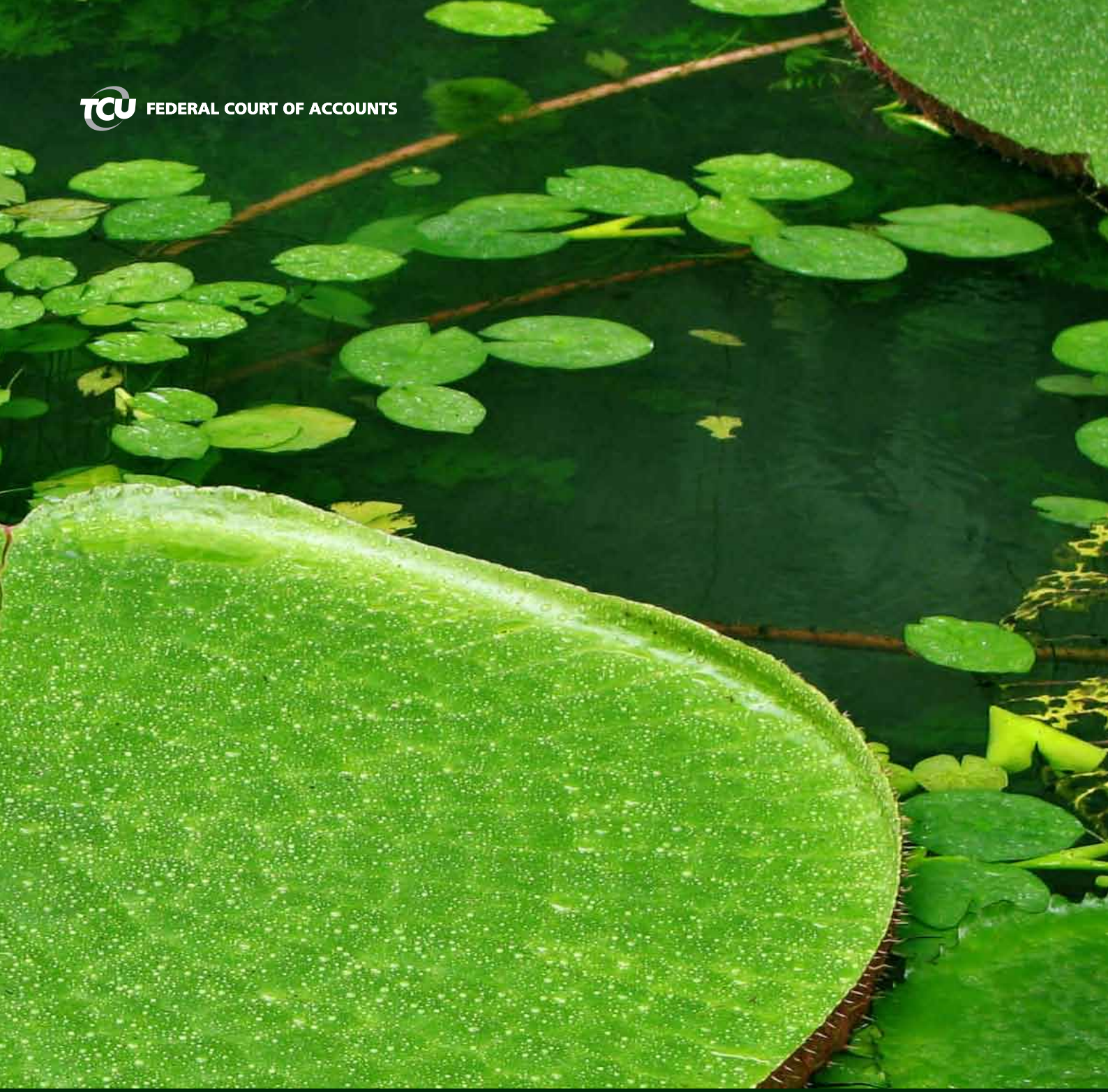

TCU FEDERAL COURT OF ACCOUNTS

AMAZON BIOME

PROTECTED AREAS

COORDINATED AUDIT

EXECUTIVE SUMMARY

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Federal Court of Accounts

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FEDERAL COURT OF ACCOUNTS TCU

AMAZON BIOME
PROTECTED AREAS

COORDINATED AUDIT
EXECUTIVE SUMMARY

BRASÍLIA, 2014

www.tcu.gov.br

The judgment of the coordinated audit of the federal protected areas in the Amazon, by Federal Court of Accounts of Brazil, occurred through Decision 3.101/2013 - TCU - Plenary (TC 034.496/2012-2).

The other audit reports, as well as their judgments, which supported the preparation of this summary may be obtained in electronic addresses of the State Supreme Audit Institutions participants:

1. **TCE-AC** • www.tce.ac.gov.br
2. **TCE-AM** • www.tce.am.gov.br
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Brazil. Federal Court of Accounts.

Amazon Biome: protected areas: Coordinated audit/Federal Court of Accounts - Brasília:TCU, 2014.

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1. Audit. 2. Protected areas - Amazon Biome. I. Title. II. Serie.

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Foreword

Dear Reader, it is our pleasure to present the Federal Court of Accounts coordinated work in the Amazon protected areas, in which we find one-third of the tropical forests of the planet, one-fifth of the available global drinking water and a significant part of biodiversity. Considering that creating protected areas is one of the internationally recognized ways to protect biodiversity, the challenge in those territories is to combine environmental conservation and the responsible usage of natural resources, focusing on sustainable development.

In this context, I highlight the relevant role entrusted to the Supreme Audit Institutions of controlling the public environmental heritage. For that reason, in 2002, after the United Nations Conference on Sustainable Development, also known as Rio+20, I suggested a joint work along with nine state Courts of Accounts to assess the governance in Amazon protected areas, as well as seeking good management practices.

Therefore, a coordinated audit was performed in Brazilian Amazon in 2013, enabling the development of a systemic diagnosis, which was reported through geo-referenced maps. The use of indicators in the method developed by the Federal Court of Accounts enables the assessment, communication and monitoring of governance in those protected areas, as shown in this publication. Also in 2013, Brazil started chairing the Organization of Latin American and Caribbean Supreme Audit Institutions (OLACEFS), one of the International Organization Supreme Audit Institutions (INTOSAI) regional working groups. Among TCU main challenges facing the organization, the performance of coordinated audits among member-countries should be mentioned.

In 2014 will be ongoing international biodiversity audit focused on protected areas in Latin America, in accordance with the work plan of the Special Technical Committee on Environment of the OLACEFS (Comtema).In view of this, I estimate that the SAIs participants of this future coordinated audit may take advantage of the work done in Brazil to enhance the method developed. This is because the joint works are instruments that contribute to exchange experiences, build capacity of participants and strengthen the Supreme Audit Institutions.

Moreover, these partnerships promote a systemic view on endless topics, as environmental issues, that supersede states and countries boundaries. The integrated and coordinated oversight activities, along with capacity building actions, are essential pillars for the improvement of environmental public policies efficiency to foster sustainable development.

I hope that this publication will contribute to enhance the performance of SAIs, strengthening the instruments of cooperation and capacity building by conducting coordinated audit.

Enjoy your reading!

MINISTER JOÃO AUGUSTO RIBEIRO NARDES

President of the Federal Court of Accounts

President of OLACEFS

Rapporteur Message

Coordinated audits are becoming one of the Supreme Audit Institutions (SAIs) main instruments to contribute to the improvement of governance and national public sector management.

In Brazil, the most relevant governmental programs, especially those that reach the most deprived segments of the population, are implemented through a joint and coordinated action of all institutions that compose the Federation: Federal Government, States and Municipalities.

In case of topics that correspond to issues that transcend the territory of a country, as environment, the coverage of coordinated actions may reach neighboring countries or regional blocks.

The assessment of internal or international government actions needs coordination among the SAIs holding the mandate to audit several governmental institutions in charge for those initiatives. The coordinated audits approach meets that need and the increasing social demand so that the public sector becomes more efficient and effective.

The present audit is a case of coordination success among several SAIs, in this case, the Federal Court of Accounts and several state courts of accounts, that allowed a broad diagnosis of governance management in Protected Areas of the Brazilian Amazon.

SUBSTITUTE MINISTER WEDER DE OLIVEIRA

Rapporteur Minister

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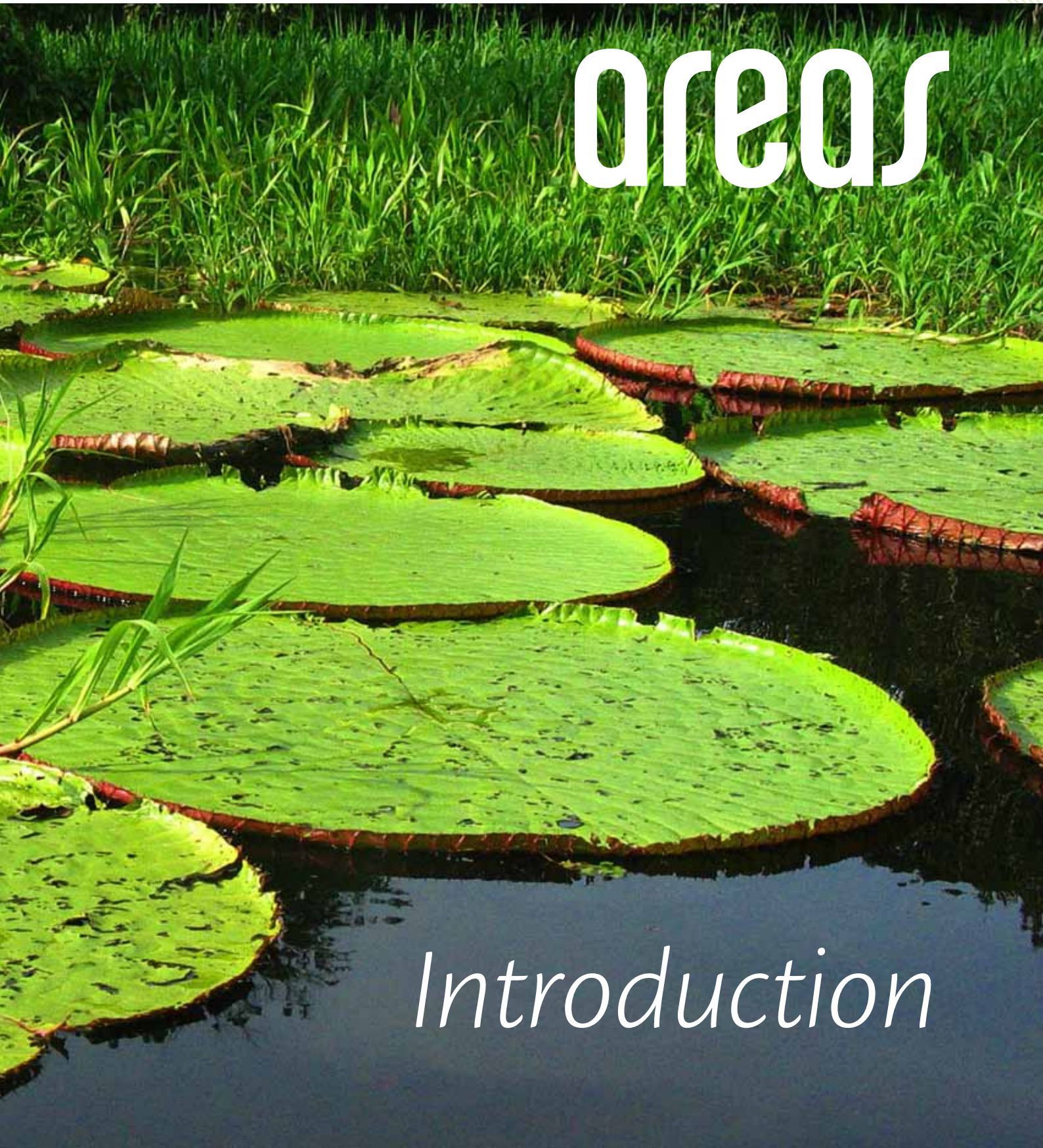
Picture: Rede de Notícias da Amazônia

Protected areas



Introduction

Coordinated audit

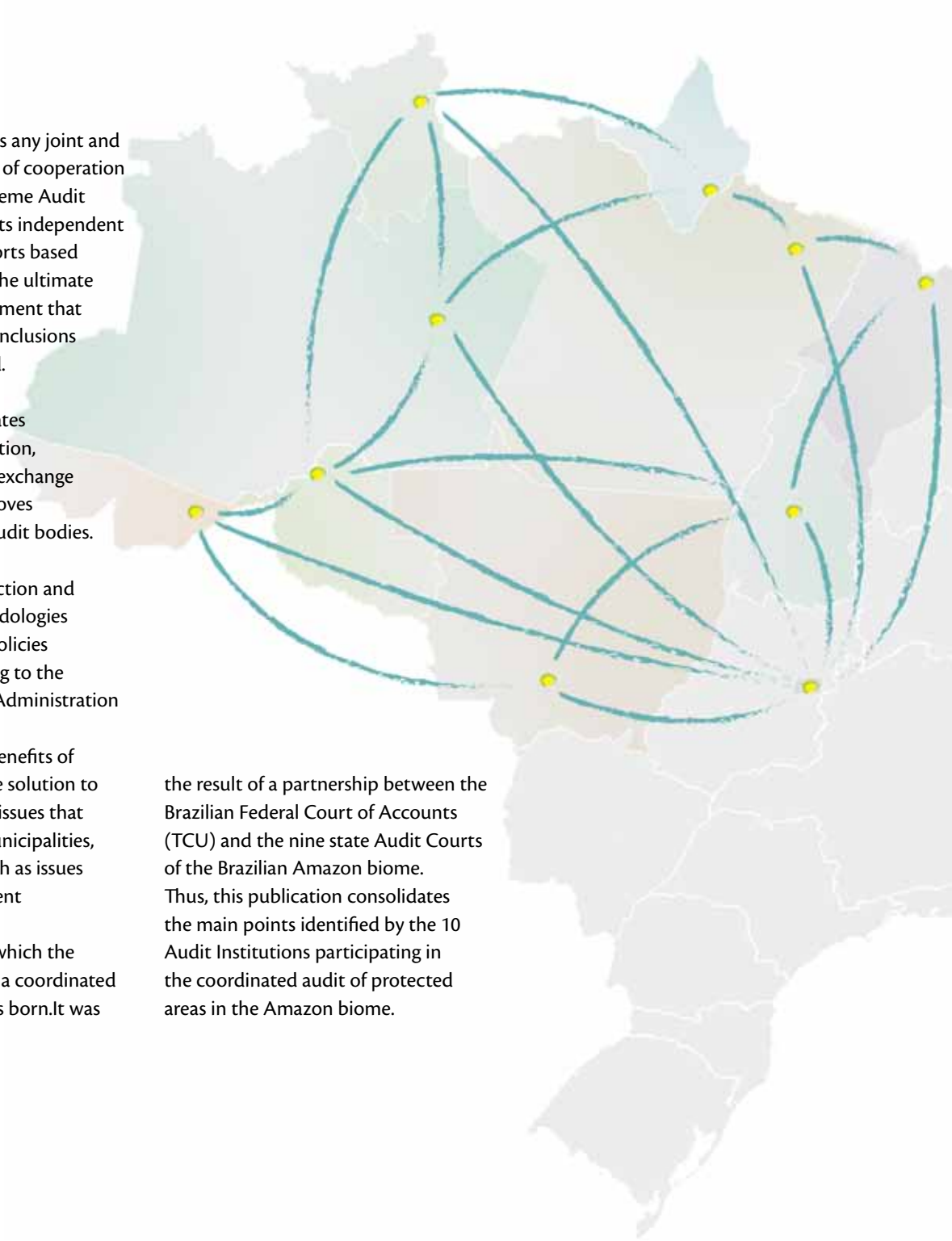
A coordinated audit is any joint and simultaneous form of cooperation in which each Supreme Audit Institution (SAI) conducts independent audits and prepares reports based on joint planning, with the ultimate goal of preparing a document that summarizes the main conclusions on the audits conducted.

