

Evaluation of the Paraguayan System of Protected Areas After 24 Years of Its Implementation

Una evaluación de los 24 años de implementación del Sistema Nacional de Áreas Protegidas del Paraguay

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Abstract

The National System of Wild Protected Areas of Paraguay (SINASIP) was created by Law No. 352 in 1994 to reorganize the country's protected areas. Since 1954, a total of 102 protected areas have been created. The category with the greatest quantity of these areas is "nature reserve," which quadruples the number of national parks and natural monuments. The measurement of SINASIP's success was initially presented in a simplistic way, based on periods of surface expansion, including the objectionable biosphere reserves. This study evaluated the SINASIP in relation to the national coverage, the management categories, and the simple analysis of the implementation level. The legal bodies of creation, modification, or derogation of each protected area were analyzed. The patterns found in relation to the increase or decrease in the surface area of the system and its causes were discussed, and strong deficiencies were found in the creation process. The decrease in terms of the system's surface area is associated with a lack of adequate management, political causes, and land claims. A tendency to change areas from strict conservation categories to less restrictive ones was revealed, involving some 420 326 hectares. The average level of implementation in terms of the five criteria does not reach 50 %. There are at least 13 wild protected areas and two categories without implementation; a further five other categories have less than 30% of implementation. Urgent attention and adequate administration are required, especially in terms of restructuring and implementing successful models with multisectoral and participatory management.

Keywords: Biosphere Reserve; Category; Governance; Management of conservation unit

Resumen

El sistema de Áreas Protegidas del Paraguay fue creado por la Ley 352 en 1994 para poner orden el sistema del país. Desde 1954 se crearon un total de 102 áreas protegidas. La categoría con mayor cantidad es la "Reserva Natural" que cuadruplica a los Parques Nacionales y Monumentos Naturales. La medición del éxito del SINASIP fue presentada históricamente de una forma simplista, en base a los periodos de expansión en superficie. Este estudio evaluó la cobertura nacional del SINASIP de áreas protegidas, las categorías de manejo y un análisis simple de nivel de implementación. Se analizaron los órganos legales de creación, modificación o de derogación de cada área protegida, como también los patrones encontrados en relación con crecimiento o decrecimiento del sistema en superficie y sus causas. Los resultados señalan fuertes deficiencias en el proceso de creación. Se identificaron problemas traducidos en pérdidas de superficies de área protegida, reducción de categoría de manejo y la pérdida de diez áreas protegidas. Las mayores causas del decrecimiento del sistema en términos de superficie están asociadas a la falta de una gestión adecuada, causas políticas y reclamos de tierras. Existe una preocupante tendencia de cambiar áreas de categorías de conservación

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estricta a categorías de menor restricción alcanzando las 420 326 hectáreas. El nivel promedio de implementación en relación con los 5 criterios no llega al 50 %. Existen al menos 13 ASP y dos categorías sin implementación. Estos problemas requieren de una urgente atención y de una adecuada reestructuración de índole administrativa.

Palabras clave: Categorías; Gobernanza; Manejo de Unidades de Conservación; Reserva de Biósfera.

1. Introduction

Historically, protected areas developed late in Paraguay, compared to other countries in Latin America where significant advances were achieved during the last 20 years (Elbers, 2011); successful cases of protected areas management can be found in Argentina, Brazil, and Costa Rica. The role of central and subnational governments, and other governance bodies such as the Civil Society Organizations for privately protected areas, has been recently published (Mitchell *et al.*, 2019).

In 1948, the first Reserve Area of Cerro Lambaré was created. It was not until 1994 that the National System of Wild Protected Areas (known as SINASIP) was established by Law No. 352/94 on “Wild Protected Areas” or “ASPs” (Spanish acronym for *Áreas Silvestres Protegidas*); its enforcement authority is currently the Ministry of the Environment and Sustainable Development (MADES, formerly Secretariat of the Environment or SEAM). The purpose of the creation of the SINASIP was to plan and organize the creation and administration of protected areas to achieve a better representation of the country’s ecoregional conservation. Law No. 352/94 establishes the official definition of a wild protected area. The resolution of the Ministry of the Environment (Res. 200/01) regulates Law No. 352/94, and establishes management categories classified into three levels: strict protection, flexible use, and special use. They were named as follows:

- a) Strict protection: it refers to scientific reserves, national parks, and natural monuments, although also included as “scientific or historical monuments”;
- b) Flexible use: it corresponds to the special categories of natural reserves and ecological reserves;
- c) Special use: it includes wildlife refuges, protected landscapes, managed resources reserves, and biosphere reserves.

More recently, the SEAM also promulgated the Resolution No. 562/17, which includes the following so-called special management categories: a) indigenous conservation territories (ICT), b) biological corridors, and c) fishery reserves. To date, however, there are no known areas under these designations.

Paraguay’s categories do not correspond formally to those established by the IUCN World Commission on Protected Areas (Dudley, 2008). However, the strict categories include categories I, II, and III; those of flexible use include category IV; and those of special use include categories V and VI. The new categories of ICTs, biological corridors and fishery reserves would





be equivalent to categories IV or VI. The non-recognition of these categorizations means that Paraguay is at a disadvantage compared to the rest of the world because this non-recognition does not allow for direct comparisons and forces us to carry out equivalence analyses whenever we have to contribute toward global goals.

The inclusion of the biosphere reserve as a protected area was, and continues to be, highly criticized. The biosphere reserves were created to coordinate the conservation of landscapes including human productive activities. The purpose is precisely to increase the efficiency of a system of protected areas by interconnecting them within a productive or anthropic matrix (Bridgewater *et al.*, 1996). In fact, the IUCN Ecosystem Management Commission explicitly mentions that although these reserves seek to link conservation with sustainable development, their core areas and, even, their buffer areas may be part of the protected area categories, but not so the rest of the area where the larger populations concentrate, including towns and entire cities (IUCN, 2018).

An important aspect of Law No. 352/94 is that it included, within SINASIP, all the protected areas previously created; it also automatically included those areas that would be created in the future. This is important because it means that Paraguay can create protected areas in two ways: through the executive branch (SEAM or MADES) via decree, and through Parliament via law. When creating an area, if the affected lands happen to be private properties, it must be necessarily established by Law of the Nation since it affects constitutional rights. Under this argument, the Paraguayan Parliament created several protected areas without the required technical rigor or the enforcement authority's participation. Even certain categories created do not adequately correspond to SINASIP, or are undefined, as in the case of a "national park with a natural monument category," and in some cases due to partisan political rivalry.

