EPIQ II
Making Policies Work for People

Tropical Forestry and Biodiversity Conservation in Paraguay:

Final Report of a Section 118/119 Assessment
EPIQ II Task Order No.1

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ACRONYMS

ALIDES	Alianza para el Desarrollo Sostenible
AVINA	The AVINA Foundation
CAF	Corporación Andina de Fomento
CI	Conservation International
CITES	Convention on the International Trade of Endangered Species
CONAM	National Environmental Council
CSP	Country Strategy Plans
DESDEL	Fundación para el Desarrollo Sostenible del Chaco
DPNVS	National Parks and Wildlife Directorate
ENPAB	National Strategy and Action Plan for Biodiversity Conservation
FAO	Food and Agriculture Organization of the United Nations
FMB	Moisés Bertoni Foundation
FY	Fiscal Year
GEF	Global Environment Facility
GOP	Government of Paraguay
IADB	Inter-American Development Bank
IBR	Instituto de Bienestar Rural
IDEA	Instituto de Derecho y Economía Ambiental
IEE	Initial Environmental Examination
INDERT	Instituto de Desarrollo Rural y de la Tierra
IUCN	World Conservation Union
JICA	Japanese International Cooperation Agency
MAG	Ministry of Agriculture and Livestock
NGO	Non-Governmental Organization
PiP	Parks in Peril Project
PVO	Private Volunteer Organization
ROAM	Network of Environmental Organizations
SEAM	Secretariat of the Environment
SFN	National Forest Service
SINASIP	National Protected Areas System

SISNAM	National Environment System
SO	Strategic Objective
TFCA	Tropical Forests Conservation Act
TNC	The Nature Conservancy
UNDP	United Nations Development Programme
UNESCO	United Nations Education, Science, and Culture Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UPAF	Upper Paraná Atlantic Forest
USAID	United States Agency for International Development
WWF	World Wildlife Fund

Executive Summary

This report complies with the requirements of the Section 118/119 Amendments for Tropical Forestry and Biodiversity Conservation to the Foreign Assistance Act examining the new Strategic Plan (2006-2011) for the USAID/Paraguay bilateral program.

As part of USAID's efforts to design a new assistance strategy for Paraguay for the period FY 2006-2011, USAID/Paraguay contracted for the services of a tropical forestry/biodiversity assessment team under the aegis of the EPIQ II IQC with Chemonics International Inc. This assessment constitutes an early environmental review of the Mission's new multi-year strategy for the country with these objectives:

- Ensure that the planned activities and investments are not likely to adversely affect tropical forestry and biodiversity.

- Explore the opportunities for program synergy among the strategic objectives that could contribute to the conservation of tropical forests and biodiversity.

- Identify other issues and opportunities related to forestry and biodiversity conservation for USAID assistance that may match the Mission's overall strategy thrust.

The New Strategy for the USAID/Paraguay Program

USAID/Paraguay's plans for its investments and activities in the environment sector, as presented in the Concept Paper for the Proposed Strategic Plan, will build on its recent experience in the sector with the specific intention of targeting the Mission's Vision Statement:

Reforming the System:
Bottom-up, Sustainable Development and Deepening of Democratic Culture

USAID's intent is to consolidate the present gains, both of its program and those of the new Government while bearing in mind that there are significant vested interests that will attempt to maintain the status quo and thwart reform. As its Strategic Objective (SO) for the environment sector (526-011), USAID has identified "Management of Globally Important Eco-regions Improved." To reach toward this SO, two immediate results areas and an array of illustrative activities have been defined; they are as follows:

Intermediate Results Areas	
IR 1. - Effective national environmental policy implemented and regulatory framework to consolidate protected areas strengthened. (illustrative activities) ➢ Incentives for private conservation measures in protected areas and buffer zones. ➢ Concessions or co-management arrangements with NGOs for protected natural areas. ➢ Technical assistance for analytical studies, awareness raising, management plan formulation and capacity building. ➢ Encouragement to the GOP to create a national environment fund, with possible support from a Tropical Forests Conservation Act (TFCA) arrangement.	**IR 2. - Local environmental regulatory and enforcement models developed and implemented in priority areas.** (illustrative activities) ➢ Institutional capacity building for local governments for conservation of protected areas and sustainable development. ➢ Technical assistance and training for zoning and land-use surveys. ➢ Promoting citizen participation in identifying and addressing local environmental issues. ➢ Support to the National Environmental Secretariat to promote national, local and community collaboration in environmental regulation and enforcement.

Major Assessment Findings

The Assessment Team's findings support USAID's strategic approach. The Team has not detected any likelihood that the planned activities for the next strategic program period would have adverse environmental impacts on tropical forests or biodiversity conservation. The Team shares USAID/Paraguay's conviction that for the near to medium term, its overall vision statement and strategic approach — "reforming the system from within and from the bottom-up" is both relevant and appropriate. The Assessment Team believes that this approach will lead to effective programming and achievable results related to the conservation of tropical forests and biodiversity, given the present situation in Paraguay.

The synergistic focus on democratic reforms by fostering alliances and building constituencies, can and must provide the driving force behind a rising ground-swell of citizens and better-informed local leaders demanding greater attention and more policy enforcement from central government. These efforts are fundamental to sustaining the promising site-based interventions and activities in many sectors and especially in the environment sector.

The wise use and just sharing of natural resources often constitute a first echelon of collective decision-making and, as such, a prima facie example of governance issues facing decentralized local governments (municipalities and departments in the case of Paraguay). Creating and/or strengthening local interest groups — stakeholders and private sector entrepreneurs — at the local level can also be vitally important for defending protected areas or countering unwise and unsustainable land-use decisions based on corruption and clientalism. Private sector enterprises marketing sustainably produced products are by definition making a contribution to conservation.

More Specific Recommendations

As a result of this assessment, the Team recommends that USAID/Paraguay consider the following more explicit recommendations as it moves forward with the present program (near term) and with the development of its new strategic program (medium term):

Intransigent Sector Externalities. The lack of an adequate policy framework and/or the political will to impose it, failure to enforce the existing norms and laws, and the legacy of corruption and patronage, combine to make quick progress in conservation at the national level unlikely, particularly as concerns the forestry sector. There is, however, a markedly improved setting for dialogue and governance within the environment community, principally between the Secretariat of the Environment (SEAM), the NGO community and local governments and the Assessment Team encourages USAID to take full advantage of these openings. While the needs remain great, the Mission must choose carefully in the near to medium term to achieve real results and the sustainability of its investments and their outcomes. The Team recommends the following:

- *Bottom-Up; the alternative to the failed top-down efforts*. Resolving the larger issues will eventually be achieved by stimulating the development of a larger and better informed conservation constituency (stakeholders brokering their competing interests, better informed leaders, civil society and a concerned citizenry) who can advocate for policy change.

- *Vision is not enough; the country needs evidence of the possible*. The Assessment Team has observed that despite the fact that there is a well-reasoned body of literature related to the forest and biodiversity conservation and development in Paraguay, the sector generally lacks the macro-economic or even micro-economic analysis that will be required to make wise sector choices. With so much to do, these choices will be difficult to make without adequate understanding and capacity for land use, sustainable development and conservation economics. The Assessment Team encourages the Mission to explore the opportunities for bringing the well-known U.S. predominant capability for natural resources economics in to play as part of its sector-wise programs.

- *Pulling together what is known*. In the near term, USAID/Paraguay should consider funding a study that, similar to the recently contracted soybean sector study, looks more broadly and from a macro-economic perspective at the values involved in land-use options. This proposed study could be similar to the Retrospective Study on environment sector investments carried out by USAID/Bolivia.

Unrealized Biodiversity Conservation Goals. Although Paraguay is far from reaching its own stated goals in terms of biodiversity conservation and the development of the protected area system, it is much better off than many other countries in the region because of the extent of relatively undegraded forest areas in the Chaco. This opportunity suggests a course of action that should be incorporated into the Missions' program, to include:

- *Giving higher priority and profile for the Chaco.* Avoiding the mistakes of the Oriente in the Chaco is an opportunity of national, regional and global significance and USAID should be a strong proponent of protecting the Chaco.

- *USAID should also continue to support more reservation of land in protected areas,* especially by encouraging Government/SEAM/National Environmental Council (CONAM) to embrace and support private sector efforts.

- Many of the *Natural Protected Areas are under significant threat*. USAID/Paraguay should encourage the Government to take an affirmative policy stance about avoiding conversion of protected areas as a good start to consolidating the National Protected Areas System (SINASIP).

- *Public-Private Management of Protected Areas*. The most promising biodiversity conservation option available to Paraguay in the near term would appear to be official sanction of public-private management arrangements for protected areas.

- *Managed Natural Resources Reserves*. The San Rafael example is extremely promising but has been and remains a challenge for all concerned. Knowledgeable specialists in Paraguay believe that more formalized governmental recognition and support for these managed natural resources reserves would provide guarantees that would alleviate the pressures on landowners who wish to cooperate.

Beyond the Bilateral Program. USAID as an agency of the U.S. Government can and is increasingly playing a wider role related to options for conservation beyond the bilateral programs in a number of countries. There are some opportunities for continuing this trend here in Paraguay.

- *Tropical Forests Conservation Act (TFCA), An Upcoming Opportunity*. The Assessment Team recommends that USAID raise the issues of non-conversion of protected areas by INDERT and the public-private partnership approach to protected area management as important issues as part of the policy agenda for dialogue with Government related to the TFCA.

- *Large-Scale Infrastructure Projects*. The Assessment Team believes that the USAID Mission should look into and invoke the principles associated with the Pelosi Amendment to ensure that the environmental management, mitigation and monitoring measures foreseen for large-scale multilateral bank investment programs are being respected.

- *Global Climate Change Options*. Paraguay has already successfully negotiated at least two carbon sequestration agreements favoring biodiversity conservation. This is an area wherein the Mission could seek near-term assistance and support from USAID/Washington.

- *Watershed Management Opportunities.* No country that sells as much hydropower or derives so much of its national budget from this unique source as does Paraguay can afford

to be unconcerned about watershed stability. The Assessment Team recommends that over the medium term USAID/Paraguay explore the opportunities for regional cooperation with USAID Missions in Brazil and Bolivia to focus on this important issue.

Forestry strategy in Paraguay; *quo vadis*? Faced with significant deforestation across the Eastern half of the country, those concerned with the forestry sector propose two major program areas – reservation cum conservation of remaining block of intact forest and the need for large-scale reforestation. Are there other opportunities and needs both in capacity building and technological interventions (for example, sustainable management of natural forest areas in the East and in the Chaco), and how can these be addressed? Among the options that should be considered are the following:

The Assessment Team believes that *the potential TFCA agreement is a near-term opportunity to get the Government's attention focused on the forestry sector* needs and opportunities, particularly the stalled reform agenda put forth by the *Mesa Forestal Nacional*.

The real costs of deforestation. The lack of good economic data is nowhere more important than in understanding the impact of deforestation...the real costs of deforestation. USAID/ Paraguay may wish to commission a study on the economic effects of deforestation to complement the findings about the development of agribusiness in the country.

Is reforestation really a solution? As part of the study mentioned above, the Assessment Team would recommend some initial calculations on both the feasibility and costs of wholesale reforestation as a policy-oriented reality check.

Building a body of understanding and a constituency for wise stewardship of forest resources. The Assessment Team believes that the best choice in the near to medium term would be to build upon the small success stories and nurture them so as to gradually enhance an understanding of the values and opportunities they present.

Community Forestry or Agroforestry. These sector strategy options – the most compelling paradigm shifts ever experienced in the forestry sector worldwide – have as yet to find their place in Paraguay. At a minimum, USAID should encourage the inclusion of community forestry or agroforestry type interventions as part of the work undertaken by the conservation community, both governmental and NGO-based, in the buffer zones around the protected areas.