This type of audit facilitates the exchange of information, training of participants, exchange of experiences and improves coordination between audit bodies.

Furthermore, the production and adoption of joint methodologies helps to ripen the way policies are assessed, contributing to the improvement of Public Administration

Thus, one of the many benefits of coordinated audits is the solution to challenges in significant issues that transcend borders of municipalities, states and countries, such as issues related to the environment

This was the context in which the opportunity to conduct a coordinated audit in the Amazon was born.It was the result of a partnership between the Brazilian Federal Court of Accounts (TCU) and the nine state Audit Courts of the Brazilian Amazon biome. Thus, this publication consolidates the main points identified by the 10 Audit Institutions participating in the coordinated audit of protected areas in the Amazon biome.



Object and Objectives Of the audit Protected areas

The Amazon is the largest Brazilian biome, occupying 4.2 million km², with a natural richness that places it among the world's most relevant regions to biodiversity. One third of the rainforests of the planet, one fifth of the world's available fresh water, and a significant sample of biological diversity, are located in this region. Most of this heritage is located inside protected areas (PAs).

Therefore, biodiversity and in particular PAs should be considered part of the environmental heritage, which is why it is the responsibility of oversight institutions to check whether the government has established mechanisms to ensure proper management of this valuable public asset.

In addition to the conservation of biological diversity, PAs can serve other goals, given the social and economic potential of these areas.

For this reason, Audit Courts decided to conduct an assessment of PAs throughout the Amazon biome, at the two governmental levels, state and federal, identifying opportunities for improvement and best practices in the management of these areas.

In Brazil protected areas (PAs) are areas established by the Government, under special administration regime, with conservation objectives and defined borders, due to their significant natural features, Federal Law 9985/2000.

That Brazil is part of the United Nations Convention on Biological Diversity (CBD), considered the main multilateral environmental agreement in the area of biodiversity. This convention considers PAs as one of the most efficient ways to preserve biodiversity *in situ*, which is conservation in the natural *habitat*.

Evaluation

The audit assessed to what degree the normative, institutional and operational conditions are sufficient for the protected areas (PAs) achieve their goals.

Three aspects were evaluated: **inputs**, **articulation** and **results**, which guided the enquiries conducted by the Supreme Audit Institutions (SAIs) participants

Between 2003 and 2008, Brazil was responsible for creating 74% of all protected areas in the world. It is known that this environmental policy needs sufficient conditions for implementation and proper management of these territories.

Relevance of PAs in the Amazon biome (area and quantity)

Currently there are 1,149 federal and state protected areas (PAs) throughout Brazil, 247 located in the Amazon biome.

The areas in this biome occupy 1.1 million km² and account for 73% of the total area of federal and state PAs in Brazil.

According to the Brazilian Federal Law 9985/2000, which established the Brazilian National Protected Areas System (Snuc, in portuguese), there are two groups of protected areas: full protection and sustainable use, with 12 categories of PAs.

The main objective of the full protection areas is to preserve nature, admitting only the indirect use of its natural resources, where people are usually not allowed to settle.

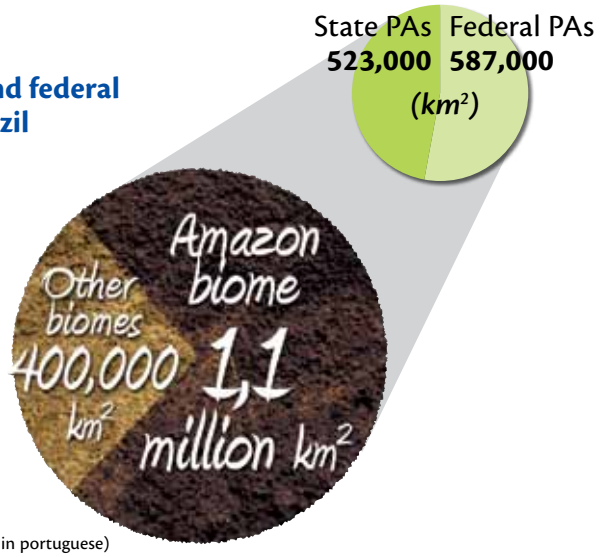
In turn, the main purpose of sustainable use areas is to combine nature conservation with sustainable use of part of its natural resources. In this group, the presence of traditional communities is allowed and encouraged.

Finally, according to the Snuc, it is expected that PAs present results in terms of protection of natural heritage and promotion of social and environmental development.

Social and environmental aspect - Protected areas (PAs) are not untouchable spaces where no human activity can be developed. Different uses that may generate immediate positive effects on the regional economy are allowed in 88.3% of the total area protected by PAs. Only 11.7% have restrictions in terms of direct use of natural resources, although activities are allowed provided they are regulated and controlled by environmental bodies.

Amount of federal and state PAs in Brazil

PAs state and federal areas in Brazil



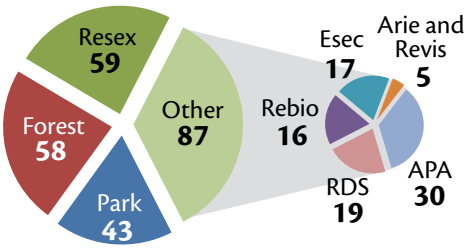
Prepared by TCU with data from the National Registry of Protected areas (CNUC, in portuguese)

Along with federal and state levels, the most representative categories in the Amazon biome are Extractive Reserves (Resex), Forests and Parks, which will be detailed in this summary.

The following acronyms in Portuguese mean: Environmental Protection Area (APA), Area of Ecological Interest (Arie), Ecological Station (Esec), Sustainable Development Reserve (RDS), Biological Reserve (Rebio), Extractive Reserve (Resex) and Wildlife Refuge (Revis).

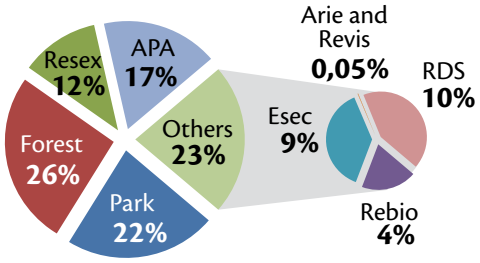
Amount of federal and state PAs in the Amazon biome

247 PAs



Area of the federal and state PAs in the Amazon biome

1,1 million km²



Methods used

Different techniques and performance audit procedures were used for the systemic assessment of the protected areas. In this context, a diagnostic tool called Problem Tree was created. This tool allows the visualization of the main aspects and weaknesses of the management of PAs, as well as the cause and effect relations.

Since this was a coordinated audit, a technical meeting was held with audit teams to standardize concepts and define oversight strategies in order to standardize data, maintain comparability, and subsequently, consolidate information.

The training workshop was delivered to 35 auditors, from the TCU and TCEs. There were technical talks on management of protected areas and performance audits techniques.

The use of a questionnaire to be completed by managers of PAs was agreed as the main data collection method. This method was considered the most appropriate given the access and locomotion difficulties that the Amazon area presents. It is worth mentioning that 100% of the managers completed the questionnaire.

A full description of the methods used, as well as the Tree Problem, can be found in the TCU report. (Decision 3.101/2013 – TCU – Plenary, Rapporteur: Substitute Minister Weder de Oliveira)

Picture: TCU Audit team

Results of the coordinated audit

The contribution of protected areas to the natural heritage

Tapajós Forest (PA)

Picture: ICMBio

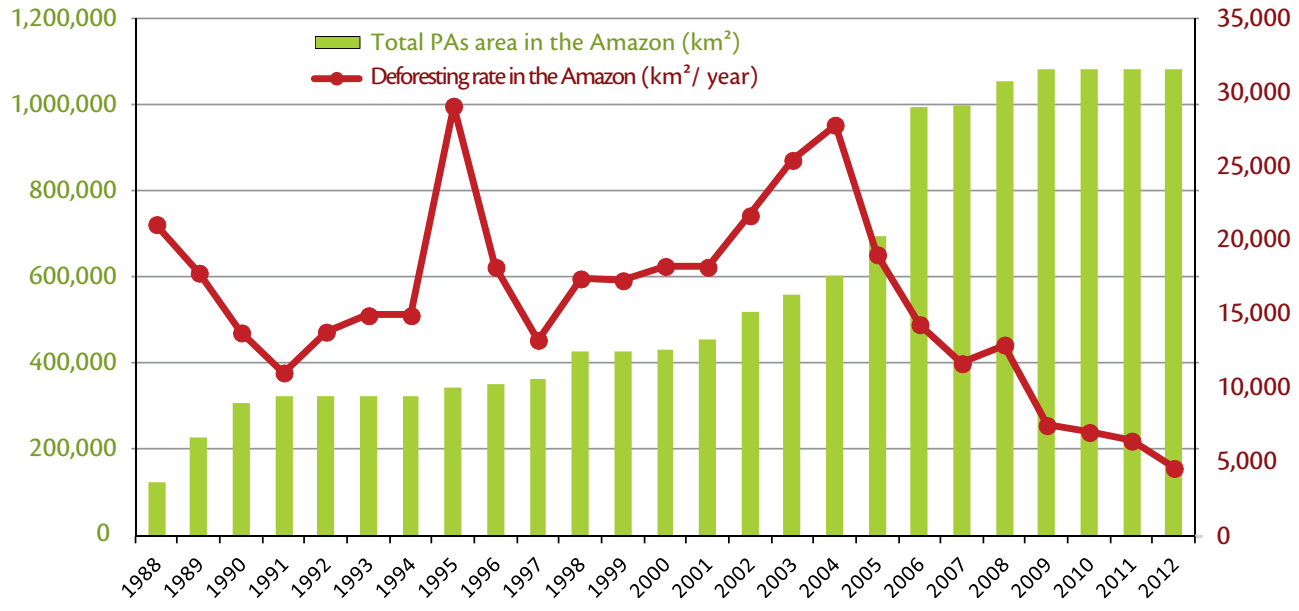
Protection against deforestation

Protected areas (PAs) have brought positive results to the protection of natural heritage, contributing to a significant reduction in Amazon deforestation.

Brazil has considerably reduced its annual deforested area. Legal deforestation in the Amazon went from 27,772 km² per year in 2004 to 4,571 km² in 2012.

There is a relation between the creation of protected areas and the reduction in deforestation rates, since the implementation of PAs by the government contributed to invert the logic of occupation and economic exploitation of these territories. This is because the categorization of these areas as public lands involves the presence of the Government, which reduces the pressure on the inappropriate use of that territory and discourages illegal claims of ownership, in particular unauthorized logging.

Brazil made a commitment to the United Nations (UN) to reduce deforestation. The country has reached 76% of the target, which is to reduce annual deforestation to an area of 3,925 km² by the year 2020.



Source: Created by TCU with data from INPE (National Institute for Space Research) and ICMBio (Chico Mendes Institute for Biodiversity Conservation)

It is worth noting that Brazil has created 74% of the world's protected areas in the period between 2003 and 2008. In this period more than 550 thousand km² of federal and state PAs were created - an area larger than that of Spain. Most of these area is in the Amazon biome.

Currently, federal and state PAs in the Amazon occupy an area of 1.1 million km², equivalent to the sum of the territories of Spain and France.

Thus, in the same period in which the annual deforestation rate was reduced, the percentage of protected areas increased.

In order to evaluate the effectiveness of protected areas in containing deforestation, TCU assessed deforestation in the Amazon biome in the period from 2008-2012.

The audit produced the Indimapa Deforestation Warnings (Deforestation map), a georeferenced tool to identify the impact of deforestation in the protected areas assessed. With this tool it was possible to individually distinguish occurrences for 247 federal and state PAs, differentiating deforestation inside and outside those territories.

The result of this evaluation showed that 94% of the deforestation in the Amazon biome occurred outside protected areas, which proves the low incidence of deforestation inside protected areas.

Finally, the deforestation control policy - part of the strategy of creation and maintenance of PAs, inspection activities, and positive financial mechanisms, among other actions, need to be maintained and improved, at risk of losing the benefits in the deforestation reduction.

Out of more than 15,000 km² deforested in the Brazilian Amazon biome in the period from 2008 to2012, only 971 km² (6%) originated in the PAs, although these areas occupy more than ¼ of the biome. Therefore, TCU's assessment showed that the probability of deforestation in areas outside PAs in that period was 4.3 times higher than inside a protected area.

While PAs have an important role in reducing deforestation, other actions and public policies also contributed to this process, such as: improvement of inspection activities, implementation of specific regulatory measures and the existence of financial mechanisms for a positive incentive to reduce deforestation.

INDIMAPA
DEFORESTATION WARNINGS

A B C D E F

1 2 3 4

AM RR AP PA MA TO AC MT RO

71% of federal and state PAs of the Amazon biome have not suffered deforestation from 2008 to 2012, as it can be seen on the map below. The information of PAs that had deforestation alerts above 25 hectares can be found at the end of this summary.

Key

Deforestation according to Deter
(Percentage of deforested hectare in PA)

- Not registered Deter warnings
- Up to 1%
- To 1% up to 2%
- To 2% up to 3%
- Above 3%

- Brazilian Amazon Biome
- Interstate boundaries
- Federal capital and state capitals

This map can be visualized in the link below:
http://portal2.tcu.gov.br/portal/page/portal/TCU/imprensa/noticias/noticias_arquivos/2%20-%20Indimapa%20desmatamento%20nacional.pdf

Carbon flow

- The greenhouse effect is vital for keeping the planet warm, and without it, life as we know it could not exist. The problem lies in the intensification of the greenhouse effect, which may destabilize the energy balance on the planet by causing global warming with a consequent change in global climate patterns.

- The consequences of climate change go beyond boundaries, because its effects go beyond regions. Some of the potential results of this process are: the savannization of the Amazon, the greater frequency and intensity of droughts in the northeast, the increasing rainfall volume and flooding in the south and southeast, all of which can cause significant impacts on agriculture, livestock, infrastructure and economic activity of the country.

- Countries have tried to reduce their emissions of gases that cause the greenhouse effect, in particular carbon dioxide (CO_2), and maintaining the standing forest influences the CO_2 fixation process and plays a crucial role in many ecosystem services that are critical in the global climate, as it influences directly the rain regimes of Brazil and Latin America.