It is important to establish that the biosphere reserves, declared by UNESCO and not recognized by the national legislation, are not part of SINASIP. Similarly, the specific units of national territory that harbor biodiversity or essential biological processes, such as RAMSAR Sites, World Heritage sites, or other similar categories (Brooks, 2011) (Important Bird Area, Key Biodiversity Areas, WHSRN sites, AZE Sites, among others) are not part of the System either. Not included in the SINASIP are, also, those areas that have certificates of environmental services, under Law No. 3001/06, and the forest reserves of 25 % required by law for native forests in farms.

Law No. 352 establishes SINASIP as a "national system" and mandates the creation of a national fund for the management of the areas and of a "National Council of Wild Protected Areas." This has been discussed in different fora; however, no information has been formally published or systematized regarding the history of protected areas in recent years after the creation of the national system. Considering the new targets for protected areas and the global conservation goals (Visconte *et al.*, 2019), Paraguay needs to make its system more realistic and plan accordingly to international standards. This review analyses and discusses some of these numbers. It also tries, for the first time, to propose a milestone in the protection of conservation sites in Paraguay by providing some points of debate for the implementation of an effective and biodiversity-oriented conservation system.



2. Methodology

All available information considered reliable regarding the history over these 24 years was compiled by the two authors, who have both been associated with the SINASIP at different times and phases throughout this period, and have had access to other sources of information when needed. MADES is currently the source of information on protected areas as the enforcement authority of Law No. 352. The Ministry has a website, with a national report on the National Strategy on Biodiversity to the Convention on Biological Diversity, and a National Document on Biodiversity. Nevertheless, these three sources of information are incomplete and are not congruent with each other. The only map of SINASIP available on its official website, from 2007, refers just to 50 areas. The latest available document is a strategic diagnosis (SINASIP, 2018) that seems to be a revision and update of the 2007 version.

As official sources of information, all legal dispositions in force regarding the creation, modification, or derogation of areas were reviewed for the purpose of this article. Since SINASIP was just implemented in 1994, and the protected areas were created in various ways, it was necessary to resort to previous legislation, such as “decree-laws.” The sources consulted were the official ones; among them were the official Gazetteer of the Executive Power, the legal archives, and the Library and Archive of the National Congress (<http://www.bacn.gov.py/>). In some instances, it was necessary to resort to judicial documents (judicial opinion) and to consult experts who explained the origin and location of certain documents.

Each legally created protected area was incorporated with the surface area mentioned in its creation legal instrument or body, or in its subsequent legal modifications. Likewise, it was assigned according to the official categories established with those creation bodies, and all the legal changes dictated for each area were analyzed.

In this study, it is assumed that, once the area has an approved legal designation, it is created as such, and subsequent processes make its implementation as a protected area in the legal and administrative fields. In this sense, the spirit and characteristics established in the first organ of creation were verified, mainly regarding its category and area of creation. For the purposes of this study, a protected area created can (a) be implemented with its original area, (b) acquire more area, (c) lose area, or (d) be repealed and, consequently, disappear from SINASIP. All this information has been mapped and a temporal analysis was conducted to describe and understand better the protected area evolution as a whole and in management categories.

In order to review the level of implementation, available official reports have been revised, and owners and managers in each area have been consulted. The approach to determine its basic level of implementation was based on the following factors:

- 1) title of ownership: if the area has legal procedures completed for proper titling and registration in the public registry;
- 2) management plan: if it at least has a current management plan, regardless of its proper implementation;



- 3) rangers: whether or not there are park rangers in place, regardless of the number;
- 4) budget: if there is a basic annual budget allocation for its management;
- 5) tourism: if there is a plan in place for tourism purposes.

3. Results

Since 1948, Paraguay has created a total of 102 protected areas totaling 27 976.42 km², equivalent to 6.87 % of the national territory (**Appendix 1**). Of all the areas created, nine are considered currently repealed and have been eliminated from the system, mainly due to legal action from their affected owners, indigenous land claims, flooding for reservoir use and peasant farmer invasions. The exclusion of these areas represents 97 290 hectares; this includes four national parks (Bella Vista, Saltos del Guairá, Estero Milagro, Serranía San Joaquín), and the Cerro Sarambi Managed Resources Reserve. In one case, an inadequate categorization was corrected for Guayaki National Park. It also includes a voluntary cession of a private reserve, in the case of Arroyo Blanco, and a private nature reserve, judicially ruled as null, in the case of Fortín Zalazar, due to a claim over an indigenous territory. The removal of the 8.82 % of the area declared for conservation within the National System of Protected Areas is an unprecedented event in literature.

There are currently nature reserves (IV), 47 % by number of areas, followed by national parks (II) and natural monuments (II), each with 11.8 %. The three most restrictive categories (I, II and III) represent 24 % of the number of areas and 65 % in terms of area coverage of the national system.

Paraguay harbors three “biosphere reserves” (BRs) created between 2000 and 2017; although Law No. 352/94 includes BRs within protected area categories, there is no technical backing to support this figure corresponding to a “managed protected area.” Instead, it refers to a type of environmental and territorial ordering or land-use planning over multiple management units that include the farms that comprise the range of private, state and individually protected areas. In fact, the National Strategy and Action Plan for Biodiversity document (**ENPAB 2015-2020**) shows that 8 % of the 15.2 % mentioned therein correspond to these BRs so that these BRs are clearly separated from the other protected areas. Hence, it was decided that “biosphere reserves” were to be excluded from this analysis.

3.1. Area Under Management for Conservation

Throughout the history of the creation of ASPs in Paraguay, periods of the area coverage growth and periods of retraction are observed in **Figure 1**.