Paying for forest conservation in the marketplace. There would appear to be opportunities for both technological innovation and strengthened entrepreneurial capabilities in the wood industry sector which would provide advantages in the regional and global marketplace. These are the same conditions implicit in the approach of the Paraguay Vende project and there would appear to be several near-term opportunities related to wood industries that this project might take up.

USAID's successes. Building NGO capacity should continue. Five years of work with the local NGO conservation community and the lessons learned in the process may be more valuable than their physical achievements. USAID/Paraguay should continue to support the local NGO conservation community by helping them to identify these lessons learned with the idea of

consolidating/expanding the gains made on institutional development for the future. USAID should also consider the following near-term action recommendations:

- Agreements to work with these local NGOs should *include an institutional strengthening grant component* that provides targeted assistance to enhance their internal capacities thus ensuring effective and efficient capabilities.

- Ensure that those NGOs working in the buffer zones around the protected natural areas are *incorporating natural resources management technologies* that work toward more sustainable farming systems.

- The Assessment Team recommends that USAID *encourage its local NGO partners to revitalize the existing network* approach so as to enable them to speak with one voice on sector policy issues and perhaps combine efforts for support services such as training, production of publications, computer and Internet services.

- The Assessment Team *endorses the present Mission engagements with the U.S.-based Conservation PVOs* but counsels the need to tighten up monitoring so as to be sure to discern cause and effect instead of just multifaceted programs, which, while successful, are difficult to replicate.

- Many of the NGOs feature environmental education and ecotourism opportunities as parts of their programs. The Assessment Team believes that *outdoor recreation opportunities* can also be a vehicle for environmental education on a very tangible scale. Local people, particularly the middle class, derive important amenity benefits from the ability to escape from their increasingly urbanized lifestyles.

A. Introduction to the Assessment

A1. Rationale

Sections 118 and 119 are amendments passed by the U.S. Congress in 1987 to the Foreign Assistance Act to complement existing U.S. Agency for International Development (USAID) environmental review procedures (22CFR216). The intention of the Congress was to ensure that the potential impact of Agency programs on the conservation of tropical forests and biodiversity were properly accounted for as part of strategic planning exercises, in the case of USAID Missions, each time a new strategic plan was being prepared. The following is a brief synopsis of the regulatory language contained in each section:

> **Section 118 — Tropical Forests**. Each country development strategy or other country plan prepared by USAID shall include an analysis of (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.
>
> **Section 119 — Biodiversity**. Each country development or other country plan prepared by USAID shall include an analysis of (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

As part of its present efforts to design and program a new assistance strategy for Paraguay for the period FY 2006-2011, USAID/Paraguay contracted for the services of a tropical forestry/biodiversity assessment team under the aegis of the EPIQ II IQC with Chemonics International Inc.

A2. Objectives

It is important to bear in mind that the tropical forestry and biodiversity assessment is not specifically a programming or sector-wise design effort. Rather, it is an early environmental review of the Mission's new multi-year strategy for the country, conceived with the following objectives:

- Ensure that the planned activities and investments are not likely to adversely affect tropical forestry and biodiversity.
- Explore the opportunities for program synergy among the strategic objectives that could contribute to the conservation of tropical forests and biodiversity.
- Identify other issues and opportunities related to forestry and biodiversity conservation for USAID assistance that may match the Mission's overall strategy thrust.

Following the procedures that have become part of these Section 118/119 assessments, the overall findings and recommendations will be incorporated by the Mission in the ongoing development of its strategy. This full final report of this Tropical Forestry and Biodiversity

Assessment will be in the master Mission Country Strategy Plan (CSP) files and available on request. It should be noted that this assessment does not substitute for the Initial Environmental Examination (IEE) of activities identified in the new strategy. Each SO Team will be responsible for ensuring that such IEEs or a Request for Categorical Exclusion are conducted at the SO level for all activities funded by USAID.

A3. Methodology

This assessment was carried out during the period October to November 2004 by a team comprised of a Team Leader-Tropical Forestry and Biodiversity Specialist and a Local Environmental Specialist in accordance with the Terms of Reference provided by the Mission (see Appendix 2). The methodology was quite straightforward and mainly dependent on secondary sources of information. Appendix 1 includes a list of the key references and documentation used by the team. Brief biographical sketches of the team members may be seen in Appendix 3. Appendix 4 provides a list of persons consulted during this exercise. Appendix 5 contains a list with basic information on the protected areas of Paraguay.

B. Program Context

B1. Background on the USAID/Paraguay Program

USAID recently celebrated its 50th year supporting development in Paraguay. The assistance it has provided covers a broad spectrum of activities from infrastructure to key government institutions and civil society. In the area of environmental protection and natural resources management, USAID has played a leading role that continues to this day.

The present report on tropical forests and biodiversity has been prepared almost 20 years after the first seminal document highlighting environmental issues was published by USAID in 1985, the Environmental Profile of Paraguay. The profile continues to be useful as a baseline for comparison and it focused investments by USAID and other U.S. Government agencies that have helped maintain tropical forests and biodiversity to this day and for future generations.

The Outlook for the Year 2011

"Paraguayan development as it now stands, the natural resource potential, and prevailing socio-economic policy all suggest that significant environmental changes will occur. The increasing exploitation of nature by man will lead to imbalances in the ecosystem and the environment, imbalances which are not yet of alarming proportions, but which will have irreversible consequences if current trends continue."

USAID Environmental Profile of Paraguay, 1985

USAID/Paraguay has taken a two-pronged approach over the past two decades with respect to environment that has been complementary to its focus on strengthening a participatory democracy. This approach has strengthened the network of national NGOs in the fields of conservation and sustainable development through programs that have focused on the conservation of natural resources and biodiversity. In 1985 only one national civil society NGO was cited in the Environmental Profile. A national list of NGOs shows some 20 environmental NGOs working in Paraguay. Several of these have been supported by USAID in some measure over the years or through its partner U.S.-PVOs such as The Nature Conservancy, World Wildlife Fund, and Conservation International.

Important programs have included the support for the creation of one of the largest and best secured protected areas in the Alto Paraná Atlantic Forest Ecoregion, the Mbaracayú Natural Forest Reserve managed by the Fundación Moisés Bertoni. The first National Environmental Education initiative, the concepts of Private Reserves and decentralization of environmental management were pioneered by USAID/Paraguay programs throughout the 1990´s leading to the mainstreaming of these issues in Public Sector programs and national environmental policy.

B2. USAID/Paraguay Strategic Plan FY 2001-2005

The USAID/Paraguay program is projected to invest $58,410,000 during the FY 2001-FY 2005 period for four Strategic Objectives:

- Key Democratic Governance Practices Instituted
- Management of Globally Important Ecoregions Improved
- Use of Voluntary Reproductive Health Services Increased
- Increased Incomes for the Poor in Selected Economic Regions

The overall levels of investment in the SOs are illustrated in the following table:

Table 1. USAID/Paraguay Funding Levels 2001-2005

Democracy & Governance	27,140,000
Reproductive Health	17,020,000
Economic Growth	8,500,000
Environment	5,750,000
Total FY 2001-FY 2005	58,410,000

The USAID/Paraguay Strategic Plan for the years 2001 to 2005 calls for an investment of $5.75 million to strengthen national policy for conservation of ecosystems of global importance and to develop local enforcement and regulatory models for protected areas. This is the smallest of the Mission's Strategic Objectives in terms of budget and scope. However, the investments are targeted particularly at civil society, NGOs, and local governments which are only weakly supported by the bilateral and multilateral development agencies and banks. This issue was highlighted in an Intensive Review Document produced by USAID/Paraguay in April 2004.

The program has focused over the present period on three ecoregional areas as defined in the SO: the Chaco dry forests, the Pantanal wetlands, and the Upper Paraná Atlantic Forest (UPAF), these last two considered the "hotspots" or "Global 200" of global conservation priorities (Mittermeier, 1998, Dinerstein, 1998). Two of the ecoregions, the Chaco and Pantanal, continue to offer significant areas for conservation efforts in the form of national parks and other large-scale initiatives. On the other hand, the most threatened and biodiverse ecoregion, the UPAF, is highly fragmented and harbors the greatest numbers of endangered species.

Upper Paraná Atlantic Forest

This program has supported efforts of World Wildlife Fund to establish a Biological Vision in this ecoregion that is shared by Brazil, Argentina, and Paraguay (DiBitteti et al. 2003). The

Vision has successfully established itself in the conservation community through a participatory process developing the vision over the last decade. In the community at large, a mass media campaign has elevated the recognition of the forest and its importance to 50 percent from a baseline of 5 percent recognition nationwide. On-the-ground implementation of the Vision includes strengthening local NGOs, management committee support in the San Rafael Managed Resources Reserve, and efforts by public officials to prosecute illegal logging and environmental degradation.

Through a contract awarded to the local NGO, *Instituto de Derecho y Economía Ambiental* (IDEA), USAID/Paraguay is supporting implementation of the *Biological Vision* in the Northern Block (northeastern Paraguay) which has the most important blocks of remaining forest with the least percentage of public protected areas. The program is focused on local government strengthening for environmental management, strengthening of the Secretary of Environment's decentralization efforts, as well as support for the few public protected areas in the region and consolidation of new ones.

Pantanal
The Nature Conservancy has partnered with USAID in the consolidation of a Chaco-Pantanal corridor. Efforts have focused on creation of conservation corridors between large blocks of National Parks in the northern Chaco. River communities including indigenous groups in the ecoregion have been supported through this program to develop handicrafts and other community development projects linked in part to a large private reserve effort in the region.

Chaco
A Cooperative Agreement with *Fundación para el Desarrollo Sostenible del Chaco* (Desdel Chaco) has strengthened local governments, achieved listing of wetlands of international importance and established conservation groups with local communities in the ecoregion. Support for the Defensores del Chaco National Park through the Parks-in-Peril program has helped in conserving the largest park in Paraguay (780,000 hectares). Desdel Chaco has become in the few years of support by USAID and other donors, such as AVINA Foundation, the most important conservation NGO in the Paraguayan portion of the ecoregion and an influential player in the three countries that share the Chaco (Bolivia, Argentina, and Paraguay).

B3. USAID/Paraguay's Proposed Overall Strategic Plan 2006-2011

USAID/Paraguay presented a Concept Paper for a proposed strategic plan 2006-2011 which was approved in Washington in May 2004. The paper reflects the Mission's conviction that both the reformist intentions as well as the legitimate achievements of the present government deserve continuing support. Accordingly, USAID/Paraguay's plans for the next strategy period focus on consolidating the gains made in terms of overcoming the deep rooted issues of corruption, ineffective government and an undiversified economy during the present program (USAID 2004). Its vision statement for the next period is:

> "*Reforming the System: Bottom-Up, Sustainable Development and Deepening of Democratic Culture*"

It is also therefore not surprising that USAID envisages the Democracy program as "central to the Mission's overall strategic plan" while at the same time providing "strategic orientation and pragmatic complementarities" to the other three proposed SO objective areas – economic growth, health and the environment (ibid). They intend to support the reformist trends by changing the political system from within, creating incentives that reward transparency, accountability and good governance. Trade-based diversification will be the hallmark of the efforts to foster economic growth while building alliances and constituencies in the areas of health and environment will further reinforce the results expected in decentralization and strengthened local governments. The new strategy features four Strategic Objectives, identified below with an indication of the illustrative activities each may undertake.