In addition to preventing the loss of biodiversity, reducing deforestation also contributes to the reduction of emissions of carbon dioxide, methane and other gases that cause the greenhouse effect.

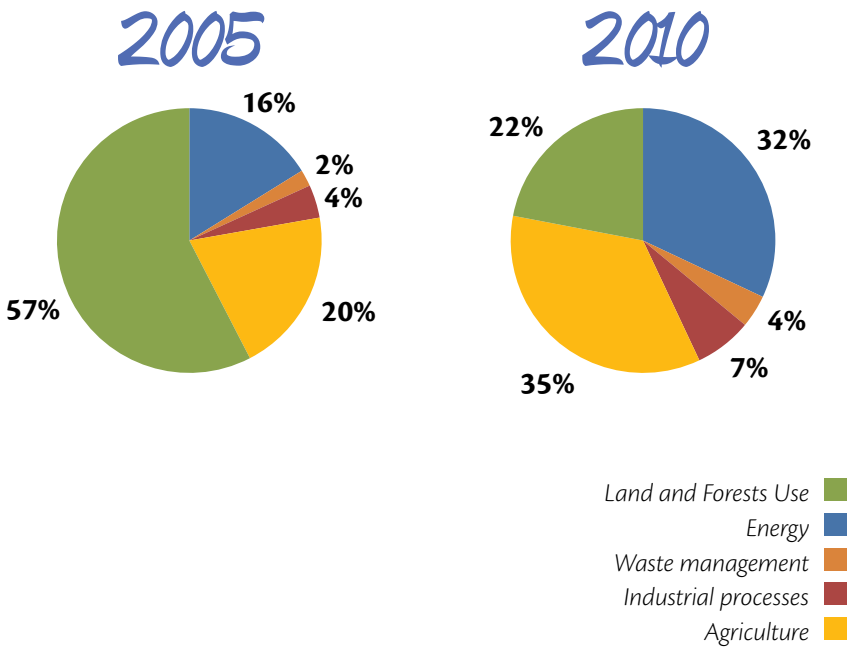
The decrease in the emission of greenhouse gases (GHG), arising from the reduction of deforestation, allowed Brazil to leave the group of the most polluting countries in the world in the 1990s.

Recently, the country has achieved good results since Brazilian GHG emissions fell by 38% between 2005 and 2010, according to the Ministry of Science, Technology and Innovation (MCTI, in portuguese).

This decrease was largely due to the reduction of deforestation, which allows the maintenance of a protected forest. That is because deforestation causes change of land use, promoting the release of carbon stored in biomass existing in that area. Therefore by preserving the standing forest, in addition to maintaining significant amounts of carbon stored in the biomass, the ecosystem can continue removing carbon from the atmosphere.

The resolution that establishes targets to reduce deforestation, also provides targets to reduce greenhouse gas (GHG) emissions by 2020. Brazil has reached 65% of that target.

Variations in emissions by sector in 2005 and 2010



The decrease in Brazilian GHG emissions was driven by reductions achieved in the "Change in Land and Forests Use" sector, which reduced emissions by 76%. Deforestation control actions, especially in the Amazon, had a great influence on this result.

The ranking of the sectors with higher greenhouse gases emissions in Brazil has changed. The forest sector went from being the number one responsible for national emissions in 2005 (57%) to the third position in 2010 (22%). The agricultural and energy sectors lead the ranking of emissions.

The decrease in carbon emissions from the forest sector - recorded in deforestation control results -, was of such magnitude that even though emissions in other sectors, such as the industry, agriculture and energy sectors have increased, Brazil has reduced its overall greenhouse gas (GHG) emissions.

Therefore, in the same period in which Brazil has expanded its production activities reaching 7th position in the world economy, the country also managed to reduce GHG emissions, a fact that highlights the importance of PAs in the context of biodiversity maintenance and development of the national economy.

In order to evaluate the role of PAs in the process of emissions and removals (flow) of CO_2, TCU calculated the contribution of federal and state protected areas located in the Amazon biome to achieving these positive results. Accordingly, an estimated carbon flux caused by changes in land use in protected areas in the Amazon was created. This was done by crossing georeferenced information on protected areas with coverage and land use maps produced by IBGE in 1996 and 2006.

TCU's analysis was based on the study on the contribution of the land use sector on emissions and removal of greenhouse gases, promoted in 2010 by the Foundation for Science, Applications and Space Technology (Funcate, in Portuguese). This study was part of the Second Brazilian National Communication to the United Nations Framework Convention on Climate Change.

The result of the assessment on PAs participation in carbon flow (emission/removal) in the Amazon between 1996 and 2006 can be seen in the table on page 23.

This analysis conducted by the TCU shows that most of the PAs in states in the Amazon biome have negative

It is possible to estimate the portion of emissions or anthropogenic emissions of carbon in a given area based on land use at two points in time. The carbon exchange caused by the changes (or not) on land use are basically of two types: the first refers to the release of carbon contained in the organic matter in the tree felling process. This amount is calculated based on the biomass volume of each plant physiognomy. The second type of exchange is the one that occurs in the physiological processes of plant species. It is known that the difference between carbon emissions and carbon removal from the atmosphere by plants is positive, since a forest that is preserved absorbs atmospheric carbon.

values (column D of the table). This means that these areas have removed carbon during the period analyzed.

Information on carbon flow per protected area, as well as the methods used, are included at the end of this document and TCU's report.

By analyzing the carbon flow resulting from land use changes (between 1996 and 2006) in the 247 protected areas in the Amazon biome (state and federal), the TCU produced the "Indimapa Carbono", a map to estimate the individual amount of CO_2 removed or emitted by each PA. This way, it is possible to monitor the carbon flow while also having a systemic view of the Amazon region.

The results achieved in reducing the deforestation rate and, consequently, reducing greenhouse gas emissions have impacted positively in the country's international image, attracting both short- and long-term financial resources.

Deforestation reduction has already benefited Brazil with external resources such as donations for the Amazon Fund. Fundraising for the Fund is subject to a reduction in greenhouse gas emissions from deforestation, that is, it is necessary to show deforestation reduction in the Amazon in order to enable fundraising.

As for future benefits, there is the possibility of trading carbon credits resulting from the reduction of CO_2 emissions, considering the vast area occupied by the PAs and the volume of carbon dioxide

One way of assessing carbon flux is by analyzing the change of land use - a technique used in the PAs audits.

It is important to warn that the calculation regards only removals. The stock of CO_2 contained in these areas has not been considered.

Carbon flow (emission/removal) within and outside of PAs in the Amazon biome between 1996 and 2006

State		Outside PAs		Inside PAs (federal and state)		Total area (inside and outside PAs)	
State	Portion of state located in the Amazon Biome (ha) *	Fraction of the area outside the PA (A)	Average carbon emission (tC/ha) (B)	Fraction of protected area in the state by PAs (C)	Average carbon emission (tC/ha) (D)	Total carbon emission (tC)	Average carbon emission (tC/ha) =(BxA)+(DxC)
Acre	14,185,700	65.65%	6.64	34.35%	-1.50	54,544,714.00	3.85
Amazonas	146,676,100	73.19%	0.60	26.81%	-3.07	-56,698,970.13	-0.39
Amapá	13,704,675	37.96%	1.23	62.04%	-3.16	-20,513,191.75	-1.50
Maranhão	10,883,325	73.30%	32.02	26.70%	8.78	280,990,820.75	25.82
Mato Grosso	48,235,075	95.25%	12.22	4.75%	-1.89	557,064,605.13	11.55
Pará	115,737,750	66.85%	8.26	33.15%	-0.99	600,985,860.50	5.19
Rondônia	23,606,000	75.43%	24.08	24.57%	-3.31	409,520,741.00	17.35
Roraima	22,179,725	79.40%	0.84	20.60%	-2.76	2,233,115.50	0.10
Tocantins	2,283,225	99.42%	15.85	0.58%	55.01	36,699,027.00	16.07
Amazon Biome	397,491,575	73.17%	7.11	26.83%	-1.90	1,864,826,722.00	4.69

* Water bodies not included (16 million ha)
Source: Prepared by TCU

removed by these territories.
It is therefore clear that the creation of protected areas, besides protecting the biodiversity, can benefit Brazil, since the reduction of deforestation and greenhouse gas emission are key in the context of climate change.

Finally, in spite of the positive results achieved in the protection of natural heritage, it should be noted that other objectives were set for PAs related to the economic, social and environmental potential of these areas.

The Amazon Fund is managed by the National Bank for Economic and Social Development (BNDES, in portuguese) and has received R$ 235 million or US$ 104 million. This fund will still receive more than 1 billion reais or US$ 440 million from foreign Governments and companies.

INDIMAPA
CARBON FLOW

A B C D E F

1 2 3 4

AM RR AP PA TO MA AC RO MT

Information about carbon flow can be found at the end of this summary

Key

Average Carbon antropic flow

- Removal to 10 up to 25 tC/ha
- Removal to 5 up to 10 tC/ha
- Removal up to 5 tC/ha
- Null removal/emission
- Emission up to 5 tC/ha
- Emission up to 5 to 10 tC/ha
- Emission up to 10 to 50 tC/ha
- Emission above 50 tC/ha

- Brazilian Amazon Biome
- Interstate boundaries
- Federal capital and state capitals

This map can be visualized in the link below:
http://portal2.tcu.gov.br/portal/page/portal/TCU/imprensa/noticias/noticias_arquivos/3%20-%20Indimapa%20carbono%20nacional.pdf

Picture: ICMBio

The role of protected areas in promoting social and environmental development

Promoting social and environmental development is also one of the objectives set for protected areas (PAs) in the Brazilian Amazon biome.

In this way, the Audit Institutions assessed issues that impact the achievement of the expected results for these territories.

Weaknesses in the management of PAs hinder social and environmental development

PAs in the Brazilian Amazon biome have faced difficulties to promote social and environmental development in view of the underuse of the potential of these areas.

Examples of underutilization are parks that are not visited, unsustainable logging of forests and extractive reserves with difficulties in implementing economically sustainable alternatives, or that threaten the fulfillment of social and environmental functions expected for these areas.

The assessment carried out by the Courts was based on the representation of Parks, Forests and Extractive Reserves, federal and state PAs that occupy most of the Amazon biome area.

National and state parks

The coordinated audit identified that Parks in the Amazon biome fail to achieve one of its main objectives: public use - visitations, tourism, recreation and environmental education.

This means that almost all of the 43 Parks in the Amazon are not fully developing education and environmental interpretation activities.

A diagnostic tool, the Indimapa, was developed to evaluate PAs in the Brazilian Amazon biome. This tool contains implementation indicators for various management aspects in these areas.

The evaluation is composed of up to 14 topics that, from the perspective of government audit, briefly communicates the situation of each area.

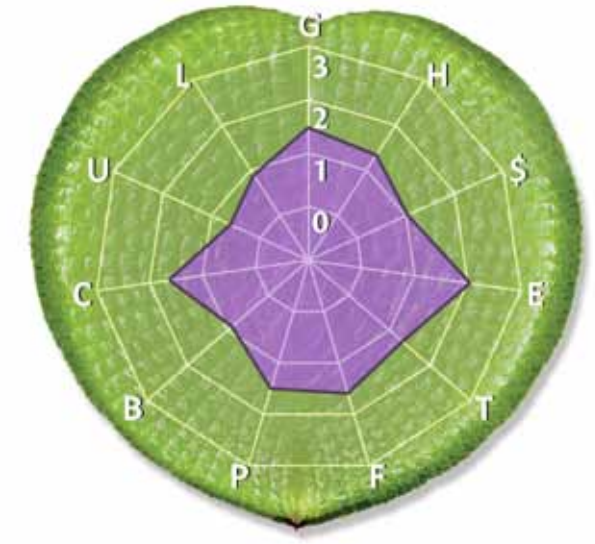
Indicators ranging from 0 to 3 materialize these criteria.That is, indicators are better positioned as they approach the entirety of each scale.

In the case of parks, public use (indicator "U") was the one with the lowest score among the criteria used to assess the implementation and management of this category.

The Snuc Law (Brazilian National Protected Area System) states that nacional and state Parks have as primary objective to preserve natural ecosystems of great ecological significance and scenic beauty in order to conduct scientific research and develop education and environmental interpretation activities, recreation in contact with nature and ecologic tourism.

Indimapa will be explained in chapter: products developed for the evaluation

43 national and state parks



Source: Created by TCU

- ***G*** *Management plan*
- ***H*** *Human resources*
- ***$*** *Financial resources*
- ***E*** *Physical structures, furnishings and services*
- ***T*** *Territorial consolidation*
- ***F*** *Inspection and fighting environmental emergencies*
- ***P*** *Research*
- ***B*** *Biodiversity monitoring*
- ***C*** *Consultative or deliberative body*
- ***U*** *Public use*
- ***L*** *Local articulation*

It should be noted that the characteristics of the Amazon impact on the public use of Parks in the region. These PAs are generally difficult to access due their location and the means of transport required for visitation. These characteristics should be considered in the evaluation of public use in the biome.

In addition, the existing visiting structures at these areas are precarious.

Some of the major Brazilian tourist attractions are in national and state parks, such as: Fernando de Noronha, Lençóis Maranhenses, Pantanal, Iguacu (Falls), Tijuca (Cristo Redentor), Anavilhas (Amazonas), Jalapão (Tocantins), among others.

According to the World Economic Forum, Brazil is considered the largest nature's tourism power in the world in natural resources. However, according to the National Tourism Plan 2013-2016, prepared by the Ministry of Tourism, the country lacks a tourism policy focused on its protected areas.

Sustainability is peripheral in the country's tourism strategy. As a result, Brazil goes from the first to 52nd place in tourism competitiveness, when analyzing infrastructure, among other aspects.

One of the negative consequences of low public use of Parks is the ignorance of the role of this type of PA in biodiversity conservation by the society. The public use, through tourism, can be seen as one way of promoting and fostering the local economy, creating jobs and generating income. The legitimacy of these areas by society, and especially by local communities, is affected by the restrictions on public use.

Anavilhanas National Park (AM)

Picture: ICMBio

Picture: Cataratas do Iguaçu SA

Iguaçu National Park (PR)

Lençóis Maranhenses National Park (MA)

Tijuca National Park (RJ)

Pictures: ICMBio

National and state forest

The National and state Forests of the Amazon have a small number of onerous forest concessions in exploitation. It is expected that forests in concession, if properly managed, will provide wood in a sustainable way, and still be a source of funds.

According Snuc Law (Brazilian National Protected Area System), nacional and state Forests have as as primary objective the sustainable multiple use of forest resources and scientific research focused on methods for sustainable use of native forests.

The Amazon PAs audit revealed that even though a high percentage of forest managers claim that there is potential for onerous forest concession in their PAs, there are still few cases of federal or state forests exploited. This indicates that this type of category has difficulties in achieving this goal.

For example, at the federal level, there are currently only two national forests with onerous forest concession in exploitation.

The indicator of onerous forest concessions (indicator N) was the worst classified for Forests in the region.

The small percentage of onerous forest concessions in exploitation is due to several factors, such as no prevision of zoning for logging.

