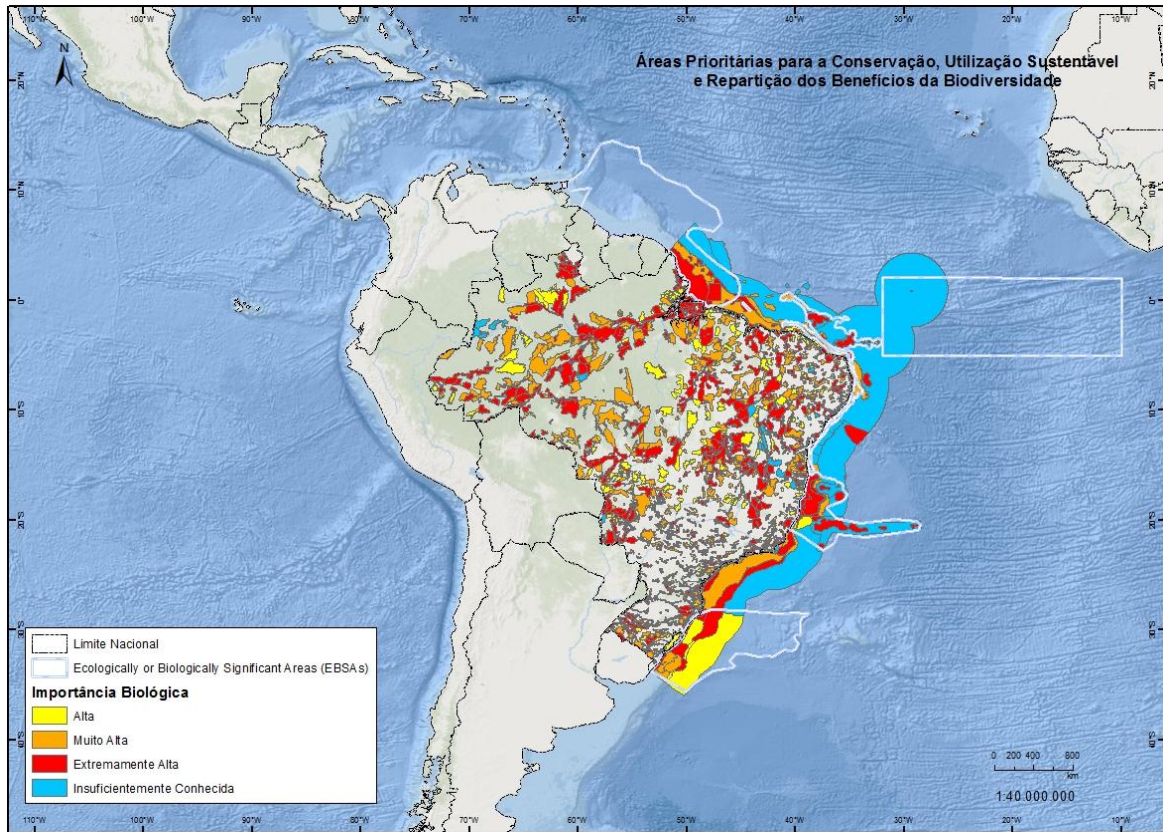
The revitalization of the corridors project partially revisits Márcio Ayres (one of the precursors of the first Brazilian corridors)' ideas, regarding the involvement of several different actors, from the highest government posts to the local communities, maintaining a wide decentralized approach that predicts complementary actions involving planning, zoning, monitoring, inspection, research development, institutional capacitation and the consolidation of long term collaborative management and sustainability structures.



The IEA-USP proposal brings and advancement in the sense of transforming an initial Project which encompassed part of the Brazilian vegetation and ecosystems in a great and solid Governmental Program that is linked to the new geopolitical scene and integrates the environmental aspect to other public policies in a continental scale. Seeking ample academic involvement, as well as the involvement of the third sector and counting with the support of various Companies, all stakeholders shall find participation and action locus within the context of the program, contributing in a substantial manner to the fulfillment of global goals.