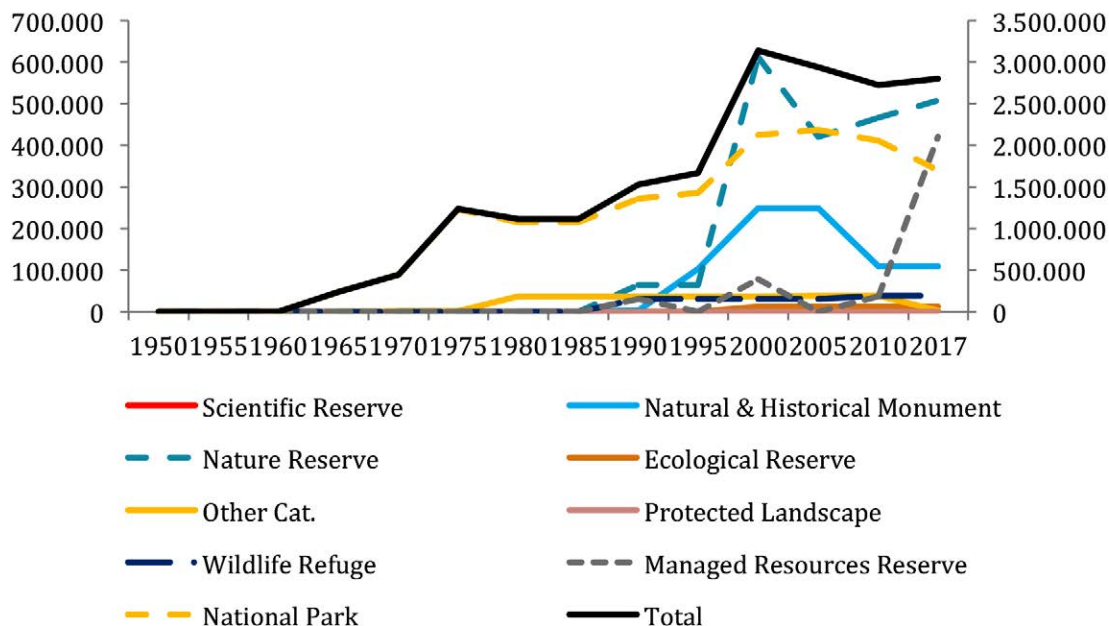


Figure 1. Area coverage ratio (hectares) of SINASIP over time. The secondary axis only shows the total surface areas and the national parks. *Other categories: not ruled categories by Law No. 352 (MADES) including national reserves, biological refuges, reserve zone, biological reserves, among others.

Figura 1. Relación de cobertura de área (hectáreas) de SINASIP a lo largo del tiempo. En el eje secundario solo se muestran las superficies totales y los Parques Nacionales. * Otras Categorías: categorías no regidas por la Ley 352 (MADES) incluyendo reservas nacionales, refugios biológicos, zona de reservas, reservas biológicas, entre otros.

SINASIP, created in 1994 as a result of the agreements signed in Rio 92, was an important output and, once firmly established, it allowed for the expansion of the system and the diversification of the management categories, except for 2010, based on a constant growth in the surface area and contributing through different management categories. The nature reserves under private administration comprise the second largest category that contributes the most to the system, following the national parks (NPs). Up until the 1990s, the NP category formed almost the entire system; to date, they continue to comprise the largest area, albeit with a notable tendency to decrease. The periods of evolution of the ASPs (see Figure 1) express some important patterns which can be identified in four phases.

3.2. Preliminary Years of the Protected Areas

The first 27 years, between 1948 and 1975, clearly marked the designation of protected areas in Paraguay under different denominations and based on very few criteria oriented toward conservation, but rather focused on sites of historical and military value. These areas were implemented by decree-law of the Executive Power, and the establishment of the first “national parks” happened mainly based on the Washington agreement and as some sort of “indigenous



reserves.” These areas were under the administration of the Ministry of Defense. The construction of the Itaipu Hydroelectric Dam also promoted the creation of reserves as compensation measures under an internal designation, such as refuges or biological reserves.

3.3. Innovation and Adaptation of Protected Areas

Between 1975 and 1990, some non-governmental organizations began working toward the creation of “nature reserves,” developed under a private domain. Some national parks were created but, for the most part, these decreased in size due to inappropriate administrative procedures. For example, the Caazapá NP was initially created with 200 000 hectares; however, at the time of implementing the area, only 6 000 hectares were considered, and then a further 10 000 were added. During this stage, the technical bases of SINASIP were constructed, and a series of priority sites for conservation were identified (CDC 1990).

3.4. Creation of the National System

Between the years 1990 and 2000, the National System was established, and various management categories were created; the system expands to a higher degree, reaching a historic maximum of 3 142 511 hectares. However, many areas were hastily created, which could be explained to comply with the Paraguayan Commitment to the Rio 92 summit without considering the reaction of the affected owners, such as the cases of the Serranía San Joaquín National Park, Estero Milagro and the Cerro Sarambí Managed Resources Reserve, which were judicially dismissed. Despite these losses, including the Saltos del Guaira NP that was submerged under the Itaipú Reservoir, totaling 71 800 hectares, the creation of new areas exceeded and expanded the coverage. The national parks and nature reserves reached their maximum coverage during this phase. The category of managed resources reserve (RRM: Spanish acronym for *Reserva de Recursos Manejados*) begins to be imposed as an alternative to implement national parks with the transformation of San Rafael into an RRM, which would later be repealed. Areas designated as strict conservation areas and under figures related to “reserve (conservation) areas for [national park]” created confusion in the conservation/environmental sector and in the private sector, since it was assumed that the areas would be expropriated to create the figure of a national park. One way to open the system was to remove the national park category to give rise to more stringent categories.

3.5. Implementation of Protected Areas

From 2000 to date, several phenomena have begun to diminish the coverage area, thus losing over 344 869 hectares. Some national parks, or certain extensions of them, have been lost due to peasant farmer invasions (PN Bella Vista and the extension of 6 462 hectares of Cerro Cora). In one case, a private owner left the system (RN Arroyo Blanco). Some administrative actions were taken in NPs such as cadastral and judicial information, and some areas are





inexplicably smaller than what was established by its original decree, disaffecting some areas apparently sold for private landowners that were part of these protected areas. In this sense, for example, the Defensores del Chaco NP, initially created with 780 000 hectares, is in reality only 720 000 hectares; the Medanos del Chaco NP, initially created with 608 792 hectares, is in reality only 431 734 hectares (**Figure 2**); due to an administrative error, the Chovoreca MN went from an initial size of 247 150 hectares to 100 953 hectares, and the land status of the property is still currently unknown.

Law 352/94 obliges the government to purchase the total area and instead of this mandate, the area is fragmented, and pieces of land are illegally sold, which is an unacceptable procedure. In a few cases, the opposite occurred with an increase in the area, as in the case of Lake Ypoa, which increased from 100 000 to 119 006 hectares. However, a notable category change is suffered from strict conservation (NP) to category VI (RRM) in the case of the former Ypoa, Ybytyruzu, Tinfunque, and Lago Ypacarai NPs that, together, total an area of 420 326 hectares.

Although these changes are legal, since they were made by law, they are not acceptable in terms of conservation commitment since the RRM can enable 50 % of their territory for agricultural and even forestry uses. Within this period, the nature reserves also increased mainly as a result of the adequacy of the Itaipú Reserves to that category.

In general, the most worrying aspect at present is the strong tendency to convert national parks (Cat. II) into managed resources reserves (Cat. VI). The problem with this is that the regulation of this category (already described in an unrevised contribution from [Alter Vida, 2002](#)) is still considered very deficient. Although there are proposals to adjust the regulation to an adequate concept of “managed resources” ([Cartes, 2013](#)), this has not been revised to date. At present, all RRM in principle can contain many private farms that can enable other uses up to 50 %. According to the trend observed since 2000 (see **Figure 3**), the decrease of strict conservation categories is compensated with less strict conservation categories. Although this may maintain the overall coverage in terms of the surface area of protected areas, the undeniable implication of possibly losing 50 % of its natural cover is of conservation concern.