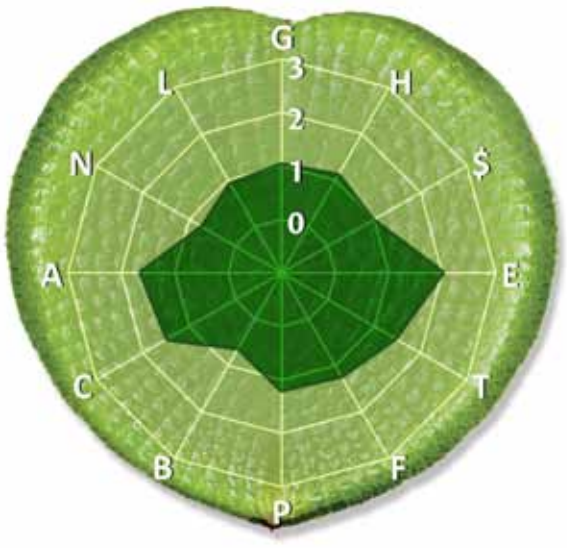
Lack of promotion of forestry exploitation impacts in the offer of certified wood in the market. This can generate distrust in the policy for the management of public forests for sustainable production.

This situation can lead to the underutilization of the potential for generating employment and income, and discourage sustainable forest economies in the Amazon.

An example of this successful practice that has benefited the local community is the National Forest (Flona) Tapajós, in Pará In this area, the traditional community organized itself as a cooperative, the Cooperative of the Tapajós National Forest (Coomflona, in Portuguese), and developed community forest management activities.

Information provided by the manager of this area indicate that the Cooperative managed 0.2% of Flona Tapajós in 2012 and generated more than three million reais, benefiting the population living in the forest.

58 national and state forests



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- **P** *Research*
- **B** *Biodiversity monitoring*
- **C** *Consultative or deliberative body*
- **A** *Access to public policies*
- **N** *Onerous forest concessions*
- **L** *Local articulation*

Besides the onerous forest concession, there is also the community-based non-onerous concession. This modality is performed in areas inhabited by traditional communities that reconcile sustainable exploitation of wood with income generation, to ensure the sustainability of environmental resources.

Good practice

In 2009 Coomflona received the Chico Mendes Award in the category Sustainable Business for the sustainable production and commercialization of forest products, helping protect vegetation, while generating income and social inclusion for families living in the forest.

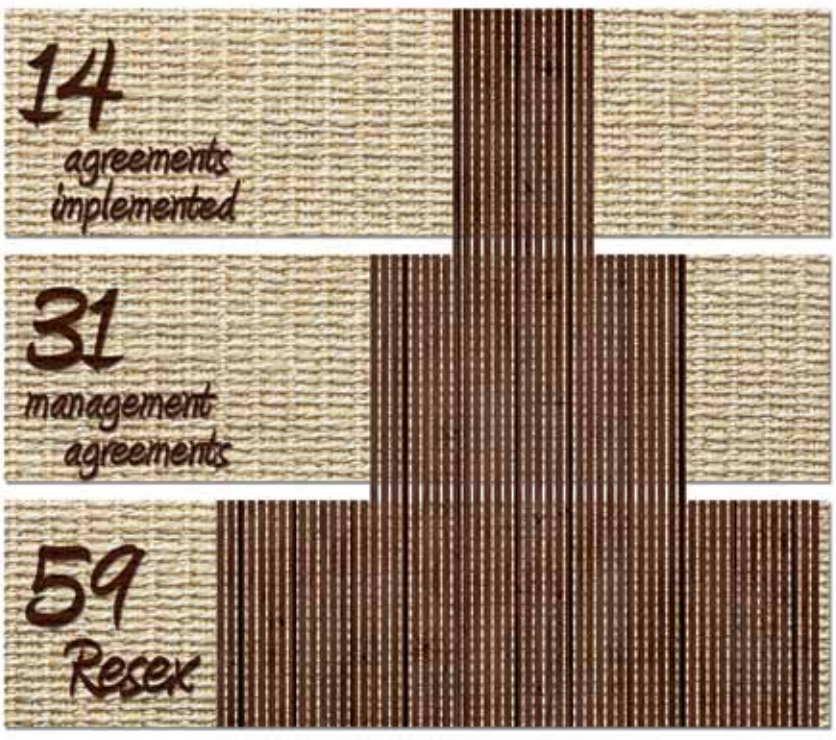
Technical visit of the President of Federal Court of Accounts at the Tapajós National Forest (PA)

Community-based forest concession in the Tapajós National Forest (PA)

Pictures: TCU Audit team

Extractive reserves

The Snuc Law (Brazilian National Protected Area System) states that Extractive Reserves are areas used by traditional communities whose livelihood relies on extraction of natural resources, i.e. activities such as exploitation of rubber, nut harvesting, oil extraction, among other products. One of its goals is to protect the livelihoods and culture of these populations, and to ensure the sustainable use of natural resources of the area.



Source: Created by TCU

At Extractive Reserves (Resex) of the Amazon biome few Management Agreements were implemented. This document regulates the community management of natural resources.

Commercialization of rubber, fish farming, exploitation of nuts, oil extraction and honey production are among the main possible activities at a Resex.

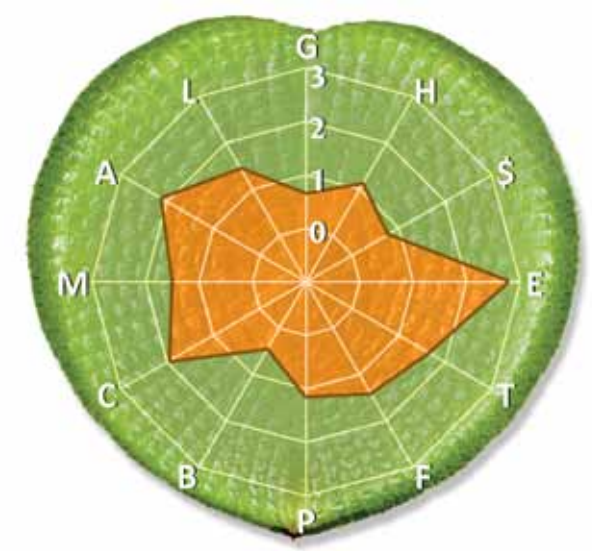
Despite the existence of Management Agreements, 53% of Resexs are facing difficulties regarding their implementation. Out of the total 59 Resexs, only 14 PAs presented medium or high level of implementation of management agreements.

The low level of implementation of Management Agreements endangers the continuity of the life style based in natural resources extraction, since traditional communities are unable to access and trade natural resources to generate income and improve their quality of life.

59 federal and state Resex

The implementation of the Management Agreements also depends on the articulation of the Snuc enforcing bodies with other stakeholders, whether governmental or not. The flow of production and addition of value to products goes beyond the implementation capacity of environmental bodies.

In this line, the generation of income in Resex transcends environmental issues and requires public policies to promote diversification and to strengthening extractivism and family agriculture.



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- ***M*** *Community management*
- ***A*** *Access to public policies*
- ***L*** *Local articulation*

Picture: TCU Audit team

Above, council meeting Resex Unini, Jaú National Park and Anavilhanas National Park (AM)

Beside, fish farming at Tapajós-Arapiuns Resex (PA)

Biodiversity research and Monitoring

Problems in conducting research and monitoring activities lead to difficulties in measuring and reporting on results achieved in the protection of natural heritage and promotion of social and environmental development of PAs located in the Amazon biome.

One of Snuc's goals is to provide means and incentives for scientific research activities, studies and environmental monitoring.

Researching in the Amazon is impacted by incipient infrastructure and difficulties of access to PAs. 73% of PAs managers stated that their area did not have infrastructure to support research. In addition, it was reported that in 180 of the 247 PAs there is lack of incentive mechanisms to conduct research.

Although Brazil has developed important information systems on biodiversity, the Ministry of Environment (MMA, in Portuguese) recognizes that not all systems allow data exchange, which difficults integration, access, and exchange of information.

Regarding monitoring, most PAs do not perform activities aimed at monitoring biodiversity and promoting social and environmental development. Of the 247 PAs evaluated in the Amazon biome, 64% of managers said they have not been monitoring biodiversity in the last 5 years.

Regarding monitoring social and environmental evolution, more than half of the managers of Extractive Reserves and Sustainable Development Reserves stated that their PA does not have tools to monitor the results of social and environmental development efforts.

In this context, it was confirmed that no comprehensive and coordinated system for biodiversity monitoring has been developed. On the other hand, Brazil is internationally recognized for its land cover monitoring systems created to monitor deforestation.

Biodiversity monitoring is an activity internationally recognized as complex, with high costs and very time consuming. All these factors were taken into account in the analysis made by the audit institutions.

In the evaluation of Ecological Stations (Esec, in Portuguese) and federal and state Biological Reserves (Rebio) of the Amazon biome, biodiversity

monitoring was one of the worst indicators for these PA categories. In 30 of the 33 areas there was no biodiversity monitoring, a relevant fact considering that conducting scientific research is among the main objectives of these PA categories.

Finally, even though monitoring of actions to combat deforestation is considered efficient - it is used as a proxy to analyze the protection of natural heritage, it should be noted that monitoring of social and environmental development in PAs need further improvement in order to provide a realistic assessment of government actions to the quality of life of communities living in those areas.

Brazil has some deforestation monitoring systems, such as Deter (Detection of Deforestation in Real Time) and Prodes (Program to Calculate Deforestation in the Amazon), both from Inpe (National Institute for Space Research).

Picture: Wikimedia Commons / Adrian Pingston

Picture: ICMBio

Provision of resources needed by protected areas

Brazil was one of the countries that created more protected areas in the recent years, mainly in the Amazon region. However, the evaluation conducted by audit institutions revealed that basic resources (management plan, human and financial resources, territorial consolidation, among others) provided by federal and state governments are not compatible with the PAs management needs.

Wild fire fighters at Maracá Ecological Station (RR)

Picture: ICMBio/ Blog of Maracá Ecological Station (RR)

Management plans

PAs in the Amazon biome have a small percentage of approved management plans, as well as a reduced level of implementation of this instrument.

Therefore, it is important that PAs not only have approved management plans, but also that these plans correspond with the reality of the conservation area, so that the actions planned can be effectively implemented. This is why audit intitutions went further in their assessment, and determined the degree of implementation and adequacy of management plans.

The absence of a management plan has consequences in the management of PAs. As long as plan is not elaborated, the management of the area focuses in protection and monitoring actions, which particularly difficults the promotion of social and environmental development.

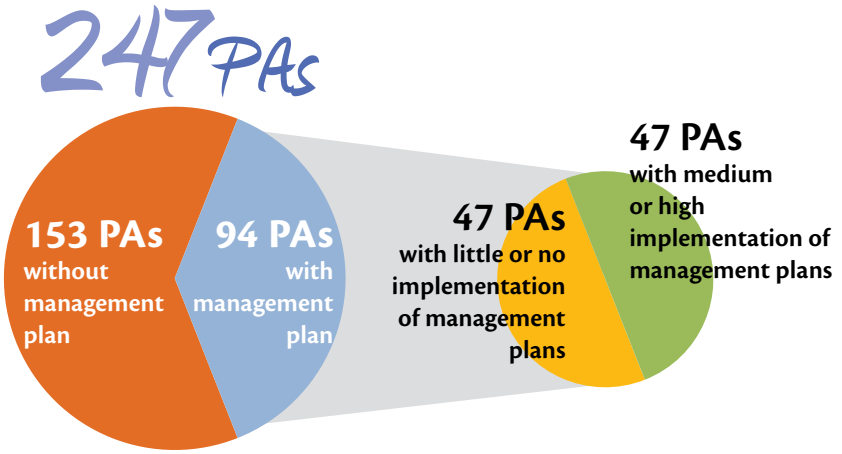
The lack and inadequacy of Management Plans - the main management and planning instrument that regulates the access and use of natural resources- implies the underutilization of the potential for sustainable use of PAs.

Finally, although the management plan is a decisive factor for the implementation of activities that depend on it, management efforts are also necessary besides the mere existence of this instrument.

The management plan is the main planning and management document that establishes the zoning and regulations concerning the use and management of PAs natural resources.

Relevant activities such as: public use (visitation, tourism, recreation and environmental education), sustainable logging (forest concessions), community resource management, among others, cannot be performed in the PAs without a management plan.

Management plans in the state and federal PAs in the Amazon biome



Source: Created by TCU

Financial resources

Financial resources available for the management of PAs in the Amazon biome are not compatible with the needs of those territories.

Analyses performed by the TCU and the nine TCEs concluded that essential management activities, such as: monitoring and combating environmental emergencies, environmental educational and awareness actions, biodiversity monitoring, research and protection were compromised because of insufficient financial resources.

PAs have the support of other financial sources in addition to those in their official budgets. The main source of extra-budgetary financial resources is the Amazon Protected Areas Program (Arpa).

In general, ARPA consists of action by the federal government to raise funds from international donors (through the MMA) to be managed by Funbio (Civil private non-profited association), and applied in protected areas of the Amazon biome (federal, state and municipal).

Despite these extra-budgetary resources that contribute to the management of PAs in the Amazon, the Audit Institutions noted the existence of an incompatibility of the total amount of resources available with the financial management needs of these territories, which has compromised the performance of essential activities.

One of Snuc Law guidelines is granting proper allocation of the necessary financial resources for protected areas to be managed effectively and achieve their objectives.

Good practice

ICMBio hired an ongoing resources management service to improve the management of financial resources and guarantee the supply of office, firefighting and other supplies necessary to preserve areas.

It is a kind of virtual warehouse, awarded a prize in 2012 by the National School of Public Administration (Enap) at the 17th Innovation Competition in the Federal Public Administration.

Arpa was established by Decree 4.326/2002 in order to expand and consolidate all protected areas in the Amazon biome, to ensure the conservation of biodiversity in the region and contribute to its sustainable development.
It is a partnership between the MMA, ICMBio, state and local governments of the Amazon, the Fund for the Environment Global Environment Facility (GEF), the World Bank, the *Entwicklungsbank* (KfW - German Development Bank), the *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ), the World Wildlife Fund (WWF-Brazil), Funbio and Civil Society Organizations.

Human resources

The current staff of state and federal PAs is not enough to carry out the management activities, since many essential activities are no longer being done due to lack of personnel.

Moreover, there are 59 areas with no staff, which represents 24% of the federal and state PAs in the Amazon region. Only 3 of 247 PAs reported that the number of staff fully meets the demands of the area.

89% of the heads of federal PAs in the Amazon biome, who participated in the RAPPAM assessment conducted by WWF-Brazil in 2010, supported this information reporting that there are not enough human resources for the effective management of the areas.

The National Strategic Plan for Protected Areas (Pnap), Decree 5.758/2006, establishes as a strategy "to have permanent staff for environmental bodies to management protected areas", in order to achieve the general goal of establishing a political, administrative and socioeconomic environment that favors the implementation of the Snuc at the three government levels.

Besides understaffing, another difficulty that PAs management faces is fixing staff locally, given the living conditions in the locations where they work and the working conditions offered in these areas.

The conditions for PAs staff at the area and its surroundings (health, education, housing, transportation, dislocation, etc.) do not contribute to their fixing residency in the Amazon region.