During the IEA-USP studies about landscape units connectivity through ecosystem integration and permitting the reestablishment of essential flows, interest areas and management tools were identified in order to contribute with the diagnosis and understanding of the current fragmented scenario of South American ecosystems and also to pinpoint possibilities for reestablishment of important flows in interstice areas.

By adopting different approaches defended by researchers, ecologists and landscaping specialists in the design and definition of the ecological corridors, the assessment of protected or sensitive areas was carried out so as to find out if the connectivity efforts would pay out, as shown in the mapping areas of Priority Preservation, Utilization and Sharing of Biodiversity Benefits, which fulfill the Brazilian goals related to environmental commitments undertaken in international agreements (**Figure 8**). Thus, that information was added to the data on Latin America's protected areas, prioritizing those integrating the National System of Brazilian Preservation Units - SNUC, made available by the Preservation Units National Records – CNUC, both managed by SBF/MMA (**Figure 9**).



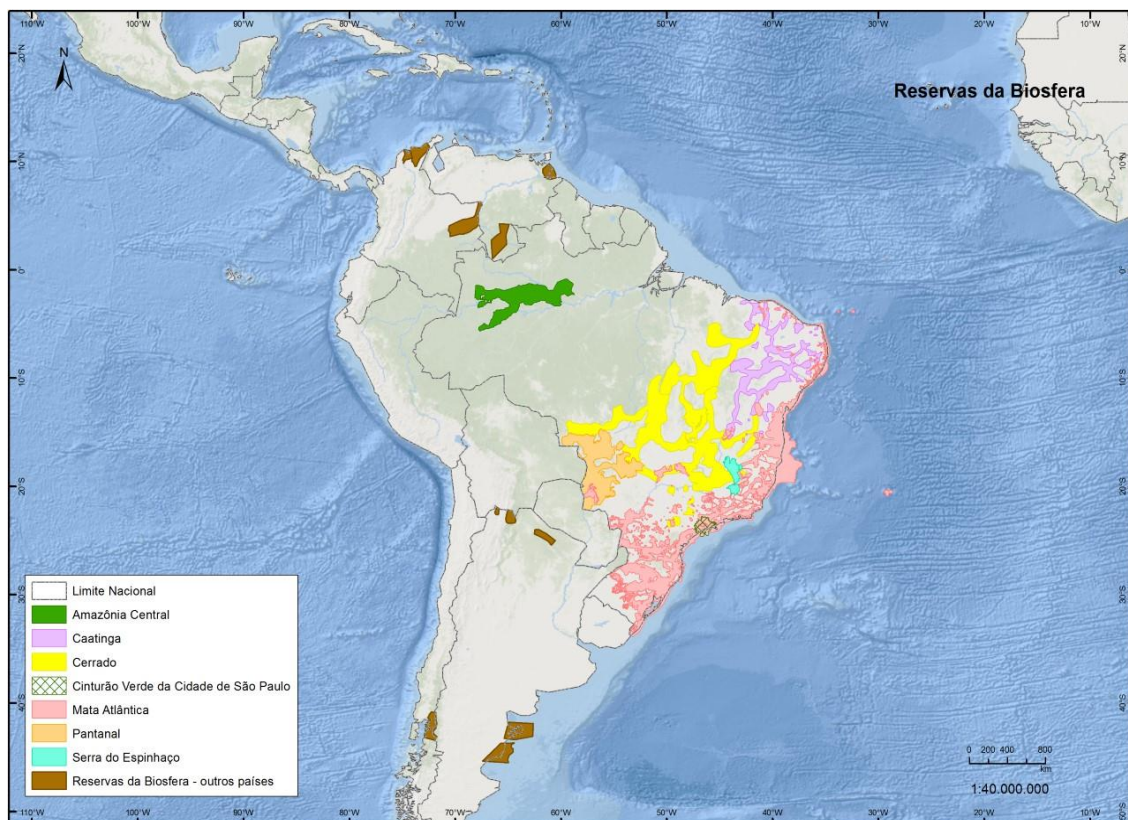
**Figure 8 – Conservation Priority Areas**  
Source: Probio (2007)