526-008: Corruption Reduced and Good Governance Improved in Key Sectors	**526-009: Employment Generated through Diversification of Markets and Products**	**526-010: Health Coverage for the Underserved Population Improved**	**526-011: Management of Globally Important Eco-Regions Improved**
— illustrative activities —			
➢ Anticorruption ➢ Governance ➢ Rule of Law ➢ Party Reform	➢ Trade ➢ Business Environment ➢ Inclusion	➢ Reproductive Health/Family Planning ➢ Child Survival & Maternal Health ➢ HIV/AIDS	➢ National Policy ➢ Local Regulation and Enforcement

B4. Current Programming Efforts in the Environment Sector

A mid-term review of past investments by USAID in the environment sector in Paraguay concluded that its achievements were significant given the modest amount of resources invested (Aggarawal et al., 2004b). Clearly, the most notable of these achievements are those related to strengthening local environment NGO capabilities. USAID is one of only a few donors active in the sector that has been able to work strengthening the non-governmental level. It now has a close working relationship with the local NGO community that has been responsible, with USAID support, for implementing effective programs supporting protected areas in the country. The AVINA Foundation, the Inter-American Foundation, MacArthur Foundation and the French GEF Facility have also provided important support to NGOs generally for project related activities or leadership development. Despite these achievements, USAID and many others active in the environment sector recognize that Paraguay's unique forests and biodiversity assets are still under constant pressure from deforestation, mainly for land-use conversion while Government agencies mandated to manage the sector remain extremely weak.

USAID plans to continue its programmatic activities in the environment sector with a strategic focus on conservation. The Strategic Objective: *Management of Globally Important Ecoregions Improved* will be addressed through two intermediate results areas described in more detail below. Program attention will be further focused in that USAID will limit its investments to only two of the principal ecoregions: the Dry Chaco and the Upper Atlantic Forests. Work in the Pantanal is contingent on resources available and priorities in the various ecoregions. Reasons for this include: only a small portion of the Pantanal is found in Paraguay, existing conservation efforts by private forces already cover a significant portion (70,000 hectares) of the ecoregion

and the fact that other donors and international organizations are active in the ecoregion (Aggarawal et al. 2004a).

IR 1. Effective national environmental policy implemented and regulatory framework to consolidate protected areas strengthened: Activities in this area will continue to support efforts to ensure the legal definition for designated protected areas and encourage innovative arrangements for conservation and management including both the NGO community and the private sector. Despite the very effective efforts of NGOs and the private sector (large landowners) in protecting wild areas designated as part of the national protected area system, the Government of Paraguay has as yet to officially sanction such arrangements. Similarly, USAID's investments will be targeted at practical steps to implementing national conservation imperatives including technical and legal assistance, increased public awareness of environmental issues, management plan formulation, and training of conservation personnel. Importantly, USAID will support local efforts to acquire critical habitat areas for the establishment or expansion of additional protected areas and the corridors linking them. A possible debt-for-nature arrangement under the Tropical Forest Conservation Act (TFCA) will provide USAID and the Embassy with a forum and possible mechanism to convince the Government to create the national environment fund that could provide stable financial resources for biodiversity protection and conservation.

IR 2. Local environmental regulatory and enforcement models developed and implemented in priority areas: Building on its engagement through the Democracy and Governance SO, USAID will also focus these efforts to assist municipal and departmental governments to play a more proactive and localized role in conserving protected areas and promoting more sustainable natural resources management efforts within their territorial jurisdictions. In order to enable local governments to understand the implications of sustainable environmental development, USAID resources will be employed to encourage land-use surveys and zoning plans to protect their constituencies from ill-conceived, short-term profit taking which has been typical of the entrenched patronage system. Citizen participation at the municipal and departmental levels in the identification and solution of local environmental issues will also be supported providing practical and tangible results of a growing conservation constituency. Finally, USAID has signaled their intention to work with the National Environment Secretariat to encourage citizen participation at the national, local and community levels in the enforcement of existing environmental regulations.

B5. Environmental Setting

The Republic of Paraguay is a relatively small country with a total area of approximately 406,752 km^2 (40.6 million hectares) and a population recently estimated at about 5.2 million people. Landlocked and surrounded by Brazil, Bolivia and Argentina, it still has access to the sea along the great Paraguay and Paraná Rivers. On the whole, it is a relatively flat country with no real highlands (nothing over 800 masl).

The Paraguay River divides the country into two very different geographic regions. The Western Region, also known as the Chaco, has a total area of about 246,925 km^2 (61 percent of the national territory) and very low population density (0.52 inhabitants/km^2) or only 3 percent of the total population. The Eastern Region on the other hand covers approximately 159,827 km^2

(39 percent of the national territory) and is home to the remaining 97 percent of the population with an average population density of 31.6/km^2 (Gonzalez, 2002).

These geographic distinctions are matched by significantly different ecological conditions. In the Western Region or Occidente, the Chaco is a relatively flat alluvial plane that gets less rainfall, ranging from semi-arid in the northwest (400 mm average rainfall) to sub-humid (1,200 mm average rainfall along the Paraguay River in the south central part of the country). In the Eastern Region (or Region Oriental), the topography is more broken with some hilly formations, many water courses and an average rainfall of 1,200 mm to 1,800 mm.

Five ecoregions are generally reported for Paraguay (Dinerstein, 1995, Guyra, 2004): the Chaco, the Humid Chaco, Pantanal, Cerrado, and the Upper Paraná Atlantic Forests. In addition there is some evidence of the presence of Chiquitano Forests and Mesopotamia Savannah in different regions of the country as studies improve the state of ecosystem knowledge. The country is thus an ecological crossroads with a resulting interesting array of biodiversity. Published up-to-date data and information on land capability and actual land use are not available but some recent studies provide an idea of situation.

Table 2 on page 8 provides some data from different studies of land capability and land use in Paraguay.[1] Map 1 on page 9 shows Paraguay's ecoregions and protected areas.

While these figures in Table 2 contain some irreconcilable differences, they do underscore the importance of taking into account the basic premise of sound natural resources management, that of matching land use to land capability as an important part of the approach to sustainable development. Similarly, they do not capture recent land-use changes that have come about as part of the dramatic expansion of soybean cultivation in the country. Expansion has been achieved largely at the expense of clearing previously forested land.

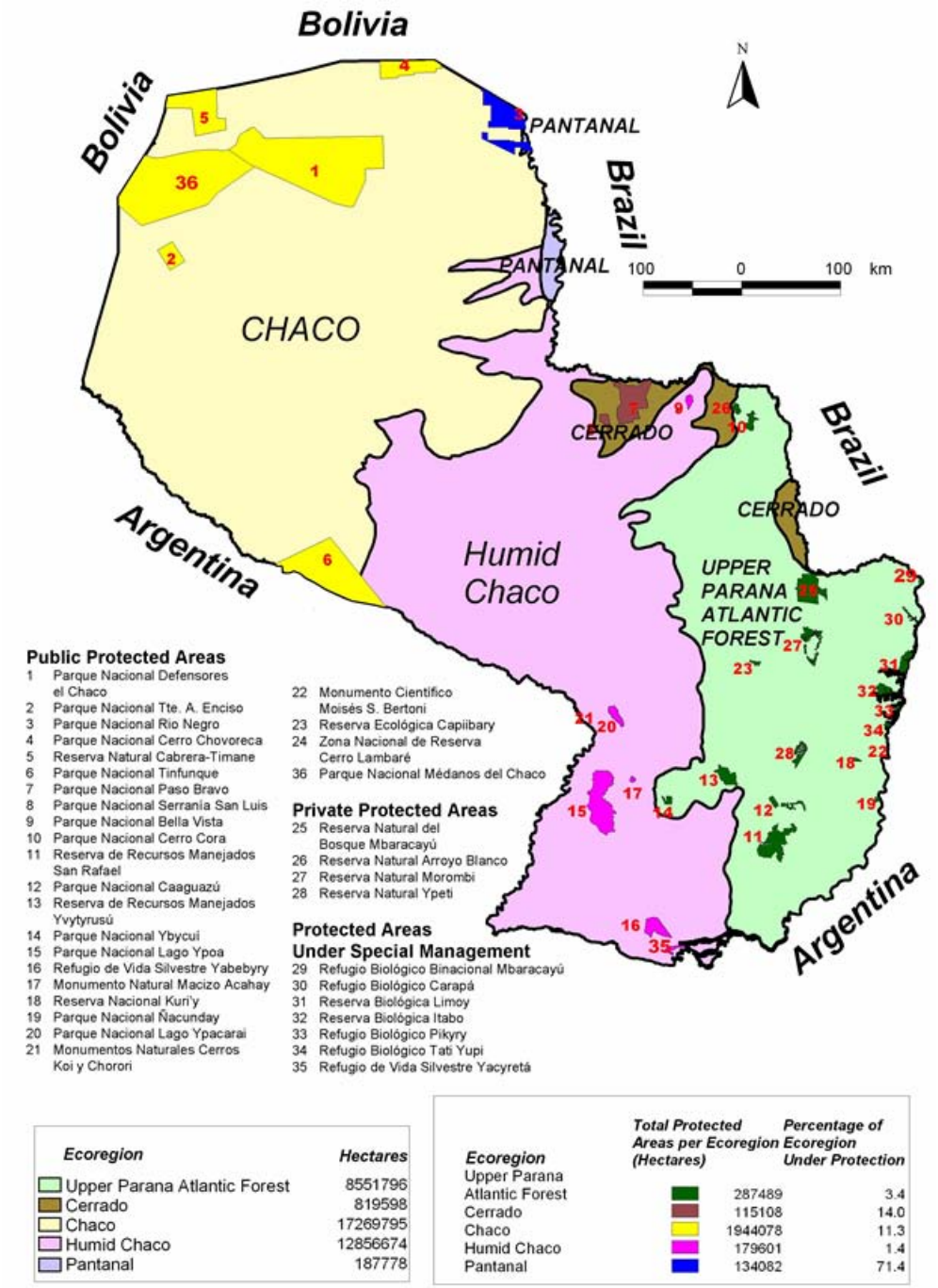
A recent study proposing a moratorium on land clearing for the expansion of the agricultural frontier in Eastern Paraguay provides a synopsis of the evolution of land clearing there (Facetti et al, 2003). In 1945, 55 percent or 8.79 million hectares of the total land area (15.982 million hectares) in the Eastern Region was still covered by forests. Twenty years later, 1.763 million hectares were cleared for agriculture, reducing forest cover to approximately 44 percent. During the seventies and as a result of major road projects which opened up more of the East, another 1.55 million hectares of forest were cleared for agriculture further reducing forest cover to 34 percent. The authors characterize the 1980s as the decade of the "green revolution" in Eastern Paraguay during which another 2.0 million hectares of forests were cleared for agriculture, leaving less than 25 percent forest cover (ibid).

[1] One of the recurrent difficulties for those interested in the natural resources sector in Paraguay is an erratic database with any number of contradictions that cannot be resolved by the reader dependent on secondary sources. Some of this data is being spread by other authors who use it, sometimes without citing the source, thus compounding the issue.

Table 2. Land Capability and Land-Use Studies in Paraguay

Land Capability for Eastern Paraguay - Universidad Nacional de Asunción, 1983.			**FAO World Soils Map, Paraguay Portion, 1994.**	**FAO Agro-Ecological Zoning Project, 1999. (Eastern Paraguay)**
Class	Hectares	%	Eastern Paraguay: - agricultural use - 47% - livestock use - 16% - forest production - 37% Western Paraguay: - agricultural use - 10% - livestock use - 71.2 % - forest production - 18.3	Actual Land Use: - land with annual and permanent agriculture – 2,247,553 ha. - land used for livestock purposes – 7,419,958 ha. - land used in different forest management systems, including production, conservation and protection – 1,676,812 ha.
I	1,875	0.01		
II	4,410,250	27.5		
III	1,884,730	11.78		
IV	3,735,275	23.36		
V	4,346,625	27.18		
VI	961,375	6.01		
VII	555,000	3.47		
VIII	93,045	0.69		
Total	15,988,275	100.		