This information is confirmed by data provided by the municipal HDI (Human Development Index), recently published in the 2013 Atlas of Human Development in Brazil by the United Nations Development Programme (UNDP).

Just like with the consequences resulting from insufficient financial resources, shortage of human resources implies that essential activities are no longer performed or were performed unsatisfactorily, mainly supervision, site coordination and conflict management,

The RAPPAM - Rapid Assessment and Prioritization of Protected Areas Management is a methodology adopted by the WWF and recognized worldwide for assessing management effectiveness of protected areas.

environmental education awareness and biodiversity monitoring.

To face these difficulties was created the National Biodiversity Academy (Acadebio).

The academy trains personnel of federal and other public institutions. These is a space to exchange information regarding the management of areas in various Brazilian regions and biomes, since course participants are lodged at the academy premises and no per diem payments is required.

Good practice

The National Biodiversity Academy (Acadebio) was created at ICMBio in 2009 to train the autarchy's staff

Acadebio is located in the Ipanema National Forest (SP)

Picture: ICMBio

Territorial consolidation

As in the Amazon biome protected areas face significant territorial consolidation problems, particularly regarding land property regularization, which can cause problems in management of areas and conflicts over ownership and use of land.

One of the consequences of lack of territorial consolidation is the existence of people that are not authorized inside the protected area by the management department. This can result in the development of activities that are incompatible with the PA goals and affect the management of that territory.

Another issue related to territorial consolidation is the poor delimitation and signaling in protected areas, which brings doubts on which are the PA boundaries and where allowed activities can be practiced. Only 25% of PAs in the Amazon biome are delimited and signposted.

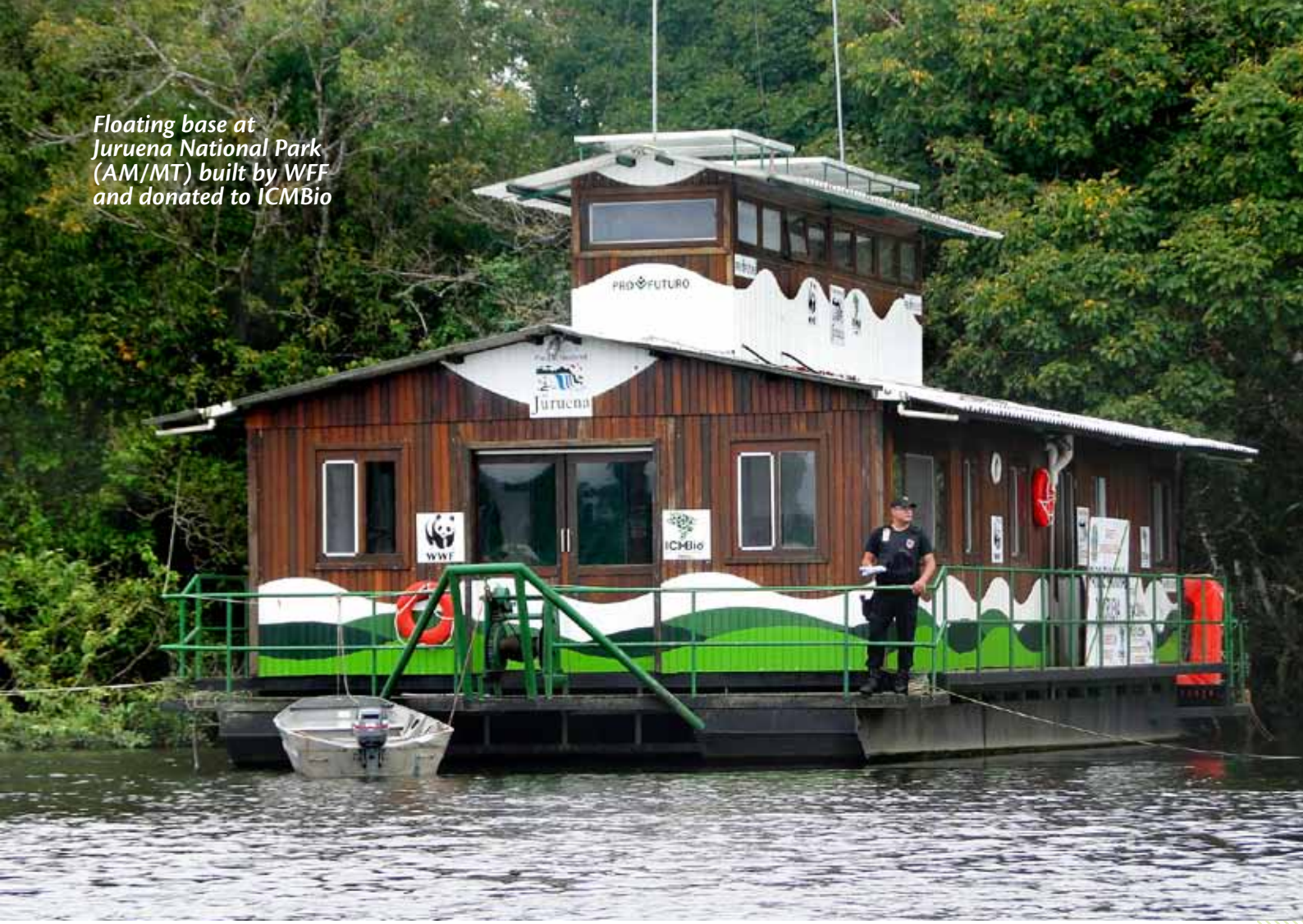
The Snuc Law states that full protection areas (ecological stations, biological reserves, parks) and some categories of sustainable use areas (forests and extractive reserves) are of public domain, and that private areas included in its limits will be expropriated.

Traditional communities living in protected areas where their residency is not allowed (fully protected areas) will be indemnified or compensated for any improvements and properly relocated by the Government in a location and conditions agreed between the parties.

Families that used to plant, fish, deforest or collect non-timber products before the creation of protected areas tend to continue performing these activities and to use natural resources available, until they are compensated or relocated.

Finally, it should be pointed out that resolution of problems related to territorial consolidation sometimes exceed the capacity of environmental bodies, requiring the participation of other stakeholders on issues related to protected areas.

Delimitation is the use of a mechanism to show the boundaries where protected areas territories begin and end. Signaling is placing plaques and sings in the main access points to the unit



Floating base at Juruena National Park (AM/MT) built by WFF and donated to ICMBio

Picture: ICMBio

Articulation of parties involved in the governance of protected areas

Articulation between parties involved in the management of PAs in the Amazon biome needs to be improved. Coordination of the Brazilian National Protected Areas System (Snuc), as well as cooperation and communication needed for good governance of these areas need to be strengthened so that PAs can achieve the objectives set forth in the time of their creation.

Coordination of the Brazilian National Protected Areas System (Snuc)

Decree 5.758/2006 established the National Strategic Plan for Protected Areas (Pnap) which was elaborated due to the commitment taken by the Brazilian government in the Convention on Biological Diversity (CBD).

In this context, the implementation of the Pnap is expected to be carried out by a committee coordinated by the Ministry of Environment (MMA).

However, seven years after the publication of the Plan the committee - an important mechanism for coordination between the parties- has yet not been created.

It is crucial for the system to have a strong and consistent coordination, through institutionalized mechanisms and promotion of coordinating and integrating actions aimed at implementing public policies.

The absence of the commission provided for in the Pnap imposes obstacles to an integrated approach of government actions and undermines the environmental governance of PAs, since it makes it difficult to have a systemic view of these areas and taking general decisions.

Moreover, problems in coordination between parties involved in the governance of PAs can cause waste or duplication of efforts, which stresses even more the need for improvement in the coordination of the Brazilian National Protected Areas System (Snuc). All that aimed at contributing with the MMA in performing its role as a formulator of national strategies, articulator, mediator and generator of good practice.

The Brazilian National Protected Areas System (Snuc) is composed by federal, state and municipal PAs, and it is managed by executive bodies at each governmental level, the Ministry of Environment being the coordinator of the system.

Cooperation between Snuc parties

Few formal mechanisms for cooperation between parties involved in the governance of protected areas are implemented in the Brazilian Amazon bioma.

Formal partnerships and intra-and intergovernmental cooperation are incipient, which hinders activities related to the management of PAs.

Over 70% of PAs managers say that cooperation between the unit and governmental bodies is little or non-existent. Furthermore, 67% of PAs managers believe that cooperation between PAs and non-governmental partners is also little or non-existent.

Given the limited human and financial resources that PAs managers have access to, cooperation between government areas and the creation of partnerships with external parties become more relevant.

A relevant example of articulation instrument and local cooperation in PAs is the role played by management councils, since these are decision making bodies and, among other roles, they seek to improve the access of the populations in these territories to public policies.

Councils are the main instrument of relationship between PAs and the society. In order to promote the shared management of Pas through broad social participation composed by representatives of society and public bodies.

Therefore, the coordination and cooperation between Snuc parties is important for the improvement of management, in addition to representing alternatives to overcome limitations that affect the governance of PAs.

Snuc Law states provides that guidelines be created to support the cooperation of non-governmental organizations, private organizations and individuals in activities that assist in the management of PAs, such as scientific research and environmental education practices.

Cooperation and coordination between government bodies and PAs is especially important when it comes to inhabited areas. In these areas, articulation is fundamental so that public policies, such as health and education, can reach residents.

Good practice

Brazil has managed to establish a partnership to attract financial resources from international donors to finance PAs activities, such as the Arpa program and international cooperation projects such as marine - GEF, land - GEF and LifeWeb initiative.

Communication in Snuc

Formal channels of communication between the parties involved in the management of protected areas need to be improved in order to bring these areas of society closer.

This improvement is necessary to increase the legitimacy of Snuc, since PAs still need to be known and recognized by the community as important spaces for environmental preservation and social and environmental development.

An example of the need to improve the promotion of PAs among society is the fact that tourists are unaware that some of the main touristic attractions of Brazil are protected areas.

Fernando de Noronha (PE); Cataratas do Iguaçu (PR), Pantanal Matogrossense (MT); Chapada dos Guimarães (MT); Chapada dos Veadeiros (GO); Chapada Diamantina (BA); Parque Nacional da Tijuca/Cristo Redentor (RJ); Jericoacara (CE); Anavilhanas (AM); Serra da Canastra (MG); Serra da Capivara (PI); Lençóis Maranhenses (MA); Abrolhos (BA); Floresta Nacional de Tapajós (PA), among others are protected areas.

The National Strategic Plan for Protected Areas (Pnap) states the need to ensure the wide promotion and public access to information related to protected areas, as well as promoting the exchange of information on ways of planning and managing PAs.

In addition to social legitimacy, communication is also needed as a supporting instrument in the management of PAs. For this purpose, the National Register of Protected Areas (Cnuc in Portuguese) - a system that manages information provided by the MMA with the assistance of federal, state and municipal bodies - seeks to provide official and updated information on PAs to the academy, governments, private sectors and society in order to support Snuc's planning and management.

There is a need to devise strategies to bring this information to the public domain and thus sensitize society about the importance of PAs, not only as tourist spots, but also as tools for biodiversity conservation.

Therefore, a better articulation (coordination, cooperation and communication) among the parties will improve the implementation of Snuc, which will contribute to fully achieving expected results in protected areas.

Good practice

The ParkView project, is the result of a partnership between Google and ICMBio Brazil. It provides a virtual tour through Brazilian parks. This tour offers Internet users the possibility to visit PAs modeled on through StreetView, Google's tool that maps roads and urban streets.

Products developed for the evaluation

Amazon river

Picture: Nasa

Indimapa

Evaluation of Implementation and management of protected areas

The assessment preformed by the Audit Institutions sought to bring a systemic view of protected areas (PAs) in the Brazilian Amazon biome, identifying bottlenecks in management process of these areas, as well as opportunities for improvement and best practices.

TCU created the Implementation and Management of Protected Areas Index (Indimapa) a product developed for this assessment.

The Indimapa is a set of 4 maps, geo-referenced instruments, for assessment, communication and monitoring of the 247 PAs of the Brazilian Amazon biome (107 federal and 140 state PAs), which allow an overview of various aspects of these territories.

The first two maps analyze the contribution of PAs to biodiversity protection, reporting on deforestation and carbon flow in each PA.

These 2 maps were presented in the preceding pages: the Deforestation Indimapa and the Carbon Flow Indimapa.

The third and fourth maps of the Indimapa are created from indicators and indexes that bring the evaluation result on points relating to the implementation and management of PAs. They are Indimapa Indicators and Indimapa Index.

These maps are complementary in their analysis, since the Indimapa Index reports the average result of all indicators applied to each PA, data from Indimapa Indicators.

It is possible to extract from each analyzed map, data of individualized management of each protected area, as well as information consolidated from assessments made by TCU and the nine state Audit Courts.

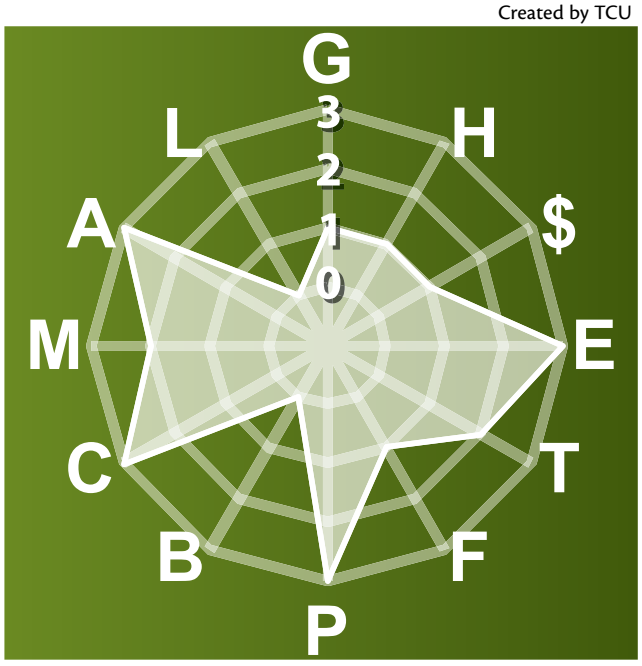
This makes it possible to quickly identify the main strengths and weaknesses in the management and implementation of PAs in the Brazilian Amazon.

The Indimapa is a tool with three main objectives: it serves as a tool for individualized diagnosis for PAs; it is a mechanism for reporting audit findings; and it enables monitoring the implementation and management of PAs over time. This assessment allows a systemic view of the Amazon biome, since it contains the consolidated result of all federal and state protected areas in the region.

Indimapa Indicators

Indicator	Issue
G	Management Plan
H	Human Resources
$	Financial resources
E	Physical structures, furnishings and services
T	Territorial consolidation
F	Inspection and fighting environmental emergencies
P	Research
B	Biodiversity monitoring
C	Consultative or deliberative body
M	Community management
A	Access of local populations to public policies
U	Public use
N	Onerous Forest concessions
L	Local articulation

Created by TCU



Indimapa Indicators assess 14 aspects related to resources and PAs articulation that are essential for the proper functioning of these areas. This facilitates achieving the results expected since the creation of these areas.

The indicators were represented in a radar chart to communicate the degree of implementation and management of the PAs assessed. In this type of representation, the more the polygon is filled - and therefore nearer to the end of the chart - the better the unit will be assessed.