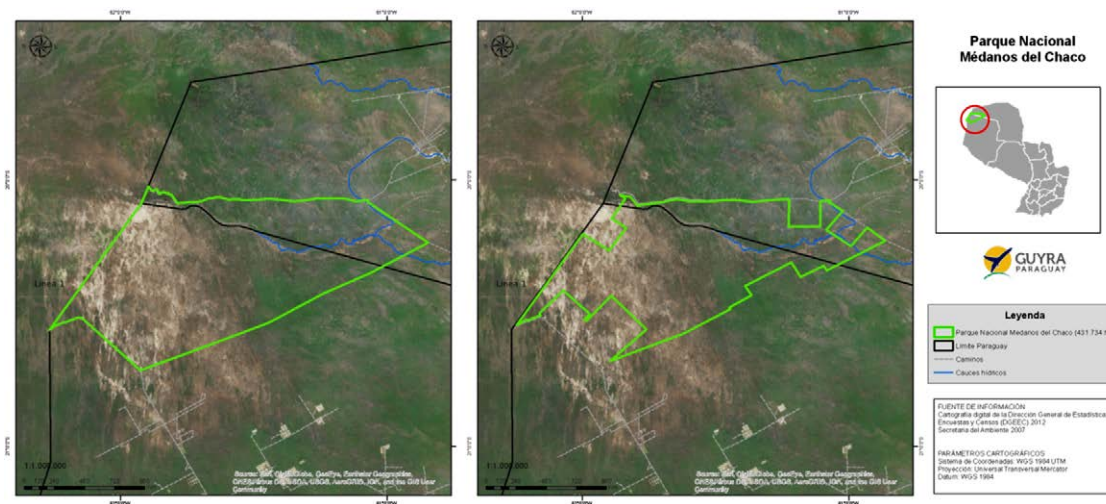


Figure 2. Map of the Medanos del Chaco National Park in light green. Left: the protected area is shown as mentioned in the Management Plan; Right: results of the cadastral study carried out by the government showing a decrease from 608 192 hectares to 431 734 hectares, resulting from the claim of private landowners in the area. In this situation, note that it almost loses its connectivity with the Defensores del Chaco National Park on the east (originally, its northeastern boundary was adjoined with the Defensores boundary). Sadly, this situation is not known by most of the Paraguayan society.

Figura 2. Mapa del Parque Nacional Medanos del Chaco en verde claro. Izquierda: el área protegida se muestra como se menciona en el Plan de Manejo; Derecha: resultados del estudio catastral realizado por el gobierno que muestra una disminución de 608 192 hectáreas a 431 734 hectáreas, como resultado del reclamo de propietarios privados en el área. En esta situación, tenga en cuenta que casi pierde su conectividad con el Parque Nacional Defensores del Chaco en el este (originalmente, su límite noreste estaba junto con el límite Defensores). Lamentablemente, esta situación no es conocida por la mayoría de la sociedad paraguaya.



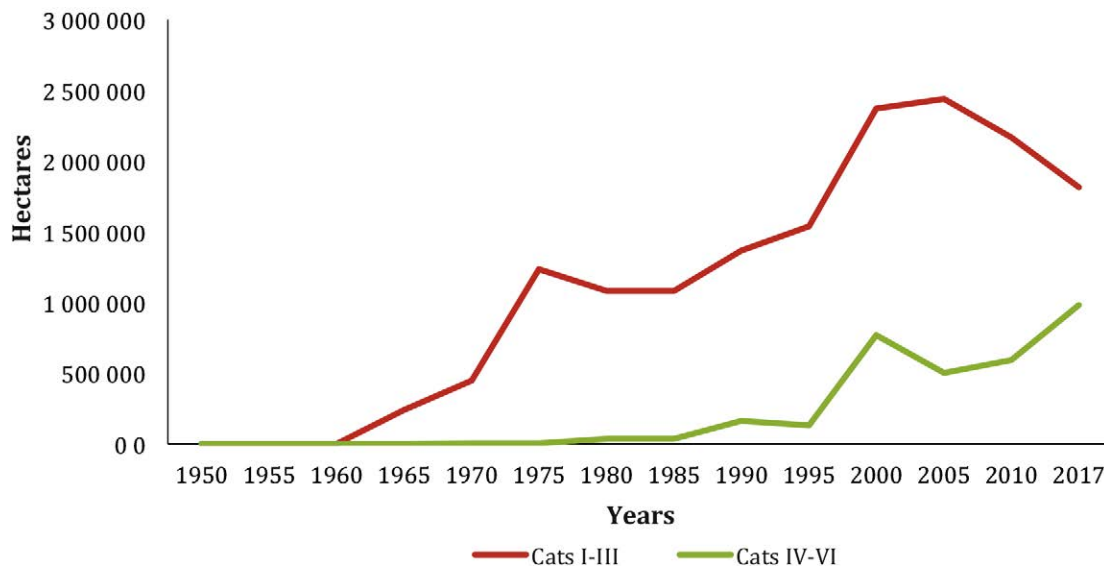


Figure 3. Overall area coverage ratio (hectares) of SINASIP over time and grouped by categories (restrictive categories I to III in red; less restrictive categories IV to VI in green).

Figura 3. Relación de cobertura de área general (hectáreas) de SINASIP a lo largo del tiempo y agrupada por Categorías (categorías restrictivas I a III en rojo; categorías menos restrictivas IV a VI en verde).

On average and according to the criteria analyzed in general, the degree of implementation of SINASIP approaches 28 %; however, this approximation is mainly due to the large number of “nature reserves,” mostly under a private domain, and consequently with greater resources than the other categories. For example, this category includes the reserves of the two hydroelectric companies and the reserves of several NGOs, in both cases with considerable resources available for their management. Despite this, the average implementation of the Nature Reserves is only 55 %, and the situation of the other categories is much worse, with only 24 % implementation. Two categories and 13 ASPs have zero (0) implementation; meanwhile, the best category implemented is the “national park” category with 60 %. However, this only happens because some national parks that maintain a certain degree of implementation are included in the category. At the same time, the rest is changed as “managed resources reserves” that, in general, only have a score of 28 % implementation. Regarding the less attended criteria, the lack of an annual budget and an updated management plan are the minor ones with 18 % and 22 %, respectively (**Table 1**).