**Figure 9 – Brazil’s Protected Area System – SNUC**  
Source: CNUC/SBF/MMA



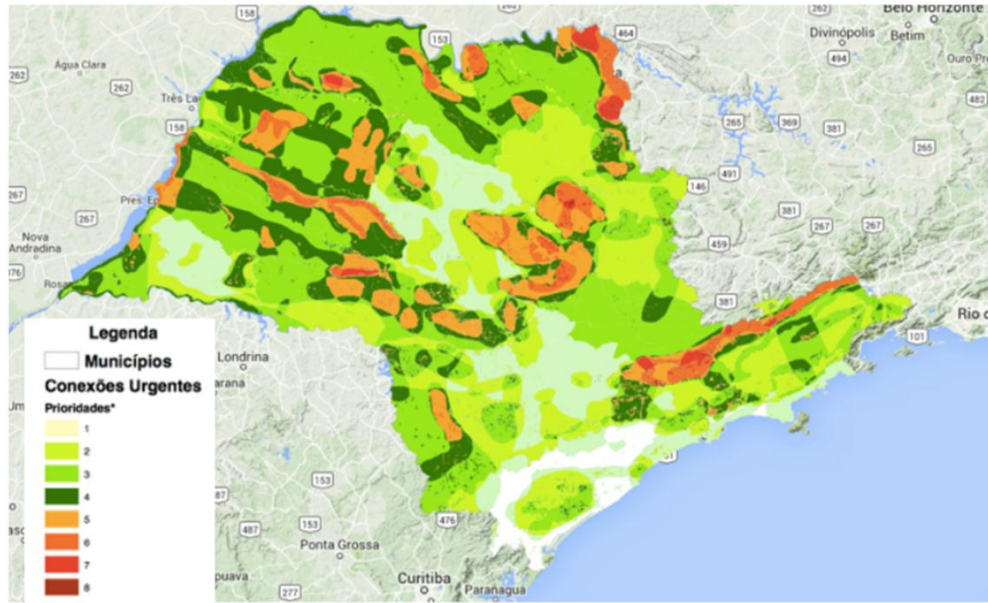
The Biosphere Reserves established by the MAB-Unesco Program (**Figura 10**) were also mapped throughout the continent.



**Figure 10 – Biosphere Reserves in South America**

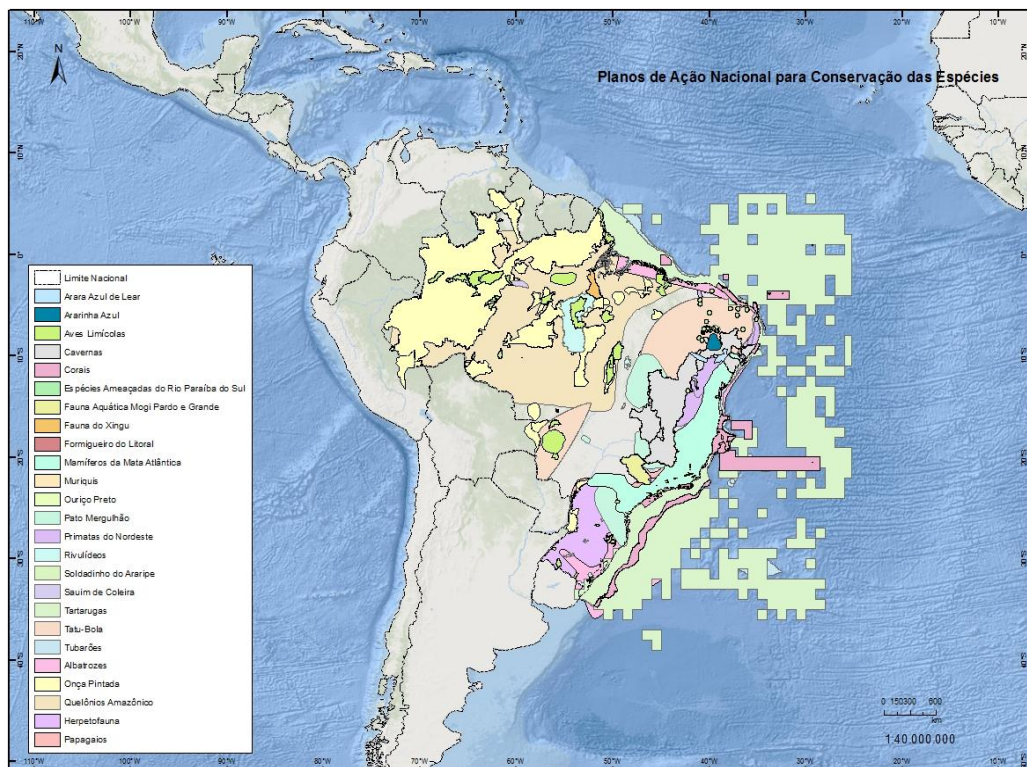
Source: Data IberoMAB (Adapted)