Despite growing recognition of the phenomena of deforestation in the country and considerable efforts to reverse the process and contain the losses of forest and its attendant problem of soil erosion, Paraguay would enter the new century as the country with the highest rate of deforestation in Latin America. As the authors also point out, current studies offer a range of suppositions about the remaining total forest cover in Eastern Paraguay from 1.3 million to 2.9 million hectares (8-18 percent). These same authors also acknowledge, as do many others, that the forest cover of Eastern Paraguay has now been highly degraded and fragmented, undermining the potential for sound management of the forest resources of the region and threatening its unique biodiversity assets (ibid).



Ecoregion	Hectares
Upper Parana Atlantic Forest	8551796
Cerrado	819598
Chaco	17269795
Humid Chaco	12856674
Pantanal	187778

Ecoregion	Total Protected Areas per Ecoregion (Hectares)	Percentage of Ecoregion Under Protection
Upper Parana Atlantic Forest	287489	3.4
Cerrado	115108	14.0
Chaco	1944078	11.3
Humid Chaco	179601	1.4
Pantanal	134082	71.4

Map prepared by Guyra Paraguay

Map 1. Paraguay's Ecoregions and Protected Areas

C. Legislative and Institutional Framework Affecting Biological Resources

C1. Sector Policy and Legislation

The Paraguayan Constitution of 1992 sets the stage for the development over the next 10 years of a more modern framework of environmental laws. The constitution refers to the environment specifically in three articles (6, 7, and 8). These articles establish an "ecologically balanced" and healthy environment as a basic right. It also establishes the need to protect resources from degradation and pollution. The principle of restoration and compensation for environmental crimes is also firmly grounded in article 8.

Paraguay has not traditionally derived its legislation in the environment sector from established national policy documents. Following the creation of the Undersecretary for Environment and Natural Resources in the Ministry of Agriculture of Paraguay in 1989, two documents in 1992 can be considered the first policy documents to have been presented by the Paraguayan Government in this sector, one regarding natural resources conservation and the other regarding biodiversity. Their effects were limited but set the tone for the following years to make important advances in the promulgation of environmental laws, strategic plans, environmental protection programs and institutional strengthening in the sector.

Following the UN Conference on Environment and Development in Rio (1992), Paraguay embarked upon a broad, participatory, consensus building exercise in 1994, with support from the German Development Agency (GTZ). This exercise resulted in 1996 in Sector Guidelines for a National Policy in Environment and Natural Resources. It also generated a National Strategy for Protection of Natural Resources and Environment that included a proposal for the National Environmental Policy and a proposed law for a National Environmental System (SISNAM) composed of a National Environmental Council (CONAM, a consultative policy entity) and the Ministry of Environment (regulatory institution).

The policy was never formally adopted, possibly due to the overall government instability throughout the 1997-2003 period, however, the process set the stage for the creation of the SISNAM in 2000 including the Secretariat (rather than Ministry) of the Environment and a CONAM. Efforts over the last few years to establish policy in sectors such as forests and wetlands have produced mixed results or general documents that have not served as guidance for programmatic and legislative action and reform in the environment sector.

A major milestone was achieved in 2003 with the finalization and presentation of the National Biodiversity Strategy (ENPAB). This document provides the overall guidelines and priority areas for intervention in biodiversity. More recently, in the last week of October 2004, the CONAM approved the first National Environmental Policy document. The overall document was approved by the CONAM members but they now must go through it in detail for final approval of specific sections. This is a positive milestone to have reached after over 10 years of debate regarding a national policy document.

Two early laws, however, have had great impact on the pattern of natural resources destruction over the last 50 years. The Agrarian Statute of 1963 and the Forest Law of 1973 provided

perverse incentives for the destruction of millions of hectares of forest in Paraguay. The first established that “unproductive land” (i.e., forests) was subject to expropriation for agrarian reform. This provided the incentive to owners of large forests to clear land and put them under “productive use” once democracy allowed small farmers to claim and invade them seeking expropriation. This law has been reformed over the last years and the incentives for deforestation removed.

The Forest Law also opened the door to forest destruction by leaving open the possibility to transfer the legal forest reserves (25 percent of any forested property) to other people who could then deforest them by 75 percent. At present, instead of 25 percent forest cover in the Eastern Region of Paraguay, the levels are under 10 percent as a consequence of this loophole. Multiple proposals for reform of this law have been presented over the years and the Congress is presently studying several of them that primarily focus on reform of the Forestry Service.

Most of the more important laws in the sector including those that incorporate most of the international conventions have been promulgated in the 1990s. Table 3 provides details on the legislation and decrees that are relevant to the forest and biodiversity sector. In Paraguay, as is the case with many developing countries, the laws provide a broad basis for management and protection of natural resources, however, enforcement and effective government programs are the major hindrance to achieving this. Some important gaps persist given that Paraguay does not have legislation regarding water resources (presently being studied by Congress) or land use planning which many consider to be key in achieving balance in the utilization of soil and water resources and protection of ecosystems including forests and wetlands in Paraguay.

Table 3. Major Sector Related Laws and Legislation

	Number	Year
Forestry Law	422	1973
CITES	583	1973
Wildlife Law	96	1992
Environmental Impact Law	294	1993
Biodiversity Law (CBD)	253	1993
Protected Areas Law	352	1994
UNFCCC and Kyoto	251/1447	1994/1999
Defense of Natural Resources	515	1994
Protection of Aquatic Fauna	555	1994
Ramsar Convention on Wetlands	350	1994
Environmental Crimes Law	716	1995
Forestation and Reforestation Law	536	1995
Convention on Desertification	970	1996
Fisheries Law	799	1996
Migratory Species Convention	1314	1998
Creation of SISNAM	1561	2000

C2. Government of Paraguay Institutions

The current president, Dr. Nicanor Duarte Frutos, was inaugurated in August 2003. The program he presented has included protection of the environment as one of 14 programmatic themes for his term. Although the sector started out with much instability (including three changes of the Secretary of Environment), the last six months have shown a marked improvement in the profile of the main institution. The new focus has been on decentralization of environmental management and a focus on deforestation, particularly in the Eastern Region of Paraguay. The new minister has achieved reinstatement of Medanos del Chaco National Park (over 400,000 hectares of fragile Chaco dune ecosystem) and presented Congress with a deforestation moratorium law (now passed by both houses of Congress and is currently on the president's desk for approval or veto).

The budget of the Secretariat of Environment is smaller than that of several national NGOs, at around US$1 million per year but most of the funding is dedicated to salaries for over 200 public employees most of whom reside and work in Asunción. The Secretariat has authority over environmental impact statements, protected areas, biodiversity and wildlife management, among its many tasks.

The General Directorate of Biodiversity Conservation and Protection of SEAM makes do with a minimal staff and a budget of less than US$200,000 per year for management of the protected areas (over 2 million hectares) and wildlife management and research (Ferreiro et al., 2004). Four offices manage the different aspects related to biodiversity: the Conservation Data Center manages information and does ecosystem level analysis; the Directorate of Protected Areas manages the protected areas system; the Wildlife Directorate manages all wildlife trade and use issues as well as leads research for management; and the Museum of Natural History carries out taxonomic research regarding Paraguayan flora and fauna and houses the collections.

Parks of great importance for protection of biodiversity have little protection, such as Defensores del Chaco National Park (720,000 hectares) which currently has only three park guards. Wildlife management is in a critical state given the lack of officers (less than 10 technical staff for the country), vehicles and equipment. Based on this dire situation, the country notified the Convention on the International Trade of Endangered Species (CITES) of a self-declared moratorium in 2003 on wildlife exports until the situation can be stabilized and managed properly. The present leadership of SEAM is not in favor of reopening the export trade in the near future.

The National Forestry Service was not included among the environmental institutions incorporated into the Secretariat of the Environment in 2000 (see additional discussion below). This has created a complex situation for both the management and the conservation of forest resources. The Secretariat of Environment has affirmed its authority over Environmental Impact Statements and hence over land use while the Forestry Service continues to play a role in authorizing "management plans" and control of the movement of wood throughout the country. There is little or no coordination between the institutions based on a common policy for the sector. Little more than an increase in bureaucracy has been achieved with these somewhat equal and opposing forces within the GOP.

The National Forestry Service (SFN) was set up as a result of the Forestry Law (No. 422/73) with the mission to protect, conserve, expand, rehabilitate and ensure rational use of the natural and artificial forests of the country. Three major programs were incorporated into its institutional mandate: research and extension, promotion of reforestation, and promotion and fiscal responsibility for the management of the natural forests. To carry out this mandate, the SFN is divided into four departments: the Forest Management Department to survey forest resources, approve and monitor forest management plans, and allow extraction and transport of forest products. The Reforestation Department is expected to review and approve reforestation plans and monitor their implementation. The Department of Education, Extension and Research is supposed to train the middle cadre of the organization, carry out research on forestry related subjects, and provide extension services on forestry technology and know-how. And lastly, the Administrative Department is responsible for the day-to-day management of the service.

There are 10 decentralized offices of the SFN, found in the following departments: Amambay, Canindeyú, San Pedro, Concepción, Caaguazú, Alto Paraná, Itapúa, Caazapá, Central and Chaco (n.b., this is the only decentralized office of the SFN in the Chaco, currently located in Filadelfia). Total staffing of the SFN is approximately 250 individuals. A 2002 study (Gonzalez, 2002) of the SFN identified a series of institutional shortcomings including a low level of autonomy in decision-making, the lack of systematic planning and monitoring, and insufficient financial and human resources. These weaknesses along with an abiding reputation as a corrupt institution perhaps account for the fact that during the last 30 years of its existence, deforestation and degradation of the forest resources base has reached unprecedented levels.

C3.Non-Governmental Organizations

Paraguay now has a relatively strong and vibrant group of non-governmental organizations (NGOs) that have flourished over the years, thanks in large part to support from USAID but also from other public and private donors around the world. Having recognized the need to conserve globally important biodiversity and participation by civil society, U.S.-based international NGOs such as The Nature Conservancy, World Wildlife Fund, and more recently Conservation International, have partnered with Paraguayan conservation organizations over the years to protect the various ecoregions which characterize and contain the important biodiversity assets of Paraguay.

International NGOs

The Nature Conservancy (TNC) with support from the U.S. Government was catalytic in launching the conservation NGO sector in Paraguay. Its first initiatives were with the Conservation Data Center in the Ministry of Agriculture in the late 1980s, resulting in 1993 with the Master Plan for Protected Areas (SINASIP) that continues to be the guiding document for protected areas to date (CDC, 1990, DPNVS 1993). TNC continues to support conservation in the Chaco, Pantanal, and Atlantic Forest Ecoregions as well as regional programs that have transboundary approaches and effects. It has supported both public and private reserves with support from USAID/Paraguay and through the Latin American programs of USAID.

World Wildlife Fund (WWF) has established itself more recently in Paraguay focusing entirely on the UPAF ecoregion. It has worked with USAID funding on several initiatives, primarily on developing a biological "vision" for the Eastern Region of Paraguay but also including environmental education and a "social pact" seeking to generate a consensus to stop deforestation with participation of the GOP, private sector and NGOs.

Conservation International (CI) has a few programs in the UPAF ecoregion, concentrating mostly on the Brazilian coastal sector of the Atlantic Forest. However, some important initiatives have been supported through CI including important biological surveys of the Pantanal and Cerrado habitat (Chernoff, 2001). Recently, it has been instrumental in establishing a private reserve with Moisés Bertoni Foundation (FMB) in a key corridor between San Rafael Reserve and Caaguazú National Park.

National NGOs

The *Moisés Bertoni Foundation* (MBF) was founded in 1988 with seed money provided by USAID. This NGO helped establish, and continues to manage, the Mbaracayú Forest Nature Reserve. Presently Mbaracayú is the best protected reserve in Paraguay's Upper Paraná Atlantic Forest. Designated a Biosphere Reserve recognized by UNESCO in 2000, it is sustained financially by a trust fund managed by TNC that provides the needed resources for basic protection of the reserve.