To illustrate the radar chart, observe the following figure: Example of a radar chart.

It is clear that indicators A, C, P and E are in the best possible situation. In turn, indicators L and B have the minimum score.

As a product of the assessment of the implementation and management indicators of the 107 federal protected areas, TCU elaborated the Indimapa indicators as shown.

Due to the unique characteristics of PAs, some indicators are specific to certain groups and PA categories, i.e., not all of these areas will be evaluated for all 14 indicators.

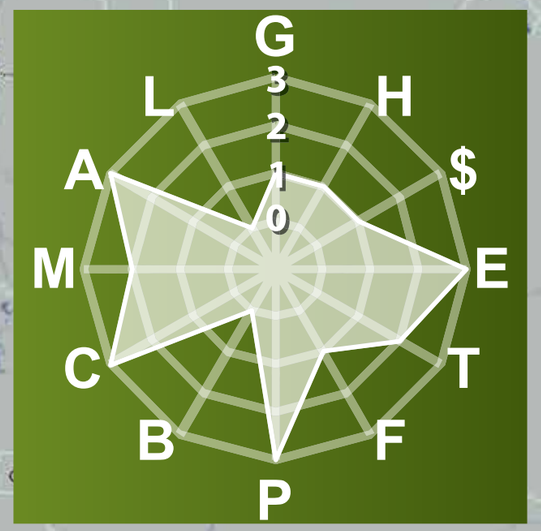
INDIMAPA

INDICATORS OF IMPLEMENTATION AND MANAGEMENT

AM
RR
AP
PA
MA
TO
MT
RO
AC

The information about indicators for each protected area are on TCU's report

Example of radar chart



This map can be visualized in the link below:
http://portal2.tcu.gov.br/portal/page/portal/TCU/imprensa/noticias/noticias_arquivos/4%20-%20Indimapa%20indicadores%20federal.pdf

Indimapa Index

To consolidate the information generated by the assessment of the implementation and management, reflected in the Indimapa Indicators, an instrument that puts together this data in a more concise and accessible level of communication was created.

This tool, called Indimapa index, presents in a consolidated way the result of the analysis of the implementation and management in 247 federal and state Protected Areas (PAs) in the Brazilian Amazon biome.

The indices presented in Indimapa index are the average of the 14 indicators applicable to each PA assessed, allowing for a view of the performance of each these areas by classifying them individually in three colors: red, yellow and green.

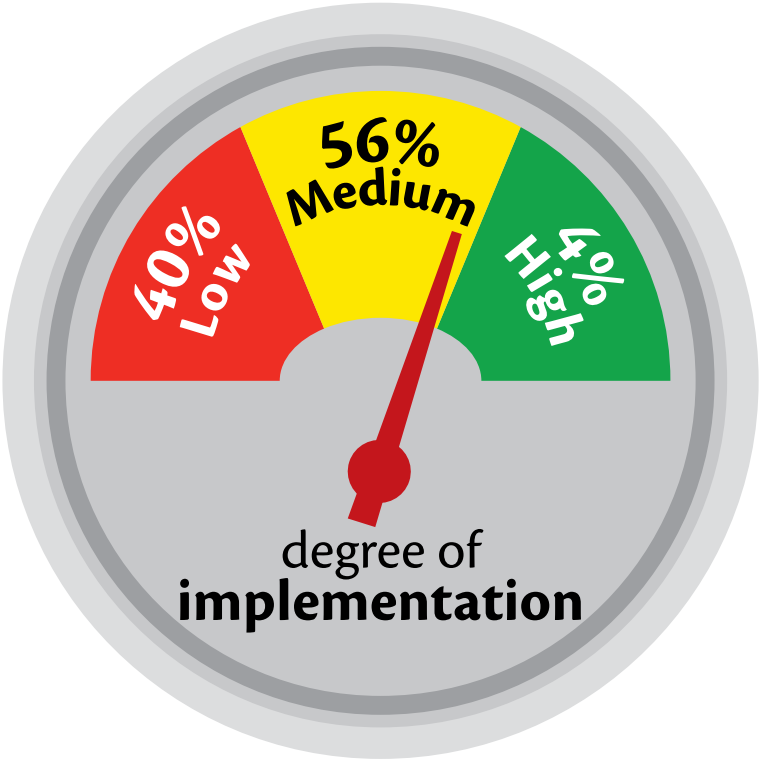
The red color range corresponds to up to 0.99 points. In turn, the yellow color range is between 1 and 1.99. Finally the green color range represents the best index, which correspondents to PAs that scored from 2 to 3 points.

This tool consolidates a range of information on all the PAs in the Amazon region, and also provides individualized data for each territory.

Let see the results

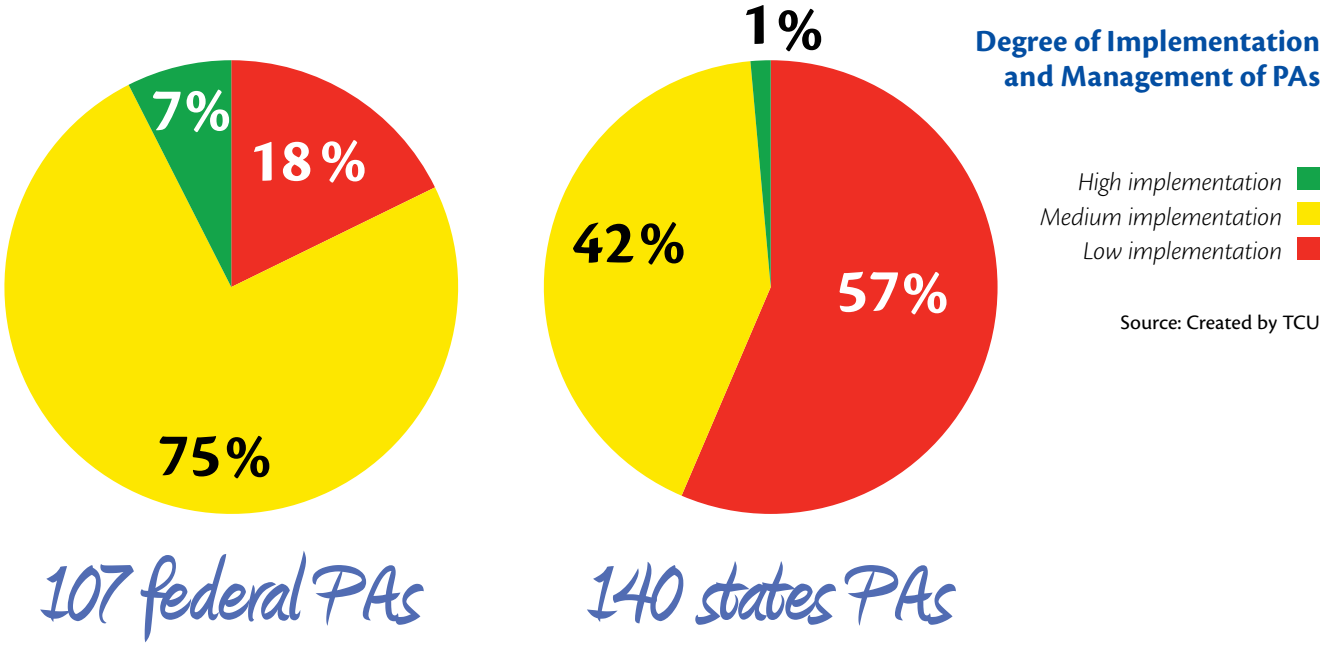
Currently, of the 247 of the federal and state PAs assessed, only 4% are in the green color range, indicating the high degree of implementation and management necessary to fulfill the objectives set for these areas at the time of their creation.

Panorama of the degree of implementation and management in the 247 PAs assessed



Source: Created by TCU

If, for example, the average of indicators of a given PA is 1.6, the index for this area will be in the yellow color range, indicating an average degree of implementation and management.



The average index of federal PAs in the Brazilian Amazon region is 1.35, while the state average is 0.98. Therefore, the average index for the 247 PAs in the biome is 1.14, on a 0-3 scale.

It should be noted that each participant state Audit Court provided data regarding PAs assessed in their state, which allowed the elaboration of Indimapa Indicators and Indimapa Index. In addition, individual results for the 247 PAs assessed can also be found at the end of this publication.

Indimapa Index enables identification of PAs with higher need of implementation actions and improvements in management, serving also as a management and strategic tool.

In addition, this tool makes it possible for oversight institutions , managing entities, non-governmental organizations, international donors and society to monitor developments in the management of these areas, thus increasing accountability and strengthening governance of the Brazilian National Protected Areas System (Snuc).

Finally, by providing a systemic view of public policy in the Amazon biome protected areas, the Indimapa, as a tool for assessment, reporting and monitoring, can also technically support the decision-making process to fully achieve the objectives of that policy and also of other public policies related to the development of the Amazon.

INDIMAPA

IMPLEMENTATION AND MANAGEMENT INDEX

Created by TCU with shared data from TCEs.

The information about index for each protected area can be found on the end of this summary.

Key

Tracks of PAs Index

Low	(0 - 1)	**• 98 areas**	**• 39,7%**
Medium	(1 - 2)	**• 139 areas**	**• 56,3%**
High	(2 - 3)	**• 10 areas**	**• 4,0%**

state / federal

Brazilian Amazon Biome
Interstate boundaries
Federal capital and state capitals

This map can be visualized in the link below:
http://portal2.tcu.gov.br/portal/page/portal/TCU/imprensa/noticias/noticias_arquivos/Indimapa%20%C3%ADndice%203%20faixas%20nacional.pdf

Conclusion

Amazon sunset at the river shore

Picture: TCU Audit team

One of the world's main strategies for biodiversity protection , i.e., fauna, flora and water resources, among other natural resources, is the creation and maintenance of protected areas (PAs).

Brazil is considered one of the mega-diverse countries and, as a result of a strategy to fight biodiversity loss, it significantly expanded its areas protected by PAs in the recent years, especially in the Brazilian Amazon region.

This way, despite the achievement of the goal of creating continental PAs by the Brazilian Government and the positive results arising from this initiative, the protected areas policy has not been accompanied by the necessary conditions for the

effective implementation and proper management of protected areas.

The Audit Institutions, through a coordinated audit of the Brazilian Amazon, assessed the implementation and management of 247 federal and state PAs in the region. To this end, assessment tools were developed: the Indimapas.

These tools have presented the benefits derived from the creation of PAs, as well as those related with governance weaknesses of these territories, enabling a systemic view of public policies for protected areas in the Amazon region.

Thus, Indimapa results showed that only 4% of the federal and state PAs have a high degree of implementation and management.

This situation leads to the underutilization of economic, social and environmental potential of protected areas, since there are significant deficiencies, such as: parks without public use (visitation, recreation and education); forests without legal logging (forest concessions), and extractive reserves with difficulties in implementing sustainable alternatives for generating employment and income.

Futhermore, most of the protected areas in the Amazon biome do not monitor biodiversity or promote social and environmental development. This fact hinders the diagnosis and monitoring of biodiversity protection and social and economic progress in the Amazon region.

The set of problems identified is linked to several factors. One of the most significant factors is that federal and state governments do not provide the resources needed for the implementation and proper management of PAs.

In addition, there were identified problems in the Brazilian National Protected Areas System (Snuc) regarding articulation between parties involved in the governance of PAs in the Amazon biome.

On the other hand, actions regarding the control of deforestation were successful and protected areas have been effective in reducing deforestation.

TCU confirmed this effectiveness when analyzing the Amazon biome. It concluded that 6% of the deforestation warnings occurred inside PAs, even though those territories occupy ¼ of the region – equivalent to the territories of Spain and France.

Deforestation control and prevention of the biodiversity loss contribute to the reduction in carbon emissions (CO_2), one of the gases responsible for the greenhouse effect.

Creation of PAs occurred, among other reasons, due to the commitment made by Brazil, before the United Nations (UN) to fight the loss of biodiversity. This commitment sets as a target that 17% of the continental territory of each country should be a protected area.

Indimapas are geo-referenced tools to assess, communicate and monitor PAs. They were divided into 4 maps: Indimapa Indicators, Indimapa Indexes, Indimapa Deforestation and Indimapa Carbon.

The main findings of the Audit Institutions Courts of Accounts were:

- Protected areas are not fully achieving the expected results
- Conditions provided by federal and state governments are not compatible with protected areas needs.
- Articulation is insufficient to achieve the objectives established for protected areas.

The creation of protected areas was one of the strategies adopted by the Brazilian government to reduce deforestation in the Amazon, with annual deforestation rates going from 27,000 km² in 2004 to 4,500 km² in 2012.

In the coordinated audit it was calculated the individual participation of PAs in the Amazon in the CO_2 flow (emission and removal), thus confirming that these protected areas remove significant amounts of carbon.

Reduction of carbon emissions originated in the forest sector, in particular by controlling deforestation, was of such proportion that while other sectors such as industry, agriculture and energy have increased their emissions, Brazil reduced its total greenhouse gas emissions.

Considering the benefits of the creation of PAs, especially in the Brazilian Amazon, and the need for effective implementation and proper management of these protected areas, the Audit Institutions, in the exercise of their work, including the educational, proposed measures to contribute with the improvement of environmental governance of that region.

Thus, the Audit Institutions, in order to increase the use of the economic, social and environmental potential of protected areas (PAs), deliberated that the various parties involved:

- Prepare studies on the tourism potential of PAs, in order to enable public use through visitation, recreation and environmental education in these areas.
- Improve actions of coordination between bodies, entities and other institutions involved in the governance of Brazilian National Protected Areas System (Snuc), with the aim of promoting sustainable activities for the Amazon region in order to provide economically viable alternatives to extractivist populations.
- Consider the development of a national strategy for biodiversity monitoring and promotion of social and environmental development, implementing indicators and tools to measure and communicate results.
- Supply PAs with appropriate management plans so that, when effectively implemented, these planning and management tools contribute to the economic, social and environmental uses of these areas.
- Gather information on the land tenure status of protected areas to assist in the planning and execution of actions to effectively consolidate these areas.

The resolutions also sought to induce actions to address shortfalls relating to human and financial resources in PAs. It should be noted that, if on the one hand the strategy of establishing PAs contributed to the protection of natural heritage, the absence or weakness of PAs management fails to add positive outcomes for biodiversity and the promotion of environmental development.

It was also identified the need to improve the coordination of the Brazilian National Protected Areas

PAs play an important role in reducing deforestation. However, other government actions are also part of the deforestation control policy. Therefore, the government needs to maintain and enhance this set of actions (creation and maintenance of PAs, inspection activities, positive financial mechanisms etc.), at risk of losing the benefits already obtained with this policy.

System, since Snuc´s law requires a responsible party to develop national strategies, articulate solutions and mediate problems.

Effective coordination of the system will provide a systemic view of PAs, which will allow the identification of weaknesses and best practices, and induce corrective actions to improve the management of these areas.

To implement the determinations and the recommendations proposed by the Audit Courts , the bodies and entities involved in the governance of protected areas must submit plans of action mentioning responsible agents, activities and a schedule, in order to adopt the necessary measures to reverse the situation identified in the coordinated audit.