As a form of affirming the validity of this territory analysis methodology, and as evidence that such an approach can be applied on many different scales, we may also observe the results of the Biodiversity Characterization, Preservation, Restauration and Sustainable Usage Research Program of the Sao Paulo State, known as Biota-Fapesp, and developed by the Campinas State University – Unicamp, identifying urgent connections in the state and classifying those connections by different priority levels based on scientific criteria (**Figure 11**). In the same way, priority preservation areas for the state of Bahia are also an example of how spatial an territorial analysis supported by the understanding of geo-environmental and socioeconomic aspects can be essential for the designing of programs and activities aimed at conservation.



**Figure 11 – Urgent Connections in São Paulo state organized by Priority Level.**  
 Source: Biota-Fapesp

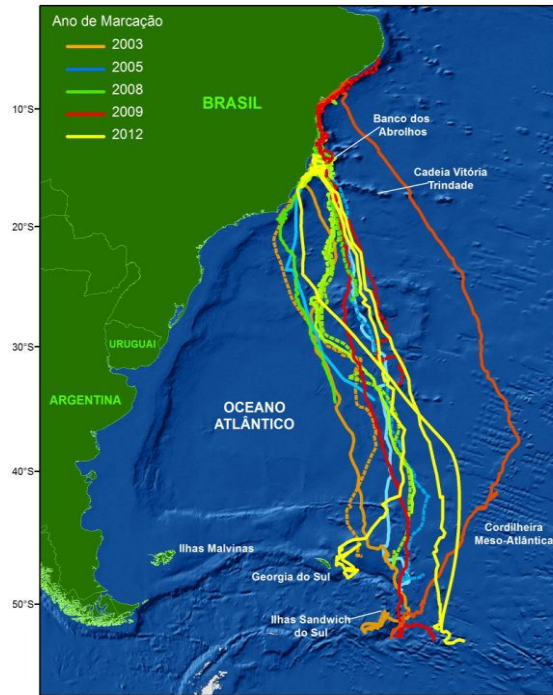
Amongst the territorial study strategy and the approach by specie in corridor designing, the National Action Plans (**Figure 12**) are also examples of possible connectivity studies that allow for the preservation of a target species or habitat, aiming to reduce the level of threats.



**Figure 12 – National Action Plans - PANs**  
 Source: ICMBio



Another approach that is widely popular amongst Ecological Corridors researchers is the adoption of key preservation species as a moto for the establishment of priority flows and connectivity identification, following the PEGNet and Paseo Pantera examples. In the studies currently finished by IEA/USP humpback whale routes (Figure 13) were mapped by utilizing available data from the species' monitoring project. The migrating bird routes (Figure 14), which usually pass through the Wet Areas located on Brazilian turf were also part of the mapping of priority areas for conservation.