The oldest organization among the conservation and sustainable development NGOs and presently one of the largest is *Alter Vida*. It has focused primarily on the Atlantic Forest Region in Central Paraguay mainly around the Ybytyruzú Managed Resources Reserve. It has traditionally been in the forefront of incorporating human development into conservation initiatives. It has also worked closely with municipalities in Paraguay.

Guyra Paraguay is a national partner of the worldwide *BirdLife network* (represented in the United States by the Audubon Society). Although it is focused on conservation of avian diversity, it was founded to support consolidation of the San Rafael Managed Resource Reserve. This organization has successfully obtained support from national and international donors to purchase a portion of San Rafael Reserve for conservation.

Sobrevivencia is a national NGO that has had most success in the oversight of impacts of multilateral development projects–in particular those funded by the World Bank and the Inter-American Development Bank. They were awarded the prestigious Goldman Environmental Award for their work with the population affected by the Yacyretá Dam in southern Paraguay. They are active on several worldwide networks that represent civil society in meetings of international environmental conventions.

The *Instituto de Derecho y Economía Ambiental* or IDEA was founded in 1997 as the first NGO dedicated to environmental law issues. Several years later it incorporated issues of environmental economics, trade and commerce into its portfolio. Among its many projects, it is presently supporting on-the-ground implementation of WWF's Biological Vision in the northern block of the UPAF with USAID funding. Most recently, its executive director, Sheila Abed, was elected

president of the Environmental Law Commission of the World Conservation Union (IUCN), the first time a Latin American has been elected to any commission of this body and the first woman to preside over one as well.

Many other small and local environmental organizations have been established and many are networked to the national and international level. Financial sustainability is an important issue for these local initiatives that ebb and flow primarily based on external resources given that little can be generated in poor communities in the interior of Paraguay.

There has been long-standing tension between the conservation NGOs and the government environmental managers ranging from open hostility to working independently of each other's initiatives. In particular, regarding the issue of private reserves and co-management, there has not been much advancement in the last 10 years since the promulgation of the Protected Areas Law. NGO initiatives to establish easements have met with limited success and the government has formally approved (by decree) less than a half-dozen private reserves over the last decade.

A problem within the NGO sector recently has been the lack of consensus and capacity to articulate and fund national campaigns in regard to environmental issues such as deforestation, pollution and pesticides. In recent years, an important group of environmental NGOs splintered off the *Environmental Organizations Network* (ROAM) and created *Alianza para el Desarrollo Sostenible* (ALIDES). Under the umbrella of international groups like WWF, they have been having some success in bringing attention to the plight of the Atlantic Forest.

Civil society participation continues to play an important role and it is expected that greater interaction with the public sector will allow more widespread replication of its successful models. Overcoming the hindrances, both legal and political, to public-private partnerships is a key for advancing in the sector.

C4. Role of the Private Sector

The private sector has been involved for many years in the tropical forests and biodiversity sector. The SINASIP incorporated the concept of private reserves in the 1992 law and included incentives for conservation. The implementation has been slow and interested landowners are sometimes overwhelmed by the governmental requirements and costs associated with non-governmental initiatives.

Paraguay is an important exporter of certified organic sugar. This success has stimulated interest from other sectors in exporting products from native biodiversity including medicinal herbs and teas. Tourism has also met with interest from the public and private sector over the last two years. Training and events in the Concepción and Alto Paraguay (Cerrado and Pantanal ecoregions) supported by USAID and the GEF Wildlands Project have stimulated awareness by local governments and creation of some local tour circuits and guide services. The Fundación Moisés Bertoni has associated with a large wholesale tour operator in Paraguay to offer nature tourism in the Mbaracayú Nature Reserve. These alliances with the private sector offer interesting potential and help overcome difficulties with NGOs operating for-profit businesses.

The link to biodiversity of private initiatives has been weak in general. The idea of incorporating the benefits to biodiversity of private sector commercial activities is still implicit rather than explicit in the marketing of these products. Most NGO-funded programs have done little to document the benefits to biodiversity of the production and harvesting of the products related to forests and natural ecosystems. One exception is the production of Yerba Mate tea (*Ilex paraguariensis*), marketed in the United States under the Guayaki brand name. This producer also carries out sustainable production of palm hearts on his property in the UPAF ecoregion. This forest under production for several decades, has been extensively studied for its biological value although the economic/commercial model used for production has not been well documented for potential replication and dissemination.

C5. Bilateral, International Organizations and Multilateral Financial Institutions

Historically, the donor community has played an important part in the management and protection of tropical forests and biodiversity in Paraguay. Some of the first initiatives in the national parks were supported by the Food and Agriculture Organization of the United Nations (FAO). While not specifically a donor agency, the U.S. Peace Corps helped established the Museum of Natural History of Paraguay with the support of many highly motivated and specialized volunteers in the 1980s. To this day, the Peace Corps has a large program with volunteers throughout Paraguay working in the areas of agroforestry and environmental education that continue the conservation work primarily in poor rural areas.

The donor community continues to play an important part in the support of environmental protection. The major donors in the sector of tropical forests and biodiversity throughout the years have been GTZ (German Technical Cooperation), Japanese International Cooperation Agency (JICA), UNDP (primarily through the Global Environment Facility), FAO, European Union and USAID. The French GEF and World Bank GEF window has provided important resources for the Fundación Moisés Bertoni to work in the Mbaracayú Biosphere Reserve. The primary donors in forestry have been FAO, GTZ and JICA while the leaders in biodiversity have been primarily USAID and UNDP.

The natural resources and environment sector is the third priority for donors overall, receiving the most funding from bilateral donors after poverty reduction and democratic strengthening programs in Paraguay according to the Technical Planning Secretariat of the Paraguayan Government. Over US$40 million is presently being invested by the donors in the Natural Resources and Environment sector of which about a quarter has been disbursed.

The international environmental conventions (generally through GEF funding mechanisms) also provide important support for issues such as the implementation of national action plans and strategies for compliance. Most recently, the National Biodiversity Strategy has provided an important guidance document for the sector.

The multilateral financial institutions are an important source of funding for environmental initiatives including biodiversity conservation. Presently, the IADB is supporting an institutional strengthening program for the SEAM. The program has had many problems in execution given the instability in the institution since its creation, however, after a reengineering process and new leadership in SEAM, it is hoped that the program will advance in the near future.

Investments in protected areas have primarily been made through mitigation programs linked to infrastructure development projects since the early 1990s. Several rural development projects and road projects have included land purchases for protected areas and park infrastructure as part of mitigation programs.

D. Status and Management of Protected Areas and Endangered Species

D1. An Overview of the Protected Area System

In 1948, Paraguay established its first reserve near the city of Asunción. The first "national park," however, was created in 1966 in the humid Chaco in order to protect wildlife (Parque Nacional Tinfunque). In the following two decades, six more parks were created by law or decree, generally under the tutelage of the Ministry of Agriculture (through its Forest Service created in 1973) and the Ministry of Defense. In 1987, the creation of the National Parks and Wildlife Directorate (DPNVS) stimulated the creation of more protected areas which continues (with a hiatus between 1992 and 1998) through the year 2004 when the latest decree establishing Medanos del Chaco National Park was promulgated. Paraguay presently has 15 areas with the denomination of national park (see Appendix 5).

The national protected areas system (SINASIP) began its development in 1988 shortly after the creation of the DPNVS. The identification of 23 priority potential areas was achieved by the Conservation Data Center with the support of The Nature Conservancy and a Peace Corps technical volunteer. Following this process, the DPNVS and Moisés Bertoni Foundation (FMB) with support from The Nature Conservancy and funding from USAID prepared the seminal document laying the groundwork for a protected areas system in Paraguay–the Strategic Plan of the National Protected Areas System (SINASIP), presented in 1993. This plan considered priorities from several different perspectives including ecological value, potential environmental services, institutional and administrative capacity, among others.

The final document proposes a system of 44 areas distributed in three subsystems (public, private and special areas) that required the creation of 16 new public protected areas. It also included components for technical/administrative reorganization of the DPNVS, fund raising for sustaining the system and NGO strengthening to support the system. Research, land acquisition, capacity building, research and increasing NGO participation in administration and buffer-zone management were included as well, providing for a comprehensive and modern focus to protected areas management over a decade ago.

Unfortunately, following a few years of increasing budgets (see Figure 1 below), investment in the protection and management of the system began to decrease to its present state. Little more than US$300,000 is currently invested to maintain the protected areas and biodiversity (the 2001-2004 data includes wildlife management), an estimated 1.8 million hectares of protected areas. The investment is less than 17 cents per hectare of park system. Protected areas such as Mbaracayú that are well consolidated in the eastern region require at least five dollars per hectare.

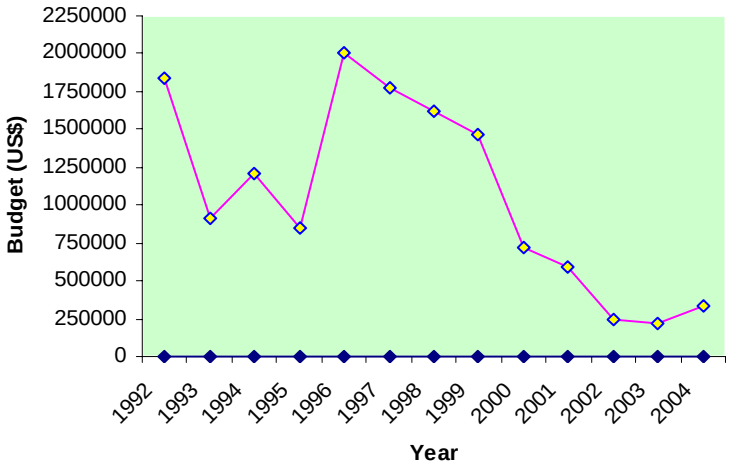


Figure 1 - Estimated Budgets for Protected Areas 1992-2004
(adapted from Ferreiro et al. 2004)

Mbaracayú Nature Reserve was created in 1991 by law and managed by FMB to protect over 60,000 hectares of UPAF held previously by the International Finance Corporation. It is the best consolidated and protected area in the system, having received several investments over the years from numerous donors including TNC, the GEF, French GEF and USAID, among others, for core area conservation and buffer-zone activities. Recently it was declared a Biosphere Reserve and initiatives are underway to create corridors and improve enforcement of related environmental laws. The situation is made difficult by the continuous encroachment of ranching and soybean farming in the reserve watershed. The FMB counts on a trust fund to cover recurrent basic costs of protection.

D2. Types of Protected Natural Areas

In addition to national parks, the country has many other types of protected areas allowed under the Protected Areas Law of 1993 which established the categories of areas considered to be part of the system. The system or SINASIP encompasses many categories of areas beyond the six categories established by the IUCN. It incorporates public, private, and special protected areas with the recent addition of Biosphere Reserves in Mbaracayú and the Chaco (proposed to UNESCO in 2004). The so-called special management areas are managed by the bi-national entities that operate the Itaipú and Yacyretá dams between Paraguay and the neighboring countries of Argentina and Brazil on the Paraná River.

Conservation easements were not originally contemplated within the SINASIP but have been promoted for several years with support from USAID. Few, however, have actually been established due to problems with taxes and difficulty in convincing landowners to sign contracts required under Paraguayan Law.

The private areas system started and supported initially by FMB grew substantially between 1993 and 1998. Studies carried out in 1992 and 1995 by FMB with Cambridge University of the UK (Lowen, 1995) identified many private properties as key areas for conservation in eastern Paraguay. USAID investment in the FMB private reserves program permitted growth and outreach, working with some 30 properties totaling well over 100,000 hectares of diverse ecosystems. However, through the decade of the 1990s, the DPNVS provided little support to the initiative and none of the reserves were recognized by decree until 2002. The progress in the past two years has been better with three reserves, decreed by the president, adding 44,000 hectares to

the reserve system. With Mbaracayú Nature Reserve included, the private reserve sub-system area totals over 108,000 hectares under private protection.