What is expected as a result of the coordinated audit?

It is expected that the Brazilian National Protected Areas System (Snuc), besides acting in the maintenance of biodiversity, also becomes an instrument to catalyze actions that promote the generation of employment and income, aiming at improving the quality of life of local residents in PAs and hence the development sustainable development of the Brazilian Amazon region.

Furthermore, it is desired that the PAs become a source for economic growth when tourism is used as a means to promote and boost the local economy, and that, through sustainable forestry, these areas contribute to reducing deforestation by supplying legal timber.

Biodiversity requires a multidisciplinary approach, extrapolating environmental bodies and traversing various Governmental areas. It is expected that PAs, with good implementation and management, achieve more significant results in relation to the protection of environmental heritage and the promotion of social and environmental development.

Finally, there is an expectation that the reports produced by the Audit Courts collaborate in decision-making process of those responsible for the coordination, development and implementation of public policies in the environmental area, in particular for PAs in the Brazilian Amazon biome.

Sector	Numeration	Government level	Protected area	Creation date	Total carbon flow (tC)	Average carbon flow (tC/ha)	Total deforestation (ha)	Deforestation per hectare (* 10-5)	Implementation and management index
A3	1	Federal	Parna Serra do Divisor	1989	-5.448.715,00	-6,20	0	0,00	1,55
A3	2	AC	Arie Japiim Pentecoste	2009	0,00	0,00	0	0,00	1,00
A3	3	AC	FE Mogno	2004	-277.233,00	-1,86	0	0,00	1,83
A3	4	AM	Resex do Rio Gregório	2007	0,00	0,00	0	0,00	1,75
A3	5	AC	FE Rio Gregório	2004	474.812,50	2,05	0	0,00	1,83
A3	6	AC	FE Rio Liberdade	2004	-249.472,50	-1,86	0	0,00	1,83
A3	7	Federal	Resex Riozinho da Liberdade	2005	-465.527,00	-1,32	0	0,00	0,83
A3	8	Federal	Resex Alto Juruá	1990	-3.435.110,00	-6,20	0	0,00	1,42
A3	9	Federal	Resex Alto Tarauacá	2000	-720.548,50	-4,34	30	18,07	1,33
A3	10	Federal	Flona Santa Rosa do Purus	2001	-931.488,00	-3,72	350	139,78	0,73
A3	11	AC	PE Chandless	2004	2.819.035,25	5,50	0	0,00	1,27
A3	12	Federal	Flona Macauã	1988	-1.133.050,00	-6,20	0	0,00	1,25
A3	13	Federal	Esec Rio Acre	1981	24.742,13	0,91	0	0,00	1,50
B1	14	Federal	Flona Amazonas	1989	-12.350.400,00	-6,19	0	0,00	0,91
B2	15	AM	Rebio Morro dos Seis Lagos	1990	-256.990,00	-6,20	0	0,00	0,20
B2	16	Federal	Parna Pico da Neblina	1979	-13.771.750,00	-6,07	0	0,00	0,91
B2	17	Federal	Esec Juami-Japurá	1985	-3.835.475,00	-6,20	0	0,00	1,50
B2	18	Federal	Resex Auati-Paraná	2001	-458.955,00	-3,72	0	0,00	1,33
B2	19	AM	RDS Mamirauá	1990	-6.654.770,00	-6,20	0	0,00	1,83
B2	20	AM	RDS Amanã	1998	-12.752.392,50	-5,58	0	0,00	1,08
B2	21	Federal	Arie Javari Buriti	1985	-73.470,00	-6,20	0	0,00	0,56
B2	22	Federal	Esec Jutaí-Solimões	1983	-1.433.285,00	-6,20	0	0,00	1,40
B2	23	Federal	Resex Rio Jutaí	2002	-823.592,50	-3,10	0	0,00	1,08
B2	24	Federal	Resex Baixo Juruá	2001	-647.931,00	-3,72	0	0,00	1,83
B2	25	Federal	Flona Tefé	1989	-711.010,25	-0,88	40	4,97	1,09
B2	26	AM	Resex Catuá-Ipixuna	2003	-481.740,00	-2,48	0	0,00	1,58
B2	27	AM	RDS Cujubim	2003	-6.340.368,00	-2,48	0	0,00	1,50
B2	28	Federal	Resex Médio Juruá	1997	-1.549.535,00	-6,20	0	0,00	1,58
B3	29	AM	RDS Uacari	2005	-745.922,00	-1,24	0	0,00	1,75
B3	30	AM	FE Catunama	2009	0,00	0,00	0	0,00	0,75
B3	31	AM	Resex Canutama	2009	0,00	0,00	0	0,00	0,58
B3	32	Federal	Resex Médio Purus	2008	0,00	0,00	0	0,00	1,17
B3	33	Federal	Flona Purus	1988	-1.698.180,00	-6,20	110	40,16	1,67
B3	34	Federal	Parna Mapinguari	2008	-37.913,00	-0,02	1440	79,20	1,09
B3	35	Federal	Resex Ituxi	2008	0,00	0,00	80	9,82	1,00
B3	36	Federal	Flona Iquiri	2008	257.891,13	0,17	270	17,55	1,33
B3	37	Federal	Flona Mapiá-Inauini	1989	-2.442.490,00	-6,20	0	0,00	1,17
B3	38	RO	Fers do Rio Madeira - B	1996	-359.755,00	-6,20	130	224,04	0,60
B3	39	RO	APA Rio Madeira	2006	91.214,75	31,45	0	0,00	0,70
B3	40	Federal	Resex Arapixi	2006	-81.204,50	-0,62	0	0,00	1,25
B3	41	RO	Fers Rio Vermelho - C	1990	-31.775,00	-6,20	70	1.365,85	0,60
B3	42	RO	Esec Serra dos Três Irmãos	1990	-588.535,00	-6,20	0	0,00	1,20
B3	43	AC	FE Antimary	1997	-455.390,00	-6,20	30	40,84	2,08
B3	44	Federal	Resex Cazumbá-Iracema	2002	857.954,75	1,07	0	0,00	2,00
B3	45	AC	APA Igarapé São Francisco	2005	100.477,25	118,21	0	0,00	0,80

Sector	Numeration	Government level	Protected area	Creation date	Total carbon flow (tC)	Average carbon flow (tC/ha)	Total deforestation (ha)	Deforestation per hectare (*10-5)	Implementation and management index
B3	46	RO	Resex Jaci-Paraná	1996	-1.317.810,00	-6,20	5740	2.700,54	0,50
B3	47	Federal	Flona São Francisco	2001	-84.072,00	-3,72	0	0,00	1,25
B3	48	AC	APA Lago do Amapá	2005	237.784,75	161,21	0	0,00	0,50
B3	49	RO	PE Guajará-Mirim	1990	-390.600,00	-1,91	40	19,52	1,82
B3	50	Federal	Resex Chico Mendes	1990	2.194.633,88	2,55	110	12,78	1,67
B3	51	Federal	Resex Rio Ouro Preto	1990	-926.094,88	-4,18	140	63,18	0,92
B3	52	RO	Rebio Rio Ouro Preto	1990	-254.200,00	-4,27	0	0,00	0,40
B3	53	Federal	Arie Seringal Nova Esperança	1999	-16.864,00	-4,96	0	0,00	0,90
B3	54	RO	Resex Rio Pacaás Novos	1995	-2.240.060,00	-6,15	130	35,66	0,67
B4	55	Federal	Parna Serra da Cutia	2001	-1.064.292,00	-3,72	0	0,00	1,45
B4	56	RO	Rebio Traçadal	1990	-156.705,00	-6,20	0	0,00	0,40
B4	57	Federal	Resex Barreiro das Antas	2001	-433.194,00	-3,75	0	0,00	1,17
B4	58	Federal	Resex Rio Cautário (federal)	1995	-852.035,00	-6,20	0	0	1,58
B4	59	RO	Resex Rio Cautário (estadual)	1995	-852.035,00	-6,20	150	109,15	0,83
B4	60	RO	Resex Curralinho	1995	-5.735,00	-6,20	0	0,00	0,36
C1	61	Federal	Parna Monte Roraima	1989	-621.705,00	-5,57	0	0,00	1,73
C1	62	Federal	Esec Maracá	1981	-577.595,00	-6,06	0	0,00	1,40
C1	63	Federal	Flona Roraima	1989	-829.295,38	-4,66	0	0,00	0,91
C1	64	Federal	Esec Caracaraí	1982	-542.500,00	-6,20	0	0,00	1,60
C1	65	Federal	Parna Serra da Mocidade	1998	-1.675.751,50	-4,35	0	0,00	1,45
C1	66	Federal	Parna Viruá	1998	-597.339,00	-2,90	0	0,00	2,09
C1	67	Federal	Esec Niquiá	1985	-1.060.975,00	-3,70	0	0,00	1,30
C1	68	Federal	Flona Anauá	2005	-241.025,00	-0,89	0	0,00	1,27
C1	69	AM	PE Serra do Aracá	1990	-11.526.110,00	-6,05	0	0,00	0,09
C2	70	RR	APA Xeriuini	1999	-5.701.396,00	-3,97	0	0,00	0,50
C2	71	RR	APA Baixo Rio Branco	2006	-690.773,00	-0,46	0	0,00	0,30
C2	72	Federal	Rebio Uatumã	1990	-5.132.360,00	-6,20	0	0,00	2,50
C2	73	Federal	Resex Rio Unini	2006	-536.951,00	-0,62	0	0,00	1,92
C2	74	AM	APA Presidente Figueiredo	1990	-2.285.940,00	-6,20	550	149,17	1,20
C2	75	AM	APA M. Esq. R. Negro S. Aturiá-Apuauzinho	1995	-3.348.620,00	-6,20	40	7,41	0,70
C2	76	Federal	Parna Anavilhanas	1981	-769.575,00	-6,20	0	0,00	1,73
C2	77	Federal	Parna Jaú	1980	-14.537.295,00	-6,20	0	0,00	1,27
C2	78	AM	RDS do Uatumã	2004	-665.461,50	-1,86	0	0,00	1,58
C2	79	AM	FE Rio Urubu	2003	-135.408,00	-4,47	0	0,00	0,08
C2	80	AM	PE Rio Negro Setor Norte	1995	-911.865,00	-6,20	0	0,00	1,73
C2	81	Federal	Arie Proj. Din. Biológica Fragmentos Florestais	1985	-36.425,00	-6,20	0	0,00	1,67
C2	82	AM	PE Rio Negro Setor Sul	1995	-926.745,00	-6,20	0	0,00	1,09
C2	83	AM	RDS do Rio Negro	2008	0,00	0,00	0	0,00	1,33
C2	84	AM	APA M. Esq. R. Negro S. T. Açu-Tarumã Mirima	1995	-316.665,00	-6,20	90	176,21	0,70
C2	85	AM	PE Sumaúma	2003	33.852,00	169,26	0	0,00	1,27
C2	86	AM	APA M. Dir. R. Negro S. Paduari-Solimões	1995	-1.767.194,13	-3,92	120	26,62	1,00
C2	87	AM	RDS Canumã	2005	-22.320,00	-1,26	0	0,00	0,83
C2	88	AM	RDS Piagaçu Purus	2003	-1.620.928,00	-2,48	0	0,00	1,42
C2	89	AM	RDS do Matupiri	2009	0,00	0,00	0	0,00	0,75
C2	90	AM	RDS Igapó-Açu	2009	0,00	0,00	0	0,00	0,67

Sector	Numeration	Government level	Protected area	Creation date	Total carbon flow (tC)	Average carbon flow (tC/ha)	Total deforestation (ha)	Deforestation per hectare (* 10-5)	Implementation and management index
C2	91	AM	RDS do Rio Madeira	2006	-140.693,50	-0,62	0	0,00	1,25
C2	92	Federal	Rebio Abufari	1982	-1.080.257,00	-5,92	0	0,00	1,30
C2	93	AM	PE Matupiri	2009	0,00	0,00	0	0,00	0,45
C2	94	AM	RDS Rio Amapá	2005	-257.455,00	-1,24	0	0,00	1,25
C3	95	Federal	Parna Nascentes do Lago Jari	2008	0,00	0,00	0	0,00	1,55
C3	96	Federal	Resex Lago do Capanã Grande	2004	-575.670,00	-1,86	0	0,00	1,17
C3	97	AM	RDS do Juma	2006	-344.720,00	-0,62	0	0,00	1,75
C3	98	AM	FE Tapauá	2009	0,00	0,00	0	0,00	0,67
C3	99	Federal	Flona Balata-Tufari	2005	-1.404.548,00	-1,24	0	0,00	1,00
C3	100	AM	RDS Bararati	2005	-127.348,00	-1,24	0	0,00	1,42
C3	101	Federal	Flona Jatuarana	2002	-1.842.562,50	-3,10	0	0,00	1,27
C3	102	AM	FE Apuí	2005	-228.191,00	-1,24	0	0,00	1,42
C3	103	Federal	Esec Cuniã	2001	-665.136,00	-3,53	780	414,23	1,40
C3	104	Federal	Parna Campos Amazônicos	2006	-617.724,00	-0,63	280	28,42	1,64
C3	105	Federal	Flona Humaitá	1998	-2.754.427,50	-5,58	330	66,85	1,33
C3	106	AM	RDS Aripuanã	2005	-262.942,00	-1,24	0	0,00	1,42
C3	107	AM	FE Sucunduri	2005	-599.726,00	-1,24	0	0,00	1,42
C3	108	AM	PE Sucunduri	2005	-1.004.338,00	-1,24	0	0,00	1,27
C3	109	Federal	Flona Jacundá	2004	-432.589,50	-1,86	0	0,00	1,25
C3	110	Federal	Resex Lago do Cuniã	1999	-245.396,00	-4,96	0	0,00	1,67
C3	111	AM	Resex do Guariba	2005	-182.652,00	-1,24	0	0,00	1,33
C3	112	AM	FE Manicoré	2005	-101.432,00	-1,24	0	0,00	1,33
C3	113	AM	PE Guariba	2005	-92.070,00	-1,24	0	0,00	1,27
C3	114	RO	Fers do Rio Machado	1990	-613.800,00	-6,20	0	0,00	0,60
C3	115	AM	FE Aripuanã	2005	-423.181,00	-1,24	0	0,00	1,42
C3	116	RO	Esec Samuel	1989	-346.580,00	-6,20	0	0,00	0,80
C3	117	RO	Resex Rio Preto - Jacundá	1996	-969.667,50	-7,63	160	125,84	0,83
C3	118	MT	PE Igarapés do Juruena	2002	-706.412,50	-3,10	0	0,00	1,36
C3	119	MT	PE Tucumã	2002	-255.207,50	-3,10	0	0,00	0,91
C3	120	MT	Esec Rio Madeirinha	1997	-87.730,00	-6,20	0	0,00	0,80
C3	121	MT	Resex Guariba-Roosevelt	1996	-740.179,00	-5,22	30	21,17	0,58
C3	122	Federal	Flona Jamari	1984	-778.938,00	-3,55	270	122,95	2,42
C3	123	Federal	Flona Bom Futuro	1988	-675.645,00	-6,20	3060	2.807,98	1,18
C3	124	MT	Esec Rio Roosevelt	1997	-321.625,00	-3,19	0	0,00	0,90
C3	125	RO	APA Rio Pardo	2010	146.554,75	0,99	0	0,00	0,80
C3	126	Federal	Rebio Jaru	1979	-2.193.298,00	-6,05	50	13,80	1,80
C3	127	MT	Esec Rio Flor do Prado	2003	-25.482,00	-2,48	0	0,00	0,30
C3	128	Federal	Parna Pacaás Novos	1979	-3.790.256,00	-5,10	0	0,00	1,55
C4	129	RO	PE Serra dos Reis	1995	-251.875,00	-6,20	40	98,46	1,00
C4	130	Federal	Rebio Guaporé	1982	-3.749.873,50	-5,93	0	0,00	1,00
C4	131	RO	Resex Pedras Negras	1995	-709.435,00	-6,20	0	0,00	0,83
C4	132	RO	PE Corumbiara	1990	4.269.141,50	10,29	0	0,00	1,91
C4	133	MT	PE Serra Ricardo Franco	1997	889.874,50	6,24	1460	1.024,56	0,73
C4	134	MT	PE Serra Santa Bárbara	1997	-171.548,75	-1,32	0	0,00	0,27
D1	135	Federal	Parna Montanhas do Tumucumaque	2002	-11.819.060,00	-3,10	0	0,00	1,55