**Figure 13 – Humpback Whales Routes**  
 Source: Projeto de Monitoramento das Baleias Jubarte



**Figure 14 – Priority Areas for the Preservation of Migratory Birds**  
 Source: ICMBio

Thus, after ample studies including mapping of other initiatives and socio-biodiversity flows able to positively influence the amplification of connectivity in South America by contemplating the reestablishment and amplification of gene flow and, especially, strengthening and integrating protected aerial networks encompassed by the Ibero-American Comitee Network MaB – Iberomab, the Latin American Technical Cooperation in Natural Parks Network – Redparques and the International Association for the Protection of the Amazon – Iapa, we were able to map all of those consolidated initiatives in a single database.

That great map arisen from the initial studies developed by IEA/USP (**Figure 15**) spatializes a first overview of connection possibilities to be restored or established in a continental scale. In a institutionalization of this initiative, IEA is united with the Brazilian Government and under the coordination of the Biodiversity and Forests Secretariat of the MMA, the Ecological Corridors Program is developed in its new formulation, fostered by collective construction and plural authorship, and grounded on five strategic pillars: Planning, Territorial Structuring, Institutional Articulation, Socio-Environment, and Effectiveness and Quality. Approaching in an integrated manner the seeking of solutions to the problems relating to water conservation, adaptation and mitigation of the effects of climate change, sustainable development, forests and biodiversity protection, elements which are always related to and dependent on economic and cultural matters.





**Figura 15 – Ecological Corridors and the Continental Perspective**  
 Fonte: IEA-USP e CI

## **Drivers for the Ecological Corridors Program**

The South American Ecological Corridors Program initiative constitutes the most effective way of reversing the crescent fragmentation and natural habitat destruction trends that threaten the survival of species and ecological balance.

By fragilizing the ecosystem stability through forest conversion motivated by accelerated urbanization and the expansion of farming frontiers, the resilience of those environments when facing global climate change is reduced, the consequences of that are already being manifested through lack of water resources and the endangerment of important and sensitive species such as the pollinators.

The amplification of connectivity between the forests remnants (especially those under some form of protection, restriction or control regime) is one of the main strategies used to reestablish gene flows that guarantee the variability and the survival of several currently endangered species.

Although we may observe matters linked to sovereignty or individual national commitments, we understand that projects of an integrative quality must become more and more frequent, since the environmental issues and other complex challenges are global matters that extrapolate borders, demanding increasing action articulation amongst countries in order to be faced.

In that sense, it is created here the opportunity for cooperation and synergy between different nations. Such an initiative is fomented by the necessary integration amongst the three governmental spheres existent in Brazil and amongst different sectors of society, providing the construction of a proposal that unites several authors and actors so that actions can be effectuated, in the most variated scales, and encompassing priority themes, and the fundamental pillars of this work: biodiversity, forests, water, climate, culture and society.

Therefore, this initiative's goals are very clear and can be pointed out in a broad manner, since we shall seek its refinement in posterior stages, once all partners as stakeholders are heard:

Developing the Ecological Corridors Program in the South and Central Americas in an interactive manner, guaranteeing its vertical and horizontal synergies, with the optimization of efforts and resources to be made available between partners.



Adopting political, administrative and legal measures necessary to fulfill the integration between protected areas and ample landscape units both in terrestrial and in aquatic ecosystems considering the South-American turf.

Seeking resources in the available sources and in any other that may arise, in order to consolidate the project. Considering that due to its wide and integrating nature the project presents great chances of success and consolidation in the execution of its goals and the obtaining of financing.

Promoting the intra and inter integration between South American regions and countries, binding this those activities spatially to the Mesoamerican Corridor reaching the continental scale perspective, with its coast and marine regions, which would make this project more vigorous in regards to expectations and results.

The project aims to guarantee regional integration for the establishment and maintenance of connectivity between ecosystems in a continental scale so as to propitiate more concrete chances for collaboration in the fulfilment of internationally assumed goals.