The two dams on the Paraná River, Itaipú and Yacyretá also add significantly to the SINASIP covering 46,000 hectares. Most of the reserves are small (less than 20,000 hectares), however, Itaipú's reserves are some of the few examples of the forest that was once found on the most productive soils of the area, now mostly lost to mechanized agriculture. The entities that manage the dams have important environmental departments, however, they have been poorly integrated with the national system over the past decade. There is significant potential to support conservation through payments by the dams for environmental services of watershed protection though it has not been officially proposed.

D3. Management Models and Constraints

The management models of the SINASIP are varied. The public sub-system is the most traditional in its focus, centering almost entirely on trying to manage the core areas. In some cases weak tenure and poorly defined boundaries make even this aspect difficult. Buffer-zone management (or even their delimitation) has been minimal with most parks lacking management plans. Those that have them, do not use them as operational tools.

Co-management agreements have generally not been achieved although several NGOs have cooperative agreements with SEAM to support protected areas or training efforts. There has been interest by the Desdel Chaco Foundation to co-manage Defensores del Chaco National Park which was supported for several years under the Parks-in-Peril (PiP) program funded by USAID and TNC. The SEAM has resisted these initiatives over the years but there may be more potential given the recent change in policy with a view toward decentralization.

Municipal management of certain small areas has not advanced well either. Efforts have stalled when the issue of sharing benefits from fees and services arises. Some progress has been made with Ybycuí National Park which is the most visited park in the system and has historic value as well as scenic and recreational value. This initiative may be the cornerstone for decentralization to municipalities of some areas should the problems be resolved regarding finances and management.

Participation has improved over the last few years with some support for this provided by the GEF Paraguayan Wildlands Initiative. This project is implemented through SEAM with UNDP support to consolidate four protected areas, San Rafael Managed Resources Reserve, Paso Bravo National Park, Medanos del Chaco National Park, and Río Negro National Park, in globally important ecosystems. The project has supported creation of management committees from its start as a basis for consolidation of the protected areas. The process has been difficult, given that SEAM has limited the scope and role of the management committees to little more than consultative groups rather than having a real role in implementation of the project and park management. The process, however, has empowered local participants to a point where they can place significant pressure on the government body. SEAM though, has little institutional capacity even if it were responsive to the requests. All four protected areas in the project now have management committees.

Many projects including the GEF Wildlands project and Parks-in-Peril have funded park guards, infrastructure, and other costs of management of the protected areas system. The experience has not been positive with regard to the DPNVS picking up the costs after the projects are finalized (although the GEF project is ongoing). Trained park guards have been lost and those funded by projects are generally treated as separate from the public paid guards. This issue is critical for long-term sustainability of the system. The core areas will continue to need oversight and the present situation with only 33 public guards for the system and 19 hired by projects for the new areas will not sustain the system adequately. There is approximately one park guard per 20,000 hectares in the public system. Appendix 5 provides more information on the parks system and information on individual parks.

D4. Future Directions and Long-Term Expectations for the Protected Area System

Threats to the public reserves are encroachments of mechanized farming and livestock ranching. These activities are profitable and well funded throughout the country. Weak tenure, lack of human resources and poorly trained staff at all levels of SEAM exacerbate the degree of these threats.

The SINASIP after 10 years without significant implementation is outdated and does not incorporate many new aspects of protected areas management such as community involvement, indigenous reserves, and biological corridors, among the most important concepts. Recently with support from the GEF, Nature Serve has developed a new priority setting for the Chaco that may be replicated for the Eastern Region to develop a new priority list of sites and mechanisms for conservation. The SINASIP requires updating in the near future to provide new directives, direction, vision that look at the viability of the areas in the system and set the priorities. It should also look closely at the need for financial sustainability through a diversity of mechanisms to permit the system to be viable. The country has many other experiences with models of management, participation, decentralization and financing that can feed lessons learned into the process.

On the positive side, the creation of more local management committees and an improvement in the relations between SEAM, local governments and NGOs sets the stage for some advancement in the near future. Initiatives such as a debt-swap through the Tropical Forests Conservation Act seem viable in the near future under these conditions and there is some consensus to focusing the funding on the UPAF. Paraguay has requested eligibility under TFCA to the U.S. Treasury and it expects a response in early 2005 in this regard. A long-term financing vehicle – the National Environmental Fund – is also expected to be designed by mid-2005 with the support of an Inter-American Development Bank loan for the strengthening of the SISNAM.

D5. Status and Protection of Endangered Species

Paraguay has been of interest for taxonomists since the time of the Jesuit missions, starting with Sánchez Labrador, followed by de Azara, describing the rich diversity of Paraguay given by the confluence of many ecosystems in this relatively small country. Few naturalists followed though, most likely due to Paraguay's isolation, wars, and political instability. In the first half of the 20th century, some work was done by naturalists including Moisés Bertoni (a Swiss citizen) and Podtiaguin (Russian). In the 1980s, with the establishment of the National Museum of Natural

History within the Ministry of Agriculture and Livestock (MAG), the situation improved with respect to biodiversity knowledge in Paraguay. The Peace Corps was an early supporter of the museum followed in later years by the Missouri Botanical Gardens, Geneva Botanical Gardens, and the Swedish Museum of Natural History.

The public sector efforts have been accompanied by much support from the conservation and development NGOs both nationally and internationally. Organizations like Guyra Paraguay have been leading players in collecting information, generating databases and establishing international networks for knowledge sharing. They are presently working with the Inter-American Biodiversity Network (IABIN) initiative in cooperation with OAS and the National Biological Inventory of the U.S. Geological Survey. Conservation International among the international NGOs has recently undertaken evaluations of the Pantanal ecoregion of Paraguay with a strong taxonomic focus.

Species Richness and Endangered Species

Plants have been the best studied and collected and are represented in Paraguay by an estimated 13,000 to 20,000 species. The largest taxon in numbers is considered to be the invertebrates at around 100,000 species. It is important to note that among both plants and invertebrates, many endemic species (restricted to Paraguay) have been recorded.

Paraguay has 125 species currently included in the 2003 Red List of Endangered Species catalogued by the IUCN. Of these, 100 are animals and 25 are plant species. The three species listed as critically endangered are birds. Thirteen species are considered endangered. The remainder is considered lower risk, near threatened or vulnerable. Some 17 species are listed as data deficient. Table 4 lists the relative numbers of species and numbers considered threatened or of concern by CITES and IUCN:

Table 4. Threatened and Endangered Species in Paraguay

	Number of Species	Nationally Threatened	CITES	IUCN Redlist
Plants	13,000-20,000	279	134	25
Invertebrates	100,000	50		3
Fish	230-250	0		2
Amphibians	63-76	0		
Reptiles	132-150	8	18	4
Birds	645-688	86	123	58
Mammals	163-175	38	32	33
Totals	---	461	307	125

Adapted from SEAM 2003, IUCN 2003 and CITES 2004

Threats

The primary threats to flora and fauna in Paraguay are deforestation and logging, hunting/fishing, wildlife trade, infrastructure projects, and pollution (particularly in smaller streams and rivers). Non-native or invasive species also can displace or out-compete native

species. The potential effects of climate change with respect to wild relatives of domestic crops and other species are little studied but are expected to impact biodiversity in future scenarios as well.

Hunting and fishing are popular activities of Paraguayans and visitors to the country. The Wildlife Law of 1992 allows hunting as regulated by the competent authorities (presently SEAM). The capacity to regulate sport hunting is minimal and highly centralized by SEAM. Sport hunting has generated some interest and success in attracting foreign tourists. It has primarily focused on the various pigeon species that congregate near the colonies of the Central Chaco. It has been reported to bring in important income to the area every year during the winter to the benefit of the local community, including members of indigenous groups that assist in the hunt.

Another project with funding from a U.S.-based organization called Conservation Force is studying jaguars in the larger properties of the northern Chaco. The long-term plan is to generate a conservation incentive for landowners through sustainable hunting of the species. The studies are carried out in coordination with SEAM, but given the present difficult situation with CITES and the state of wildlife management in general, it is uncertain what the potential is for this effort.

Increasing international monitoring, in particular from European Union countries, resulted in the review by CITES of the wildlife trade, management procedures and records in Paraguay. The visit performed in 2003 resulted in a self-declared moratorium by Paraguay in regard to CITES species and has been extended to all wildlife exports at present.

The largest amount of wildlife captured is for the trade in animal skins, live wild animals for export as well as cacti, orchids, and palms for ornamental and horticultural purposes. The sale of permits for wildlife has generated approximately US$80,000 per year reported for the 2000-2002 period. Fishing licenses and commercial fishing fees have generated between US$100,000 to US$190,000 for the same period.

None of the species of fish in Paraguay are listed as endangered. Excessive sport and commercial fishing (including large legal and illegal trade with Brazil) is known to locally deplete resources, particularly near cities and popular fishing areas. The two dams have also had important impacts on fisheries of the Paraná River given that many large commercially important species of the Paraná Basin migrate during the spawning season. Smaller and commercially less important fish species may be disappearing given the pollution in streams but there is little monitoring and research to establish whether this is a fact.

Three species of endemic snails from the now flooded Yacyretá Island are extinct in the wild, highlighting the impacts of infrastructure projects on biodiversity that are not easily mitigated. They are bred in captivity in Misiones, Argentina while the search for other wild populations continues.

Non-native species have been recorded in Paraguay with 253 species cited. The impacts of most of these introductions have not been studied with exception of the golden mussel (*Limnoperna*

fortunei). A native of Asia, it may have been introduced in ballast water of ships entering the river systems. It now has spread to the upper reaches of the Paraguay River into the Pantanal and has caused problems in the dams of the Paraná River. The mussels form colonies in pipes and intakes, clogging the systems and increasing maintenance costs.

E. Status and Management of Tropical Forest Resources

Nothing speaks more emphatically about the forestry sector in Paraguay than the often heard assertion that the country has one of the highest deforestation rates in Latin America.[2] Perhaps just as disconcerting is the fact that given the current state of forestry statistics in the country, it is hard for those trying to make policy decisions related to the sector to know whether the above assertion is true, what it really means and what to do about it. In short, while the deforestation rate is clearly something to be concerned about, the abiding lack of clear policy and institutional capacity within the sector is of even greater concern.

E1. An Assessment of Present Forest Cover

There are a number of studies and reports available which provide summary data on forest cover in Paraguay, most of which tend to emphasize the status of the forests in the Eastern side of the country. Table 5 on the next page summarizes some of the data related to deforestation trends. Over recent decades there has been much more concern and consideration of the forest cover in the Eastern Region of the country, reflecting the fact that these better watered areas produced the bulk of the nation's forest products, both for domestic consumption and export. Of course, this area also directly coincides with where the bulk of the population resides–according to recent statistics, as mentioned above, a 97/3 percent split between the Oriente and the Occidente (Chaco). Accordingly, there is more data on deforestation trends available for the east than for the west. Table 6 on page 25 provides a summary of forest cover by department, with some extrapolations relating forest cover to the actual area of each of the departments.

Little information could be found about the deforestation statistics in the Chaco. Gonzalez (2002) cited above uses the figure of 201,707 hectares deforested in the Occidente during the period 1986 to 2002 although it is not clear from where or how these figures were derived. This same report summarizes forest cover in the West or Chaco Region as having declined from approximately 18.4 million hectares in 1987 to 15.5 million hectares in 2002. About 8 percent or 1.2 million hectares is currently protected within the boundaries of the protected area system. The Defensores del Chaco National Park alone covers an area of 780,000 hectares and there are three other areas (Tinfunque N.P., Tte. Enciso N.P. and Chororeca Natural Monument) that cover the rest.