Table 1. Criteria analysis for the degree of implementation of the protected areas under each management category of the SINASIP.

Tabla 1. Análisis de criterios para el grado de implementación de las áreas protegidas bajo cada categoría de manejo del SINASIP.

Current status	%	Quantity	Land title	Manag. plan	Rangers	Budget	Tourism act.	Average/Cat.
Dismissed	9.8	10						
Ecological reserve	3.9	4	0.00	0.00	0.00	0.00	0.00	0.00%
Managed resources reserve	4.9	5	0.20	0.40	0.60	0.00	0.20	0.28%
National park	11.8	12	0.58	0.67	0.83	0.75	0.17	0.60%
Nature & historical monument	11.8	12	0.25	0.25	0.08	0.08	0.58	0.25%
Nature reserve	47.1	48	0.98	0.50	0.67	0.56	0.06	0.55%
Other categories	2.0	2	0.50	0.00	0.00	0.00	0.50	0.20%
Protected landscape	4.9	5	1.00	0.20	0.20	0.20	0.60	0.44%
Scientific reserve	1.0	1	0.00	0.00	0.00	0.00	0.00	0.00%
Wildlife refuge	2.9	3	0.33	0.00	0.33	0.00	0.00	0.13%
Total & Avg/ Criteria		#102	0.43%	0.22%	0.30%	0.18%	0.23%	0.27%

4. Discussion

Throughout the history and development of Paraguay's protected areas, SINASIP has not yet been appropriately institutionalized. Protected Areas have been under the Directorate of Biodiversity Conservation since the creation of the Secretariat of the Environment in 2001; now, with the recent upgrade to a ministerial level, the Directorate remains the same. Before 2001, the national parks were also a Directorate within a Sub-secretariat of Natural Resources in the Ministry of Agriculture. It appears that the protected areas are not duly mainstreamed into the development policies of Paraguay. This is one of the causes for which there is a great lack of proper attention regarding the creation, allocation of surface areas, and registration of lands as protected areas. Much of the land losses were due mainly to legal/administrative disorders in the management of protected areas. Although most of the protected areas in Paraguay have been created based on opportunities or values, other than those related to conservation, a recent study on reptiles (Cacciali *et al.*, 2015) demonstrated the importance of the system.

Furthermore, this study also highlighted the importance of the Laguna Blanca Private Nature Reserve, which may have been lost due to a lack of governmental support. Regarding palms, the protected areas system barely represents the important areas (Gauto *et al.*, 2011). The key areas for bird conservation in Paraguay are only represented in 22 of the 57 key sites (Cartes & Clay, 2009). This situation, in terms of representativeness, is further exacerbated by the rapid changes occurring within the ecosystems, affecting connectivity and the protected areas (Huang *et al.*, 2007).



Among the most serious difficulties observed, we can mention that the areas were created with little or no technical criteria, poorly adjusted to the socio-environmental reality of the area, and their lands are not insured or registered in the public registry of the property as protected areas. To date, few public areas have been registered in the National Registry, which is the final point of the creation management of an area. This situation facilitates that the very same State that promotes the creation and maintenance of protected areas also sells fractions of areas into the system for agrarian reform through its Institute of Land Development (INDERT), in open contradiction to Law No. 352/94 that establishes that all property of the public domain to be declared as protected areas passes on to it at no cost.

Also, the fiscal remnants, areas which are not in private ownership and result as unowned after judicial measures, should remain in the public domain and be protected. This could have provided the Environmental Authority with lands in areas of conservation importance which were entirely in private hands; this is the case of San Rafael and some other areas.

It is necessary and imperative that SINASIP be duly institutionalized, starting with the creation and start-up of a Wild Protected Areas Fund and a National Council of Wild Protected Areas. After a 70-year history of protected areas and 24 years since the creation of SINASIP, it has become obvious that the government is not interested in advancing the proper implementation of protected areas. The budget allocated by the State for implementing the system is not easy to delimit as it falls within a global package for the Directorate where Protected Areas have been inserted. It should also be considered that for the strengthening of the system, several heavily funded projects from the international cooperation sector have been carried out in Paraguay, of which their outcomes are evidently a failure.

Another problem detected is that, given the impossibility of acquiring and managing the lands assigned to strict conservation categories, such as the case of the “national parks,” there is a notable trend of transformation to a much less restrictive category, the managed resources reserve, that allows private property and facilitates the land for agricultural uses. However, the worst problem is that the criteria established for the management of the RRM are not technically viable, are not understood by society, and do not guarantee the conservation of their resources in the long term; thus, it is necessary to define better criteria for their planning (Cartes, 2016). This strategy maintains the conservation area but reduces the level of strict conservation focus. In other words, the conservation area is reduced by 50 % and changes the focus to proceed with an unregulated use.

However, we can conclude that the situation of SINASIP is not entirely justified by the low investment and budget allocated; other factors which were recorded include:

- a. Limited management from the Environmental Authority in terms of carrying out the basic administrative procedures (database of ASPs in Paraguay, Annual Operative Plans and Management Plans, registration of public lands in the land registry) and interference of state powers in the creation of areas without respecting processes and technical criteria.



- b. Creation processes without proper consultation with either the private sector or indigenous people, by affecting the free and informed consultation in the area corresponding to their territories, whether these are owned or claimed.
- c. Poor management in terms of legal and administrative reforms that attempt to put the situation of SINASIP in order.
- d. Political interference in the use of ASPs as an argument to render certain areas inexpiable, which is attentive to the specific objectives of SINASIP.
- e. Little interest in implementing and developing neither the National Council of Wild Protected Areas nor the Environmental Fund for SINASIP.
- f. Poor management in the control and monitoring of the ASPs that make up the SINASIP, including the private ones and those of Itaipú Binacional.

Protected areas are required to be an integral part of the society and show a clear contribution toward the wellbeing of the Paraguayan people. There is a recent interest from the tourism institution (SENATUR) since the area of a natural monument was recently given in concession to an NGO. This is the first example of a tourism-based interest in a conservation site.

All these factors prove that the entire Paraguayan SINASIP is deficient, and there are many areas for improvement. Although it must be recognized that certain recommended measures have already been taken since 2009, it is unfortunately still not enough to reach an average level of effective biodiversity conservation in Paraguay. Finally, we must bear in mind that this work was based on a very basic analysis of the state of implementation of SINASIP. If we were to add a management evaluation for effectiveness in these protected areas, as well as governance aspects, the results may be even worse.