**Figure 16 – Drivers for the Ecological Corridors Program**

# **The Ecological Corridors Initiative as a Strategy to Preserve Ecosystems and Socio-Biodiversity**

Biodiversity and Forests Secretariat

It was the Secretariat of Biodiversity and Forests of role to consolidate the institutional partner's contribution. The first impressions about the Ecological Corridors Program in a continental perspective gathered here are fruit of technical discussions that took place in a seminar held in August 2016, that counted with the participation of all Secretariats, autarchies and institutions related to the Ministry of the Environment, and a few external guests.

Those discussions reflect the search for synergy amongst the several developing projects and programs, once observed the competencies and institutional mission of each of those partners who have manifested the utmost interest in being involved and collectively designing the Ecological Corridors Program in this new format, wider and more able of integrating and optimizing efforts in order to meet the Brazilian goals reached in accords in international conventions.

This working document's goal is to present to potential partners, during the 13rd COP organized by the Biodiversity Convention – CDB, the Ecological Corridors Brazilian Proposal, integrated to a continental system. Therefore, this paper presents the initial considerations on the Program, arisen from internal discussions held in August 2016.

We do not, however, make any claims that this document fully deals with the complexity of the subject, neither does it appoint, at this moment, any concepts or definitions. It is merely intended as a record of this collective process and of the building of partnerships able to promote integration at a continental level, resulting in the definition of ideas and actions promoting synergy amongst countries, institutions and several sectors of society in facing relevant global issues.

The resuming of strategic planning activities in the elaboration of large scale public policies, able of overcoming the limitations of the current governmental period and establish long term objectives, presupposes the significant involvement of other social segments, reinforcing a global tendency of strengthening governance processes, especially when it comes to environmental issues.

It is with this strategic focus, that the revisions in the sectorial public policy management system start to take shape, following the previous example of the reorganization of the National Environment System, of the Water Resources Management and of the Preservation Units Management, after the middle of the 1990 decade.

The research and literature on the theme prove that the sole legal establishment of Preservation Units is not enough to reach the Brazilian goals in environmental preservation, other factors will also interfere directly with the environmental public policies results.

The incorporation of the environmental aspect to the development of other public policies; especially economic, urban and agricultural policies; can be translated in specific actions of both a structural or non-structural quality, amplifying the possibilities for nature preservation at a local level and unfolding in regional scale impact. In that context, it becomes necessary the adoption of other biodiversity preservation strategies, one of them being the establishment of Ecological Corridors, which involves a greater level of adhesion for the collective discussion and construction leading to a common understanding of the theme.

Thus, once observed its institutional competencies, the Secretariat of Biodiversity and Forests has been leading this initiative that congregates several goals and activities, favoring the referral and economy of efforts and existing resources in several existing projects thus creating the perfect starting point to receive new projects that may contribute to fulfilling the socio-biodiversity preservation goals.

With the responsibility of fostering the strengthening of the National Preservation Units System – SNUC and the Preservation Units National Records – CNUC, the Protected Areas Department – DAP seeks to reduce the pressure on Preservation Units, diminishing the conflicts and pressure factors over those protected areas. The DAP actions for the PUs integrity are being complemented by projects from the other areas of The Secretariat of Biodiversity and Forests.

When promoting conservation and landscape monitoring of the Brazilian biomes, as well as recovery actions for vegetation coverage, along with actions led by the Ecosystem Department – Deco, The Secretariat of Biodiversity and Forests also aims to guarantee policies related to the sustainable production and handling of landscapes, respecting the new legislation that guarantees social participation in the concessions for usage and

exploitation and in the equal sharing of socio-biodiversity resources, a job coordinated by the Department for Genetic Resonics – DPG.

The Species Department deals with the knowledge regarding the Brazilian Fauna and Flora and its integration to a bigger system through monitoring migratory species and controlling invading species.

Therefore, all SBF projects and resources are aimed at Socio-biodiversity Preservation and the strengthening of SNUC, interdependent and complementing activities. Thus, it is one of MMA's main divisions when it comes to developing actions on many levels, from local activities (through social action and popular participation) to international accords.