[2] According to the FAO Forestry Department publication, State of the World's Forests 2003, any number of other countries, both in South America and Latin America in general, easily surpass the estimated annual rate of deforestation reported for Paraguay – 123,000 hectares per year between 1990 and 2000 or a rate of change of 0.5 percent loss per annum.

Table 5. Forest Cover Change (Deforestation) in Paraguay

Deforestation Trends	Period	Authors	Institution
Cambio Cobertura Forestal Paraguay Oriental Existing Forest 1989: 3.1462 million ha Non-Forest 1989: 9.5211 million ha Deforestation: 1.3555 million ha	1989 to 2001	Aistatt et al.	Univ. Maryland, NASA, CI & Guyra Paraguay
Deforestation - Mapa de Uso de la Tierra 1991 y Avance de la Deforestación de 1984 a 1991 (Región Oriental) Area of Forest in 1984: 5,362,186 ha Area of Forest in 1991: 3,342,328 ha Area Deforested: 2,019,858 ha Average Annual Deforestation Rate: 288,000 ha	1984 to 1991	Anon.	Univ. Nac. Asunción, Carrera de Ingeniería Forestal
Tasas de Deforestación en los Últimos 40 Años en la Región Oriental de Paraguay 1968-1976: 210,000 ha/year-Servicio Forestal Nacional 1984-1991: 288,000 ha/year-Carrera de Ingeniería Forestal, UNA 1989-2001: 112,958 ha/year-Global Land Cover Facility, UMD 1990-2000: 123,000 ha/year-FAO	Various	Various	FAO-Situación Forestal en América Latina y el Caribe, 2002

Over and above the inconsistencies that these data sets present, which are not untypical in many countries, they also underscore a number of themes worth mentioning about the tropical forestry situation in Paraguay. Although the actual area of deforestation is an important indicator for those considering the development needs and opportunities in the sector, it is by far much more important to have a quantified measure of the deforestation rate or current trends, ideally, broken down to the degree that is possible. Furthermore, this trend must be expressed in terms of remaining natural forests (or perhaps total forest area if the area of plantations is of sufficient importance to a country, which so far is not the case in Paraguay).

Another important measure of deforestation is a comparison of conversion rate and extent with the estimates of land capability. Although total area of natural forest deforested is a measure of grave concern to those interested in biodiversity conservation, deforestation against a backdrop of fragile lands is also vitally important as an overall indicator of the environmental stability of the nation in question. If large areas of the country are being deforested that are not suitable for agriculture, the loss of biodiversity habitat is also accompanied by significant impacts on the other important environmental services these forests once provided – watershed protection, recharge of underground aquifers, soil stability and fertility, desertification, landscape amenity values, and sedimentation rates in the watercourses. See Map 2 on page 27.

Table 6. Natural Forest Cover by Department in Paraguay (in hectares and by percentage) Source: Gonzalez 2002 + extrapolations

DEPARTMENT	A. Total Area of the Dept.	B. Total Forest Area	C. % B/A	D. Productive Forest Area	E. % D/A	F. % D/B	G. Forest in Protected Areas	H. % G/A	I. % G/B	J. Non-Productive Forest Area	K. % J/A	L. % J/B
CONCEPCION	1,805,100	621,797	34.4	139,859	7.7	22.5	113,291	6.3	18.2	368,646	20.4	59.3
SAN PEDRO	2,000,200	536,348	26.8	115,061	5.8	21.5	----	0	0	421,286	21.1	78.5
CORDILLERA	494,800	34,549	7.0	6,369	1.3	18.4	----	0	0	281,80	6.0	81.6
GUAIRA	384,600	73,374	19.0	10,335	2.7	14.1	24,000	6.2	32.7	390,40	10.1	53.2
CAAGUAZU	1,147,400	296,208	25.8	35,786	3.1	12.1	----	0	0	260,422	22.7	87.9
ITAPUA	1,652,500	300,562	18.2	63,988	3.9	21.3	39,000	2.4	13.0	197,574	12.0	65.7
MISIONES	955,600	13,947	1.5	1,002	0.1	7.2	----	0	0	12,945	1.4	92.8
PARAGUARI	870,500	67,965	7.8	4,593	0.5	6.8	7,500	0.8	11.0	55,871	6.4	82.2
ALTO PARANÁ	1,489,500	326,231	21.9	27,764	1.9	8.5	35,954	2.4	11.0	262,513	17.6	80.1
CENTRAL	246,500	?	--	?	--	--	116,000	47.0	--	?	--	--
NEEMBUCU	1,214,700	45,356	3.7	1,480	1.2	3.3	----	0	0	43,877	3.6	96.7
AMAMBAY	1,293,300	398,743	30.8	188,801	14.6	47.3	13,811	1.1	3.5	196,131	15.2	49.2
CANINDEYU	1,466,700	542,474	37.0	154,161	10.5	28.4	63,355	4.3	11.7	324,958	22.2	59.9
EASTERN REGION	15,021,400	3,257,554	21.7	749,199	4.9	22.8	412,911	2.7	12.6	2,211,443	14.7	67.8
PTE. HAYES	7,290,700	3,142,606	43.1	1,978,417	27.1	62.9	280,000	3.8	8.9	884,190	12.1	28.1
BOQUERON	9,166,900	6,593,761	71.9	3,116,593	34.0	47.3	40,000	0.4	0.6	3,437,168	37.5	52.1
ALTO PARAGUAY	8,234,900	5,799,780	70.4	4,172,891	50.7	71.9	880,953	10.7	15.2	745,936	9.1	12.9
WESTERN REGION	24,692,500	15,536,147	62.9	9,267,901	37.5	59.6	1,200,953	4.9	7.7	5,067,294	20.5	32.6

Table E2 Notes - by Department and Region (explanation of the non-titled columns): **Column C** - Percent remaining forest cover. **Column E** - Percent total area still in productive forests. **Column F** - Percent total forest area still considered productive forest **Column H** - Percent total area in protected areas. **Column I** - Percent total forest area in protected areas. **Column K** - Percent total area considered non-productive forests. **Column L** - Percent total forest area considered non-productive.

Another recent study, carried out by the Mesa Forestal Nacional with the support of FAO and said to be based on 2002 satellite imagery provides a different set of similar data for forest cover in Paraguay (MFN 2003). This study provided the following data:

Table 7. Forest Cover Data prepared by the Mesa Forestal Nacional (2003)

Region	Total Area (ha)	Total Productive	Percent Coverage of
Oriente	15,982,700	765,456	5.0%
Occidente	23,838,493	15,536,147	65.0%
National Total	39,821,193	16,301,603	40.0%

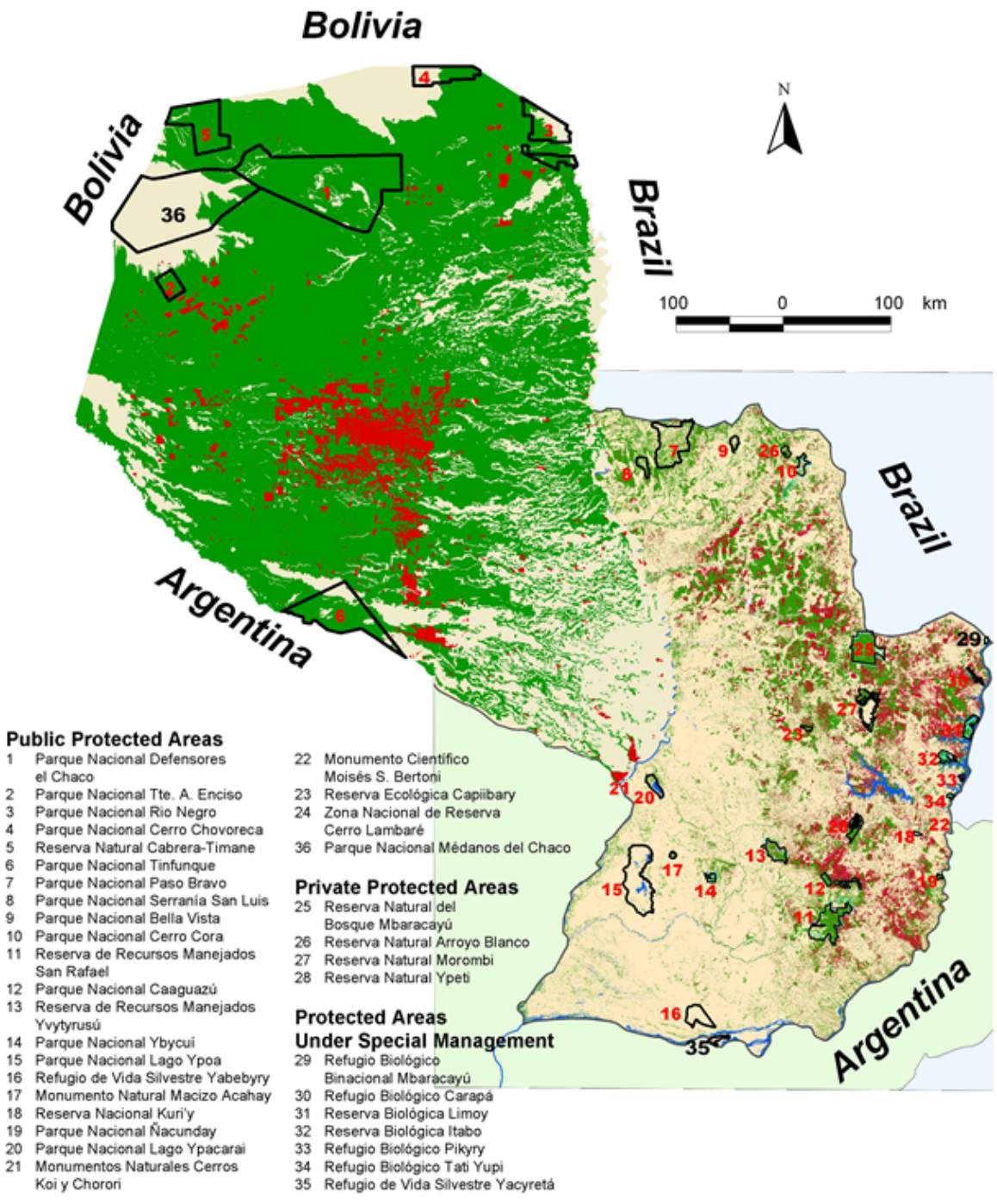
Although these figures are close enough to suggest some confidence in the data, there remain issues in terms of classification terminology and time frame which erode their importance as sector planning data. The data in Table 6, page 25, does provide some indications as to where in the country there are needs and opportunities for forestry sector attention and investment.

E2. Present Sector Policy and Institutional Framework

Concern for the forestry sector in Paraguay has been on the national agenda for some time. Indeed the present Forestry Law (Ley No. 422 de 1973) created the National Forestry Service, established fiscal incentives for reforestation, created the Forestry Fund and formulated the rules for forest exploitation (Vidal, 2004). It also included a requirement that all rural properties greater than 20 hectares must maintain at least 25 percent of their land under natural forest cover. Rural properties over 20 hectares that did not have 25 percent forest cover were expected by law to reforest at least 5 percent of their lands. In 1986, there was another resolution (No. 18831) whose intention was to reinforce the existing requirements, however, this period also coincided with the period of very high deforestation related to the advancement of the agricultural frontier.

Although forest plantations are a relatively common sight in Eastern Paraguay, a number of efforts to further stimulate reforestation have had only modest results. A 1995 law for promoting reforestation (Ley No. 536 de 1995) was enacted creating economic incentives and subsidies for forestry plantations. Despite a promising start, Government has been unable to find the financial resources to maintain this program. The early budget allocations for this program have waxed and waned from a high of 20 million Guaraníes in 1998 to 2 million in 2001. The current reforestation achievements have been estimated at approximately 40,000 hectares although it is not clear if this covers all reforestation or only that carried out under official programs.