With around 6 % of its country area protected under some form of management category (whether this is a less or more strict level of conservation), Paraguay is far from the 20% or a higher level of protected terrestrial areas in Latin America and the Caribbean (Elbers, 2011). Paraguay needs to advance toward an effective and realistic measure of areas under conservation. Besides, as explained by Feinsinger *et al.*, (2010), protected areas (referred to as protected spaces) cannot be conceived as isolated places that do not relate to the socio-cultural conditions with the ultimate goal of preserving the natural capital of the country. These areas need to be immediately integrated within Paraguay's development patterns if the areas are to be conserved for present and future generations. If there is no clear benefit for society, the areas will lose more space and importance in favor of the increasing number of people and their demands, given that, according to Gudynas (2010), more than 80 % of the existing protected areas harbor human communities within them. Protected areas need to satisfy human needs and be part of their development. As guided by the GEF (2018), there is an urgent need to link the sustaining of protected areas and their conservation objectives with targeted investments in spatial and use



planning in the surrounding geographies. This is the only strategy Paraguay must face if protected areas are going to play an important role for society and conservation, and contribute to the global goals for conservation in the new Post-2020 Agenda (Visconte *et al.*, 2019).

5. References

- Alter Vida 2002. Directrices y alcances de la categoría de manejo de Reserva de Recursos Manejados. Informe de Taller. No publicado.
- Bridgewater, P, A Phillips, M Green and B Amos. 1996 Biosphere reserves and the IUCN system of protected area management categories. Australian Nature Conservation Agency – IUCN – UNESCO MAB Program. Canberra. 24 pp.
- Brooks, T. 2011. Conservation planning and priorities. En capítulo 11, pp. 199-219, “Sodhi, N.S. y P. R. Ehrlich: Conservation Biology for All. Oxford University Press, Oxford. <https://doi.org/10.1093/acprof:oso/9780199554232.003.0012>
- Cacciali, P., H. Cabral & A. Yanosky. 2015. Conservation implications of protected areas’ coverage for Paraguay’s reptiles. Parks 21(2): 101-119. <https://doi.org/10.2305/IUCN.CH.2014.PARKS-21-2PC.en>
- Cartes, J. L. & Clay, R. P. 2009. Paraguay. Pp 297 – 306 in C. Devenish, D. F. Díaz Fernández, R. P. Clay, I. Davidson & I. Yépez Zabala Eds. Important Bird Areas Americas - Priority sites for biodiversity conservation. Quito, Ecuador: BirdLife International (BirdLife Conservation Series No. 16).
- Cartes, J.L. 2013. La urgencia de tomar medidas correctas al respecto del manejo de áreas protegidas. Paraquaria Natural 1(1):39-42.
- Cartes, J.L. 2016. Propuesta para la elaboración de planes de manejo en Reservas de Recursos Manejados. Paraquaria Natural 4(1): 19-29
- CDC (Centro de Datos para la Conservación, Paraguay). 1990. Áreas Prioritarias para la Conservación en la Región Oriental del Paraguay. DPNVS (Dirección de Parques Nacionales y Vida Silvestre). Subsecretaría de Estado de Recursos Naturales y Medio Ambiente. Ministerio de Agricultura y Ganadería. 1990. Asunción, 99 pp.
- Dudley, N. 2008. Directrices para la aplicación de las categorías de gestión de áreas protegidas. UICN/CMAP – Fundación Biodiversidad. Gland. 96 Pp. <https://doi.org/10.2305/IUCN.CH.2008.PAPS.2.es>
- Elbers, J. (Editor) 2011. Las áreas protegidas de América Latina: Situación actual y perspectivas para el futuro. Quito, Ecuador, UICN, 227 p.





- ENPAB 2015-2020. 2016. Estrategia Nacional y Plan de Acción para la Conservación de la Biodiversidad del Paraguay 2015-2020. Ministerio de Ambiente y Desarrollo Sostenible, Asunción. 97 pp.
- Feinsinger, P., Pozzi, C., Trucco, C., Cuellar, R.L., Laina, A., Cañizares, M., Noss, A. (2010). Research, conservation, and protected areas in Latin America: an incomplete store. *Ecosistemas* 19(2): 97-111
- Gauto, I., R. E. Spichiger & F. W. Stauffer. 2011. Diversity, distribution and conservation status assessment of Paraguayan palms (Arecaceae). *Biodivers. Conserv.* <https://doi.org/10.1007/s10531-011-0100-6>
- GEF. 2018. GEF VII Biodiversity Strategy. Global Environment Facility, Washington, D.C. 40 pp.
- Gudynas, E. 2010. Imágenes, ideas y conceptos sobre la naturaleza en América Latina. En pp. 267-292, En: "Cultura y Naturaleza", Leonardo Montenegro, ed. Jardín Botánico J.C. Mutis, Bogotá (Colombia).
- Huang, C.; S. Kim; A. Altstadt; J.R.G. Townshend; P. Davis; K. Song; C.J. Tucker; O. Rodas; A.A. Yanosky; R. Clay & J. Musinsky. 2007. Rapid Loss of Paraguay's Atlantic Forest and status of protected areas – A Landsat assessment. *Remote sensing of Environment* 106 (2007): 460-466. <https://doi.org/10.1016/j.rse.2006.09.016>
- Mitchell, B.A.; Stolton, S.; Bezaury-Creel, J.; Bingham, H.C.; Cumming, T.L.; Dudley, N.; Fitzsimons, J.A.; Malleret-King, D.; Redford, K.H. & Solano, P. 2019. Directrices para áreas bajo protección privada. Serie Directrices sobre Buenas Prácticas en Áreas Protegidas No. 29. Gland, Suiza: UICN. xii + 100pp. <https://doi.org/10.2305/IUCN.CH.2018.PAG.29.es>
- SINASIP. 2018. Diagnóstico Estratégico. Sistema Nacional de Áreas Silvestres Protegidas – SINASIP. Ministerio de Ambiente y Desarrollo Sostenible, PNUD, Asunción. 56 pp.
- Visconte, P. P. S. H. Butchart, T. M. Brooks, P. F. Langhammer, D. Marnewick, S. Vergara, A. Yanosky & J. E. M. Watson. 2019. Protected area targets post-2020. *Science*: Science 19 APRIL 2019 • VOL 364 ISSUE 6437. DOI: 10.1126/science.aav6886. <https://doi.org/10.1126/science.aav6886>



6. Appendix

Appendix 1. List of Protected Areas analyzed in this study
 Apéndice 1. Lista de áreas protegidas analizadas en este estudio