The SBF teams understand that the work they perform must unite with the goals and the Ecological Corridors Program proposal, considering a continental perspective that represents an interesting strategy for the integration of results and actions of the projects they carry out.

## Abbreviations

- AMP – Áreas Marinhas Protegidas [Protected Marine Areas]
- ANA – Agência Nacional de Águas [National Water Agency]
- APA – Área de Proteção Ambiental [Environmental Protection Area]
- APP – Área de Preservação Permanente [Permanent Protection Area]
- ARPA – Áreas Protegidas da Amazônia [Amazon's Protected Areas]
- BHSF – Bacia Hidrográfica do Rio São Francisco [São Francisco River Water Bay]
- Biota - Programa de Pesquisas em Caracterização, Conservação, Restauração e Uso Sustentável da Biodiversidade do Estado de São Paulo [Biodiversity Characterization, Preservation, Restoration and Sustainable Usage Research Program of the Sao Paulo State]
- BNDES – Banco Nacional de Desenvolvimento Social [National Social Development Bank]
- BV – Bolsa Verde [Green Grant]
- CAR – Cadastro Ambiental Rural [Rural Environmental Record]
- CBHSF – Comitê da Bacia Hidrográfica do Rio São Francisco [São Francisco Water Bay Committee]
- CDB – Convenção para a Diversidade Biológica [Biodiversity Convention]
- Cenap – Centro Nacional de Pesquisa e Conservação de Mamíferos Carnívoros [National Center for the Research and Preservation of Carnivore Mammals]
- CI – *Conservation International* (Conservação Internacional)
- CNUC – Cadastro Nacional de Unidades de Conservação [Preservation Units National Records]
- COP – *Convention of the Parties* (Convenção das Partes)
- DAP – Departamento de Áreas Protegidas [Protected Areas Department]
- DECO – Departamento de Ecossistemas [Ecosystem Department]
- DESP – Departamento de Espécies [Species Department]
- DF – Distrito Federal [Federal District]
- DIPEQ – Diretoria de Pesquisas [Research Directory]
- DPG – Departamento de Patrimônio Genético [Genetic Patrimony Department]
- DZT – Departamento de Zoneamento Territorial [Territorial Zoning Department]
- EFGAU – Estratégia Federal de Gestão Ambiental Urbana [Federal Strategy for Environmental Urban Management]
- Embrapa – Empresa Brasileira de Pesquisa Agropecuária [Brazilian Company for Agricultural Research]
- ENBT – Escola Nacional de Botânica Tropical [National School of Tropical Botanic]
- EPANB – Estratégia e Plano de Ação Nacional de Biodiversidade [National Strategy and Plan for Biodiversity]

Fapesp – Fundação de Amparo à Pesquisa do Estado de São Paulo [Foundation for the Fostering of Research in the State of Sao Paulo]

Funbio – Fundo Brasileiro para a Biodiversidade [Brazilian Fund for Biodiversity]

GEF – *Global Environmental Fund* (Fundo Global para o meio Ambiente)

GIZ – Cooperação Alemã para o Desenvolvimento Sustentável [German Cooperation for Sustainable Development]

Ibama – Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis [Brazilian Environment and Renewable Resource Institute]

ICMBio – Instituto Chico Mendes de Conservação da Biodiversidade [Chico Mendes Institute for the Conservation of Biodiversity]

ICMS – Imposto sobre Circulação de Mercadorias e Serviços [Circulation of Goods and Services Tax]

ILPF – Projeto de Integração Lavoura-Pecuária-Floresta [Integration Project for Farming-Cattle Raising and Forests]

IPCC – International Panel on Climate Change

JBRJ – Jardim Botânico do Rio de Janeiro [Rio de Janeiro Botanic Garden]

JCU – Jaguar Conservation Unit (Área de Conservação de Onças)

Jica – Japanese International Cooperation Agency

LC – Lei Complementar [Complementary Law]

LNCC – Laboratório Nacional de Computação Científica [Computer Science Laboratory]

MAB – *Man and Biosphere* (O Homem e a Biosfera)