Sector	Numeration	Government level	Protected area	Creation date	Total carbon flow (tC)	Average carbon flow (tC/ha)	Total deforestation (ha)	Deforestation per hectare (*10-5)	Implementation and management index
D1	136	PA	Esec Grão Pará	2006	-2.635.790,50	-0,62	0	0,00	0,90
D1	137	PA	Rebio de Maicuru	2006	-749.781,50	-0,62	0	0,00	0,70
D2	138	AP	RDS do Rio Iratapuru	1997	-5.185.029,00	-5,94	0	0,00	0,90
D2	139	PA	FE Trombetas	2006	-1.931.517,00	-0,62	40	1,28	1,42
D2	140	PA	FE Paru	2006	-2.228.605,50	-0,62	310	8,62	1,36
D2	141	Federal	Esec Jari	1982	-1.346.175,00	-6,20	0	0,00	0,80
D2	142	Federal	Rebio Rio Trombetas	1979	-2.103.040,00	-6,20	0	0,00	2,00
D2	143	PA	FE Faro	2006	-469.994,00	-0,78	70	11,59	1,58
D2	144	Federal	Flona Mulata	2001	-554.494,75	-2,45	30	13,23	1,36
D2	145	Federal	Flona Saracá-Taquera	1989	-3.089.407,00	-7,25	2530	593,93	1,92
D2	146	PA	PE Monte Alegre	2001	-1.674,00	-3,72	0	0,00	1,64
D2	147	PA	APA Paytuna	2001	-14.424,00	-3,98	0	0,00	1,60
D2	148	Federal	Resex Verde para Sempre	2004	2.183.394,50	2,35	0	0,00	1,25
D2	149	Federal	Resex Renascer	2009	-268.207,50	-1,78	40	26,51	1,17
D2	150	AM	APA Nhamundá	1990	-200.471,00	-5,58	170	472,88	1,00
D2	151	Federal	Resex Tapajós-Arapiuns	1998	10.736.518,13	18,02	0	0,00	1,67
D2	152	Federal	Flona Tapajós	1974	-2.428.906,25	-4,60	0	0,00	1,67
D2	153	AM	FE Maués	2003	-904.146,00	-2,48	0	0,00	1,08
D2	154	Federal	Parna Amazônia	1974	-6.722.412,00	-6,15	210	19,23	1,00
D2	155	Federal	Resex Rio Iriri	2006	-208.738,50	-0,62	0	0,00	1,08
D2	156	Federal	Flona Trairão	2006	-168.562,50	-0,62	40	14,71	1,17
D2	157	Federal	Flona Pau-Rosa	2001	-3.613.980,00	-3,72	0	0,00	0,75
D2	158	Federal	Resex Riozinho do Anfrísio	2004	-1.373.238,00	-1,86	40	5,42	1,08
D2	159	Federal	Flona Itaituba II	1998	-2.233.674,00	-5,58	920	229,83	0,67
D2	160	Federal	Flona Amanã	2006	-345.975,50	-0,62	80	14,34	1,08
D2	161	Federal	Resex Rio Xingu	2008	0,00	0,00	0	0,00	1,25
D2	162	Federal	Esec Terra do Meio	2005	-4.140.453,00	-1,24	210	6,29	0,90
D2	163	Federal	Flona Itaituba I	1998	-1.254.244,50	-5,58	0	0,00	0,73
D3	164	Federal	Parna Jamanxim	2006	-520.273,00	-0,62	1910	227,61	0,91
D3	165	Federal	Parna Serra do Pardo	2005	-550.033,00	-1,24	160	36,07	1,45
D3	166	Federal	Flona Altamira	1998	-4.145.800,50	-5,58	8920	1.200,58	1,36
D3	167	Federal	Flona Crepori	2006	-461.140,50	-0,62	120	16,13	0,92
D3	168	PA	APA Triunfo do Xingu	2006	-1.044.173,00	-0,62	29510	1.752,22	0,70
D3	169	Federal	APA Tapajós	2006	-1.301.008,00	-0,62	1520	72,44	0,90
D3	170	PA	FE Iriri	2006	-273.342,50	-0,62	620	140,63	0,33
D3	171	Federal	Flona Jamanxim	2006	-820.430,50	-0,62	18290	1.382,18	0,83
D3	172	MT	Reserva Ecológica de Apiacás	1994	-518.940,00	-6,20	0	0,00	0,30
D3	173	Federal	Parna Rio Novo	2006	-332.971,00	-0,62	3570	664,53	0,91
D3	174	Federal	Parna Juruena	2006	-1.930.711,00	-1,02	70	3,69	1,55
D3	175	Federal	Rebio Nascentes da Serra do Cachimbo	2005	-290.967,00	-0,82	2250	635,91	1,40
D3	176	MT	PE Cristalino	2000	-278.214,75	-4,63	60	99,96	1,09
D3	177	MT	PE Cristalino II	2001	-548.979,00	-3,72	200	135,52	1,09
D3	178	MT	PE Xingu	2001	-384.896,00	-3,79	0	0,00	0,91
D4	179	MT	Esec Rio Ronuro	1998	-609.475,50	-5,58	0	0,00	0,40
D4	180	MT	Rebio Culuene	1989	-	-	-	-	0,30

Sector	Numeration	Government level	Protected area	Creation date	Total carbon flow (tC)	Average carbon flow (tC/ha)	Total deforestation (ha)	Deforestation per hectare (* 10-5)	Implementation and management index
E1	181	Federal	Rebio Lago Piratuba	1980	-2.206.735,00	-6,20	0	0,00	1,20
E1	182	Federal	Flona Amapá	1989	-2.959.725,00	-6,20	0	0,00	1,42
E1	183	AP	Rebio do Parazinho	1985	-	-	0	0,00	1,30
E1	184	AP	FE Amapá	2006	-1.432.544,75	-0,59	0	0,00	0,92
E2	185	AP	APA Rio Curiaú	1998	24.445,50	1,11	0	0,00	1,50
E2	186	AP	APA Fazendinha	2004	-	-	0	0,00	0,80
E2	187	PA	APA Algodoal Maiandeua	1990	-13.950,00	-6,20	0	0,00	1,20
E2	188	Federal	Resex Mãe Grande de Curuçá	2002	-67.613,00	-3,01	0	0,00	1,91
E2	189	PA	PE Charapucu	2010	-193.595,00	-2,86	0	0,00	1,27
E2	190	Federal	Resex Rio Cajari	1990	-3.157.040,00	-5,82	0	0	1,33
E2	191	PA	APA Arquipélago Marajó	1989	-6.252.873,38	-1,63	0	0,00	0,22
E2	192	Federal	RDS Itatupã-Baquiá	2005	-81.778,00	-1,24	0	0,00	1,67
E2	193	Federal	Resex Mapuá	2005	-117.521,00	-1,25	0	0,00	2,00
E2	194	PA	PE Utinga	1993	80.398,50	169,26	0	0,00	2,09
E2	195	Federal	Resex Gurupá-Melgaço	2006	-90.690,50	-0,62	0	0,00	1,33
E2	196	PA	Revis Metrópole da Amazônia	2010	20.207,50	4,93	0	0,00	0,90
E2	197	Federal	Resex Terra Grande Pracuúba	2006	-121.179,50	-0,60	0	0,00	1,17
E2	198	PA	APA Ilha do Combu	1997	-	-	0	0,00	0,80
E2	199	PA	APA Região Metropolitana de Belém	1993	232.479,00	134,77	0	0,00	1,30
E2	200	Federal	Flona Caxiuanã	1961	-334.798,75	-1,27	0	0,00	1,50
E2	201	Federal	Resex Arioca Pruanã	2005	-106.733,00	-1,24	0	0,00	1,33
E2	202	Federal	Resex Ipaú-Anilzinho	2005	-72.726,00	-1,24	0	0,00	1,00
E2	203	PA	RDS Alcobaça	2002	-99.892,50	-10,71	100	1.072,39	1,08
E2	204	PA	RDS Pucuruí-Ararão	2002	-12.787,50	-3,65	0	0,00	1,00
E2	205	PA	APA Lago de Tucuruí	2002	2.035.301,50	10,03	460	226,77	1,50
E2	206	Federal	Resex Ciriaco	1992	-66.482,50	-6,65	0	0,00	1,42
E2	207	Federal	Rebio Tapirapé	1989	-621.550,00	-6,20	2700	2.693,27	1,50
E3	208	Federal	APA Igarapé Gelado	1989	162.332,00	7,74	0	0,00	1,20
E3	209	Federal	Flona Tapirapé-Aquiri	1989	-1.266.660,00	-6,20	440	215,37	2,09
E3	210	TO	APA Lago de Santa Isabel	2002	724.957,75	55,13	0	0,00	0,20
E3	211	PA	PE Serra dos Martírios / Andorinhas	1996	951.107,00	33,73	0	0,00	1,55
E3	212	Federal	Flona Carajás	1998	-2.150.347,75	-5,27	2500	613,01	2,18
E3	213	Federal	Flona Itacaiunas	1998	-860.405,00	-5,95	50	34,57	0,92
E3	214	PA	APA São Geraldo do Araguaia	1996	723.700,75	37,40	0	0,00	1,40
E3	215	TO	APA Ilha do Bananal / Cantão	1997	-	-	-	-	0,70
E3	216	TO	PE Cantão	1998	-	-	-	-	
E3	217	MA	APA Reentrâncias Maranhenses	1991	8.385.488,00	9,43	0	0,00	0,50
F2	218	MA	PE Lagoa da Jansen	1988	3.765,25	150,61	0	0,00	1,00
F2	219	MA	Esec Sítio Rangedor	2005	45.183,00	150,61	0	0,00	0,91
F2	220	Federal	Resex Quilombo do Frexal	1992	-66.960,00	-6,20	0	0,00	1,42
F2	221	MA	APA Baixada Maranhense	1991	14.535.168,38	10,13	0	0,00	0,50
F2	222	MA	APA Itapiracó	1997	50.543,50	72,21	0	0,00	1,20
F2	223	MA	PE Bacanga	1980	415.927,75	134,17	0	0,00	0,83
F2	224	MA	APA Região do Maracanã	1991	-2.964,25	-1,25	0	0,00	0,60
F2	225	MA	APA Upaonaçu Miritiba Alto do R. Preguiças	1992	3.019.365,25	10,70	30	10,63	0,50

Sector	Numeration	Government level	Protected area	Creation date	Total carbon flow (tC)	Average carbon flow (tC/ha)	Total deforestation (ha)	Deforestation per hectare (* 10-5)	Implementation and management index
F2	226	Federal	Rebio Gurupi	1988	-886.050,75	-3,11	1920	674,81	1,50
*	227	RO	Fers Gavião	1996	-886,00	-1,11	50	6.250,00	0,60
*	228	RO	Resex Angelim	1995	-205.262,50	-19,93	0	0,00	0,83
*	229	RO	Resex Mogno	1995	210.113,00	61,80	0	0,00	0,83
*	230	RO	Fers Periquito	1996	218.642,50	128,61	0	0,00	0,60
*	231	RO	Fers Cedro	1996	-21.700,00	-6,20	40	1.142,86	0,45
*	232	RO	Resex Maracatiara	1995	236.046,75	23,55	60	598,50	0,83
*	233	RO	Fers Araras	1996	-8.060,00	-6,20	90	6.923,08	0,82
*	234	RO	Resex Sucupira	1995	119.723,50	31,93	0	0,00	1,25
*	235	RO	Resex Ipê	1995	-26.087,50	-20,87	0	0,00	0,75
*	236	RO	Resex Garrote	1995	7.831,50	5,80	40	2.962,96	0,83
*	237	RO	Resex Seringueira	1995	32.540,00	43,39	0	0,00	0,92
*	238	RO	Fers Tucano	1996	6.645,75	8,06	30	3.636,36	0,50
*	239	RO	Fers Mutum	1996	-67.758,00	-5,25	660	5.116,28	0,50
*	240	RO	Resex Castanheira	1995	-1.952,88	-0,16	0	0,00	0,83
*	241	RO	Resex Massaranduba	1995	345.170,75	46,49	0	0,00	0,83
*	242	RO	Resex Freijó	1995	-3.539,63	-3,37	0	0,00	0,83
*	243	RO	Resex Roxinho	1995	51.214,13	33,04	0	0,00	0,92
*	244	RO	Resex Piquiá	1995	-14.955,00	-7,98	0	0,00	0,83
*	245	RO	Resex Jatobá	1995	24.790,00	12,40	0	0,00	0,83
*	246	RO	Resex Aquariquara	1995	-154.148,00	-6,75	0	0,00	0,67
*	247	RO	Resex do Itaúba	1995	119.004,00	49,59	0	0,00	0,83

Acknowledgement

The executive summary was produced with material, experiences and knowledge shared among various members of the coordinated audit on protected areas (PAs) in the Brazilian Amazon biome.

In order to obtain a systemic vision of the management of the Amazon PAs, the participatory and collaborative spirit of the technical teams and leaders of the nine state Audit Court in the Amazon biome that participated in the audit (TCE-AC, TCE-AM, TCE-AP, TCE-MA, TCE-MT, TCE-PA, TCE-RO, TCE-RR and TCE-TO), together with the support of SEAUD and the seven Departments of External Control (Secex) of the Federal Court of Accounts (TCU) (Secex-AM, Secex-AP, Secex-MA, Secex-MT, Secex-PA, Secex-RO and Secex-RR) was essential.

Environment management bodies collaborated providing information and granting access to their premises. In turn, the collaboration of the heads of the protected areas and environmental managers, who saw in this work an opportunity to improve the performance of conservation and environmental preservation activities, was indispensable, since they provided information on the management of these areas.

Finally, this work is dedicated to all who believe that it is necessary and possible to combine biodiversity protection with the social and environmental character represented by the PAs in Brazil, in particular those located in the Amazon biome.

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