#	Name	Nat. Category	IUCN	Department	Legal establ.	Year	Ha	Current Status
1	Itaibo	Biological Refuge	IV	Alto Paraná	RSE No. 052	1984	18 293	Nature Reserve
2	Limoy	Biological Refuge	IV	Alto Paraná	RSE No. 052	1984	22 529	Nature Reserve
3	Mbaracayu	Biological Refuge	IV	Canindeyu	RSE No. 051	1984	1 436	Nature Reserve
4	Taiti Yupi	Biological Refuge	IV	Alto Parana	RSE No. 052	1984	3 866	Nature Reserve
5	Banco San Miguel y Bahía de Asunción	Ecological Reserve	IV	Asuncion	Law 2.715	2005	300	Ecological Reserve
6	Capitibary	Ecological Reserve	IV	San Pedro	Dec. 18.219	2002	3 082	Ecological Reserve
7	Carrizales del río Paraná	Ecological Reserve	IV	Ñeembucú	Law 3.601	2008	9 049	Ecological Reserve
8	Jukyty Guasu	Ecological Reserve	IV	Cordillera	Law 4.387	2011	4	Ecological Reserve
9	Cerro Sarambí	Managed Resources Reserve	VI	Amambay	Dec. No. 19.432	1997	0	Dismissed
10	Nú Guasu	Managed Resources Reserve	VI	Central	Law 2.795	2005	280	Managed Resources Reserve
11	Bella Vista	National Park	II	Amambay	Dec. 20.713	1998	0	Dismissed
12	Bosque Protector Yacui	National Park	II	Itapúa	Dec. 17.072	1975	0	Dismissed
13	Caazapa	National Park	II	Caazapa	Dec. 30.952	1973	16 000	National Park
14	Cerro Cora	National Park	II	Amambay	Dec. 20.933 y 6.090	1976	5 538	National Park
15	Chovoreca	National Park	II	Alto Paraguay	Dec. 21.566	1998	100 953	Nature & Historical Monument
16	Cristo Rey	National Park	II	Cordillera	Law No. 5.066	2013	s/a	National Park
17	Defensores del Chaco	National Park	II	Alto Paraguay	Dec. 16.806	1975	720 000	National Park
18	Esterio Milagro	National Park	II	San Pedro	Dec. No. 19.431	1997	0	Dismissed
19	Guayaki	National Park	II	Caaguazu	Lost Decree	1960	0	Dismissed
20	Lago Ypacarai	National Park	II	Central	Dec. 5.686	1990	36 000	Managed Resources Reserve
21	Lago Ypoa	National Park	II	Cent/Par/Nee	Dec. 13.681	1992	119 006	Managed Resources Reserve
22	Médanos del Chaco	National Park	II	Boq/A.Py	Dec. 21.957	2003	605 075	National Park
23	Nacunday	National Park	II	Alto Paraná	Dec. 30.953	1973	2 000	National Park
24	Paso Bravo	National Park	II	Concepción	Dec. 20.712	1998	100 614	National Park
25	Rio Negro	National Park	II	Alto Paraguay	Dec. 14.218	2003	123 786	National Park
26	Saltos del Guairá	National Park	II	Canindeyu	Dec. 30.955	1973	0	Dismissed
27	San Rafael	National Park	II	Ita/Cpa	Dec. 13.680	1992	72 849	National Park
28	Serranía de San Luis	National Park	II	Concepción	Dec. 11.964	1991	10 282	National Park
29	Serranía San Joaquín	National Park	II	Caag/Can	Dec. No. 19.430	1997	0	Dismissed
30	Tinfunque	National Park	II	Presidente Hayes	Dec. 18.205	1966	241 320	Managed Resources Reserve
31	Tte. Agripino Enciso	National Park	II	Boquerón	Dec. 15.936	1980	42 241	National Park
32	Ybycui	National Park	II	Paraguari	Dec. 32.772	1973	5 000	National Park
33	Ybytyruzu	National Park	II	Guaira	Dec. 5.815	1990	24 000	Managed Resources Reserve
34	Kuri'y	National Reserve	?	Alto Paraná	Dec. 30.956	1973	2 000	Other Cats.



#	Name	Nat. Category	IUCN	Department	Legal establ.	Year	Ha	Current Status
35	Cerro Lambare	National Reserve Zone	?	Asunción	Dec. 26	1948	3	Other Cats.
36	Caverna 14 de julio y Santa Caverna - Cerro Tres Cerros	Nature & Historical Monument	III	Concepción	Law No. 4.577	2012	140	Nature & Historical Monument
37	Caverna Kamba Hopo	Nature & Historical Monument	III	Concepción	Law No. 4.577	2012	18	Nature & Historical Monument
38	Caverna Santa Elena	Nature & Historical Monument	III	Concepción	Law No. 4.577	2012	35	Nature & Historical Monument
39	Caverna Ykua Pa'i - Cerro Morado	Nature & Historical Monument	III	Concepción	Law No. 4.577	2012	77	Nature & Historical Monument
40	Cerros Koi y Chorori	Nature & Historical Monument	III	Central	Law 179	1993	17	Nature & Historical Monument
41	Isla Susu	Nature & Historical Monument	III	Caazapa	Law 4.002	2010	5 000	Nature & Historical Monument
42	Laguna Blanca	Nature & Historical Monument	III	San Pedro	Law 3.998	2010	157	Nature & Historical Monument
43	Laguna Méndez y Laguna Sisi	Nature & Historical Monument	III	Ñeembucú	Law 4.602	2012	776	Nature & Historical Monument
44	Macizo Acahay	Nature & Historical Monument	III	Paraguari	Dec. 13.682	1992	2 500	Nature & Historical Monument
45	Moisés Bertoni	Nature & Historical Monument	III	Alto Paraná	Dec. 3.847	1984	200	Nature & Historical Monument
46	Parque Nacional Mcal. José F. Estigarribia	Nature & Historical Monument	III	Cordillera	Law 5.006	2013	7	Nature & Historical Monument
47	Arcadia	Nature Reserve	IV	Boquerón	Dec. 6.450	2011	5 000	Nature Reserve
48	Arrecife	Nature Reserve	IV	Concepción	Dec. 10.897	2013	7 437	Nature Reserve
49	Arroyo Blanco	Nature Reserve	IV	Amambay	Dec. 14.944	2001	0	Dismissed
50	Arroyo Tapiracuái	Nature Reserve	IV	San Pedro	Law 4.647	2012	s/a	Nature Reserve
51	Bosque Arary	Nature Reserve	IV	Misiones	Dec. 3.754	2015	52	Nature Reserve
52	Bosque Mbaracayu	Nature Reserve	IV	Canindeyu	Law 112	1991	64 405	Nature Reserve
53	Bosque Ybyraty	Nature Reserve	IV	San Pedro	Dec. 4.791	2010	262	Nature Reserve
54	Bosques Nativos de Paso Kurusu	Nature Reserve	IV	San Pedro	Law 4.229	2010	0	Dismissed
55	Cabrera Timane	Nature Reserve	IV	Alto Paraguay	Dec. 13.202	2001	125 823	Nature Reserve
56	Campo Iris	Nature Reserve	IV	Boquerón	Dec. 2.945	2015	3 500	Nature Reserve
57	Cañada El Carmen	Nature Reserve	IV	Boquerón	Law 2.795	2005	3 973	Nature Reserve
58	Carapa	Nature Reserve	IV	Canindeyu	RDE No. 183	2008	4 382	Nature Reserve
59	Cerrados del Tagatiya	Nature Reserve	IV	Concepción	Dec. 7.791	2006	5 700	Nature Reserve
60	Cuenca del Ao. Tacuary-Chopi Sayju	Nature Reserve	IV	Itapúa	Dec. 3.813	2015	788	Nature Reserve
61	Cuenca del Arroyo Aguapey	Nature Reserve	IV	Itapúa	Dec. 3.964	2015	8 624	Nature Reserve
62	Eddira	Nature Reserve	IV	Itapúa	Law N° 3.415	2007	954	Nature Reserve
63	El Guayaacán I, II y III	Nature Reserve	IV	Concepción	Dec. 1.230	2014	1 509	Nature Reserve
64	Estrella	Nature Reserve	IV	Amambay	Dec. 9.858	2012	1 019	Nature Reserve
65	Fortín Zalazar	Nature Reserve	IV	Presidente Hayes	Dec. 11.804	2008	0	Dismissed
66	Guasu Puku	Nature Reserve	IV	Itapúa	Dec. 3.724	2015	3 492	Nature Reserve