MEA – *Multilateral Environmental Agreements* (Acordos Multilaterais de Meio Ambiente)

MG – Minas Gerais

MMA – Ministério do Meio Ambiente [Ministry of the Environment]

PAN – Plano de Ação Nacional [National Action Plan]

Parna – Parque Nacional [National Park]

PBV – Programa Bolsa Verde [Green Grant Program]

PEGNet – Pan European Green Corridors Network (Rede de Corredores Pan-europeia)

PGAT – Plano de Gestão Ambiental Territorial [Territorial Environmental Management Plan]

Planafe – Plano Nacional de Fortalecimento das Comunidades Extrativistas Ribeirinhas [National Plan for the Strengthening of River Side Communities]

PNA – Plano Nacional de Adaptação às Mudanças do Clima [National Plan for Adapting to Climate Change]

PNMA – Política Nacional do Meio Ambiente [National Environmental Policy]

PNRH – Política Nacional de Recursos Hídricos [Water Resource Policy]

PMFC – Programa de Manejo Florestal Comunitário e Familiar [Communal and Familiar Forest Handling Plan]

PP-G7 – Programa de Proteção às Florestas Tropicais do Brasil [Brazilian Tropical Forests Protection Plan]

PRA – Programa de Regularização Ambiental [Environmental Regularization Plan]

Probio – Projeto Nacional de Ações Integradas Público-Privadas para Biodiversidade [National Project for Integrated Public-Private Biodiversity Actions]

Pronabio – Programa Nacional de Biodiversidade Biológica [Biologic Biodiversity Program]

PSA – Pagamento por Serviços Ambientais [Payment for Environmental Services]

RPPN – Reserva Particular do Patrimônio Natural [Natural Patrimony's Private Reserve]

RL – Reserva legal [Legal Reserve]

SAIC – Secretaria de Articulação Institucional [Institutional Articulation Secretariat]

SBF – Secretaria de Biodiversidade e Florestas [Secretariat of Biodiversity and Forests]

Secex – Secretaria Executiva [Executive Office]

SEDR – Secretaria de Desenvolvimento Rural Sustentável [Secretariat for Sustainable Rural Development]

SFB – Serviço Florestal Brasileiro [Brazilian Forestry Service]

SiCAR – Sistema de Cadastro Ambiental Rural [Rural Environmental Recording System]

Sisnama – Sistema Nacional de Meio Ambiente [National Environment System]

Snif – Sistema Nacional de Informações Florestais [National System for Forest Data]

SMCQ – Secretaria de Mudanças Climáticas e Qualidade Ambiental [Secretariat for Climate Change and Environmental Quality]

SNUC – Sistema Nacional de Unidades de Conservação [National Preservation Units System]

SRHU – Secretaria de Recursos Hídricos e Ambiente Urbano [Department of Urban Environment and Water Resources]

TEEB – *The Economics of Ecosystems and Biodiversity* (Economia de Ecossistemas e Biodiversidade)

TI – Terra Indígena [Indigenous Land]

PU – Preservation Unit

UICN – União Internacional para a Conservação da Natureza [International Union for the Conservation of Nature]

UNFCCC – *United Nations Framework Convention on Climate Change* (Convenção Quadro das Nações Unidas sobre Mudança do Clima)

Unesco – Organização das Nações Unidas para a Educação a Ciência e a Cultura [United Nations Organization for Education Science and Culture]

Unicamp – Universidade Estadual de Campinas [University of Campinas]

URAD – Unidade de Recuperação de Área Degradada [Degraded Area Recovery Unit]

USAID – Agência dos Estados Unidos para o Desenvolvimento Internacional [United States Agency for International Development]

USP – Universidade de São Paulo [University of São Paulo]

ZAP – Zoneamento Ambiental Produtivo [Productive Environmental Zoning]

WB - *World Bank* (Banco Mundial)

WCS – *Wildlife Conservation Society* (Sociedade para a Conservação da Vida Selvagem)

WWF – *World Wild Fund* (Fundo Mundial para a Natureza)



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