#	Name	Nat. Category	IUCN	Department	Legal establ.	Year	Ha	Current Status	
67	Guyratí	Nature Reserve	IV	Paraguari	Dec. No. 5.450	2010	3 811	Nature Reserve	
68	Kai Rague	Nature Reserve	IV	Amambay	Dec. 1.977	2004	1 859	Nature Reserve	
69	La Morena	Nature Reserve	IV	Canindeyu	Dec. 1273	2014	1 831	Nature Reserve	
70	Laguna Blanca	Nature Reserve	IV	San Pedro	Dec. No. 3893	2010	802	Nature Reserve	
71	Lote 1	Nature Reserve	IV	Alto Paraguay	Dec. 11.762	2008	5 364	Nature Reserve	
72	Maharishi	Nature Reserve	IV	Alto Paraná	Dec. 11.763	2008	343	Nature Reserve	
73	Maharishi II	Nature Reserve	IV	Alto Paraná	Dec. 6.108	2011	77	Nature Reserve	
74	Morombi	Nature Reserve	IV	Caa/Can	Dec. 14.910	2001	25 000	Nature Reserve	
75	Municipal Huasipungo	Nature Reserve	IV	Canindeyu	Law N° 3.106	2006	78	Nature Reserve	
76	Ñu Guasu	Nature Reserve	IV	Boquerón	Dec. 5.845	2005	50 000	Nature Reserve	
77	Palmar Quemado	Nature Reserve	IV	Boquerón	Dec. 8.001	2006	9 478	Nature Reserve	
78	Patrimonio Ayoreo Punite Paesoi	Nature Reserve	IV	Boquerón	Dec. No. 11.761	2008	3 780	Nature Reserve	
79	Pikyry	Nature Reserve	IV	Alto Parana	RDE No. 186	2008	2 866	Nature Reserve	
80	Piroý	Nature Reserve	IV	Amambay	Dec. 9.859	2012	13	Nature Reserve	
81	Pozuelo	Nature Reserve	IV	Canindeyu	RDE No. 64	2014	5 521	Nature Reserve	
82	Riacho Florida 2	Nature Reserve	IV	Alto Paraguay	Dec. 5.999	2011	1 185	Nature Reserve	
83	Itakyry	Nature Reserve	IV	Alto Paraná	Dec. 9.860	2012	196	Nature Reserve	
84	Tabucái	Nature Reserve	IV	Alto Paraná	Dec. 11.760	2008	559	Nature Reserve	
85	Tagatiya mi	Nature Reserve	IV	Concepción	Dec. 10.398	2007	33 789	Nature Reserve	
86	Tapya	Nature Reserve	IV	Caazapa	Dec. 5.831	2005	4 736	Nature Reserve	
87	Toro Mochó	Nature Reserve	IV	Boquerón	Dec. 5.841	2005	18 000	Nature Reserve	
88	Villa Josefina	Nature Reserve	IV	San Pedro	Dec. 868	2013	180	Nature Reserve	
89	Yacyreta	Nature Reserve	IV	Misiones	Res. EBY 11.716	2009	8 345	Nature Reserve	
90	Yaguarete Pora	Nature Reserve	IV	Alto Paraguay	Dec. 11.726	2008	27 508	Nature Reserve	
91	Yguazu	Nature Reserve	IV	Alto Paraná	Dec. No. 1.739	2014	1 785	Nature Reserve	
92	Ypeti	Nature Reserve	IV	Caazapa	Dec. 21.346	2003	13 592	Nature Reserve	
93	Yyryrokái	Nature Reserve	IV	Alto Parana	RDE No. 113	2008	4 864	Nature Reserve	
94	Arroyo Yukyry	Protected Landscape	V	Central	Law No. 5.606	2016	s/a	Protected Landscape	
95	Cerro dos de Oro	Protected Landscape	V	San Pedro	Law 2.971	2006	44	Protected Landscape	
96	Cerro Kawaju	Protected Landscape	V	Cordillera	Law No. 5.377	2014	110	Protected Landscape	
97	Salto del Monday	Protected Landscape	V	Alto Paraná	Law 4738	2012	304	Protected Landscape	
98	Ykua Bolaños	Protected Landscape	V	Caazapa	Law 4.348	2011	10	Protected Landscape	
99	Ybera	Scientific Reserve	I	Canindeyu	Law 5.530	2015	1 748	Scientific Reserve	
100	Humedales del Bajo Chaco	Wildlife Refuge	IV	Presidente Hayes	Dec. 6.473	2011	8 510	Wildlife Refuge	
101	Isla Carrizal	Wildlife Refuge	IV	Ñeembucú	Law 3.473	2008	s/a	Wildlife Refuge	
102	Yabebyry	Wildlife Refuge	IV	Misiones	Dec. 16.147	1993	30 000	Wildlife Refuge	
							Total extension	27 976	km ²

Notes: IUCN: WCPA categories; Legal Establ.: Legal Establishment. #40 Cerro Koi & Chorori: as these were established within the same legal decree, and are separated only by a few hundred meters, most authors consider them as a single protected area.