The National Forest Service has not fared much better. Tarnished by a reputation as a corrupt institution and with little political and public support, its budgets have been at best minimal allowing only for paying salaries with little resources for operations or investments. When the National Environment Secretariat was established in 2000, and many of the mandates for natural resources conservation and management transferred to it, the Forest Service remained behind as



Map prepared by Guyra Paraguay

Map 2. Protected Areas, Forest Cover, and Deforestation

an Agency of the Ministry of Agriculture. In 2000, its budget was only 10 thousand million Guaraníes, orders of magnitude smaller than its sister agencies in the agriculture sector. There has also been a fairly constant turnover of leadership depriving the institution of the continuity of leadership that would be required to come to grips with the challenges and opportunities of the forestry sector.

Of even greater concern is the tacit policy that views forest lands as "undeveloped." As a result, Government programs aimed at settling farmers without land, under the aegis of the *Instituto de Bienestar Rural* (IBR), now called *Instituto de Desarrollo Rural y de la Tierra* (INDERT), were often carried out at the expense of forest lands regardless of their inherent suitability for agriculture or potential for forest production. Forested areas are also typically chosen as targets by landless peasants invading private properties who justify their actions because the lands are not being "used" by their owners.

Of more recent vintage and of great promise is the establishment of the *Mesa Forestal Nacional (MFN)*. Created in 1999, the MFN is a consultative body bringing together both public and private sector actors in a concerted effort to reform the forestry sector in Paraguay. With support from both FAO and GTZ, the *Mesa Forestal Nacional* has taken a proactive role, developing a national forestry agenda, a national forestry policy document, elaborating a Tropical Forestry Action Plan (PAFT), and most significantly a new draft forestry law which embodies proposals for the establishment of a National Forestry Institute and a Forestry Development Fund. Unfortunately, this draft law has as yet to be endorsed by the National Congress and the international support for the MFN has come to an end and the road ahead is unclear.

E3. Forestry Sector Programs and Activities

Beyond the reforestation plans and programs mentioned above, there are also a series of so-called forest management mechanisms in Paraguay. From a forestry management perspective, the National Forestry Service authorizes three different types of plans: Forest Management Plan, Forest Exploitation Plan and the Land-Use Plan. The first (*Plan de Manejo Forestal*) is a genuine forest management planning process based supposedly on an inventory and projection of sustainable use and silvicultural treatment to maintain a productive forest area. The Forest Exploitation Plan (*Plan de Aprovechamiento Forestal*) is a simple cutting plan authorizing logging within a private forest area based on a minimum diameter limit and a 15-year rotation cycle. The Land-Use Plan (*Plan de Uso de la Tierra*) is essentially an official sanction of the right of property owners to clear forest within their property down to the 25 percent limit.

Despite several attempts to obtain up-to-date information on the area currently authorized under each of the above categories, no clear information emerged. Gonzalez (2002) cites figures from the National Forest Service that suggest that in 2001 there were a total of 105 approved management plans covering an area of approximately 232,000 hectares although it is not clear if these are both forest management plans and forest exploitation plans.

Those knowledgeable about the forestry sector told the Assessment Team that there were only three known examples of Forest Management Plans in the country, and that one of them recently folded after being sold. It is thought that there are many Forest Exploitation Plans, usually obtained by a land owner by contracting the services of a registered forestry consultant service.

When such an authorization is obtained, the owner has the right to cut timber based on the needs of the industry he is supplying and on a system of minimum diameters and idealized rotation (15 years between subsequent cuts). This cutting permit system conveys with it the right to transport wood (as do the forest management plans) but that by default because of lack of resources to man roadside checkpoints, the National Forestry Service is unable to properly control wood flows. By implication, these transport permits may be used several times or worse.

Wood Industries

It is therefore not surprising that the total area of productive forests in the Eastern side of the country is generally supposed to have been reduced to about 5 percent of the total area of what was once a massive forest estate. This lamentable state of affairs has also had its impact on the state of the wood and timber industries in the country. Recent forest industry statistics suggest that commercial wood production is now about half of what it was two decades ago and many industries are languishing for lack of raw material.

The following Table 8 provides a snapshot of some of the data and information available about the breadth of the wood industries in Paraguay.

Table 8. Wood Industry Data and Information

Estimated total employment in the forestry sector-2004: 40,000 people, but including all those related to any activity within the forestry and timber sectors. **Primary Wood Industry Sector**: Sawmills and veneer plants as well as commercial charcoal production both for domestic use and in steel making. **Secondary Wood Industry Sector**: Wood flooring (parquet), plywood and furniture plants.	**Timber and derivatives exported in the first 8 months of 2004**: US$48 million. **Plantation-based wood products exported in 2003**: Approximately US$3 million. **Value of imported wood products**: Approximately US$3 million from January to June 2004, not including paper products.

Source: Federación Paraguaya de Madereros (FEPAMA)

Sector sources routinely cite a figure of 2.8 percent as the participation of the forest and timber industry in the Gross Domestic Product (PIB) although reliable figures are not currently available to substantiate this statement. Furthermore, timber exports are cited as being third in importance as an export commodity (after soybeans and cotton). There are some more recent additions to production capacity resulting from the impact of the *Ley de Maquilas* which allows wood industry to import raw materials (essentially plantation produced wood — pine from neighboring countries and process it as timber products — mouldings for re-export). This situation may prove ephemeral because it is dependent on low salary scales for Paraguayan woodworkers and disorganization among the wood industries in neighboring countries. There is some hope that the growing plantation forestry resource base could become a source of raw material for the transformation of the wood industries as the natural forests with prized species on which they were once dependent are no longer available, either because of forest degradation or the eventual imposition of national conservation imperatives.

Two products currently classified as forest products also offer some potential for continuing commercial development in the wood industry sector, although both of them are non-timber

forest products — yerba mate and palm hearts. Both are showing more options as late as some growers attempt to produce them "organically" in response to growing market demand for green products. Paraguay, it would appear, is well positioned to respond to both of these opportunities.

What is of greater concern is the growing realization that much of the timber industry in Paraguay has grown up dependent on unrestrained supplies of inexpensive raw materials. This situation has led to the creation of a relatively non-competitive industrial base in the sub-sector because cheap raw material stimulates little incentive for technological innovation or efficiency in conversion. As a result, knowledgeable sources suggest that the majority of the private sector timber industries are not very competitive and would find difficulties in competing in an increasingly globalized or even regionalized timber marketplace. Typically, their products would be non-competitive because of high production costs and low quality control for manufactured products. Overcoming this situation will also be difficult because typically, these industries have few specialized personnel, have not diversified their production chains, and have generally underdeveloped managerial and entrepreneurial capabilities.

F. Conservation Outside Protected Areas

F1. Managed Natural Systems

Watersheds and Wetlands

Paraguay is well endowed with freshwater resources with an estimated 63,000 cubic meters per inhabitant per year, one of the highest in South America. It has used this abundance to its economic benefit turning the country into a net exporter of electricity from hydro power to neighboring countries, Brazil and Argentina. The Paraná River is the primary source of energy generation given that it has the greatest volume and changes in height that permit damming of the river.

The Paraguay River basin covers more of the surface area of the country but is smaller in volume and offers less opportunity for hydroelectric power production. The Paraguay River basin is quite flat providing ideal conditions for the formation of extensive wetlands systems. It is estimated that between 30 and 40 percent of Paraguay harbors wetlands of different types. The environmental services provided by these wetlands, including the provision of freshwater, pollution control, buffering against floods, and maintaining fisheries, have not been recognized historically.

Conservation policy has tended to focus on forested ecosystems. Major threats to Paraguay's wetlands include the expansion of rice cultivation and livestock management. Rice cultivation has increased channeling of water changing the flow and flood patterns as well as converting the ecosystems to monoculture. Livestock grazing results in burning, increased organic loads, and habitat change.

Sedimentation of wetlands due to deforestation in higher areas of the watersheds is also considered a major problem. Although the widespread adoption of no-till farming has lowered erosion (in the Paraná basin especially), rural roads may be contributing important loads. Traditional smallholder agriculture still makes up a large part of the farming landscape and may

be contributing important sediment loads. Chemicals used in agriculture are also reported to be contributing to increased signs of eutrophication in the Ypacarai and Ypoa lakes, the latter a designated Ramsar site.

Some dramatic changes due to the impacts on wetlands have fostered greater attention in recent years. In the case of the Pilcomayo River in the Chaco, the sediment loads are so great that the river is retreating and wetland areas are disappearing or severely impacted including a Ramsar site, Tinfunque National Park, Paraguay's first national park. The situation is exacerbated by the diversion of large volumes of water by Argentina by means of a canal.

Some of the major paved roads of the country have important impacts on the wetland ecosystems of Paraguay. Roads in the department of Ñeembucú, Cordillera and the Transchaco highway create virtual dams to the passage and natural flow of water. Although designs have been improved over the last years, they still do not adequately take the dynamics of the wetlands into account. Oversight of design and construction continues to be weak and impacts should be more closely monitored, in particular those supported by the major development banks.

Other major projects such as the Paraguay-Paraná Waterway or Hidrovia also are considered threats to wetlands in a regional context. In particular, the Pantanal ecoregion, considered a "hotspot" for biodiversity, may have its flooding patterns altered by dredging and other work that could affect the wildlife.

Some progress has been made in regard to wetlands conservation although slowly. Projects like the Yacyretá Dam have been monitoring impacts to globally threatened species in wetland areas and are studying ways to mitigate impacts supported by the World Bank. In the Chaco, Fundación del Chaco with support from USAID, has successfully achieved designation of the Laguna Salada wetlands as a Ramsar site protecting important salt flats that harbor migratory species of global importance.

Efforts by local governments to stimulate tourism and cultural events linked to wetlands such as Pilar and Carapeguá have also increased. Paraguay has expanded Río Negro National Park and is presently consolidating the area of over 100,000 hectares with support from the GEF Wildlands Project.

The watersheds of Paraguay not only are important from a surface water context but also from a regional groundwater context. Under Paraguayan soils are several freshwater aquifers that serve millions of people as a source of potable water. Other aquifers in the Chaco are shared with Bolivia and are being looked at possible targets for regional cooperation.

The Guaraní Aquifer covers a large part of Eastern Paraguay (coinciding largely with the area originally covered by the UPAF). It extends into Brazil, Argentina, and as far away as Uruguay. Presently the aquifer is the subject of research and policy-making by the governments of these countries with the help of the GEF. There may be potential to establish incentives for environmental services provided from the protection of recharge areas of this aquifer. Paraguay is thought to be an important area for recharge in the areas with sandstone geologic formations.

Deforestation has been recognized as a potential threat to recharge as has contamination from expansion of chemical-intensive mechanized agriculture.

Grasslands

As occurs in many countries and with the wetlands, Paraguay's grasslands have been underestimated from a standpoint of productivity and biodiversity. The natural grasslands of southern Paraguay have only recently been recognized as belonging or sharing characteristics of the Mesopotamia Grasslands of Argentina. The grasslands of the northern part of Eastern Paraguay are also recognized now as important reservoirs of biodiversity of the Cerrado — some harboring unique endangered species such as the White-winged Nightjar (*Caprimulgus candicans*).

Burning is one of the principal threats to grasslands. Although for many of these grasslands fire may be part of the natural regime, the frequency and extent of burning has increased beyond natural occurrences. The impact of human activity and the effects of natural climactic patterns are poorly understood, if at all, to be able to propose any kind of management. As a human health issue, the public recognizes the problem annually during the dry season or periods of drought but has no effective means to combat fires or stop intentional burning. Monitoring of fires in National Parks has improved thanks to a technology using MODIS satellite imagery and provided locally to conservation organizations and public institutions with the support of Conservation International, University of Maryland and Guyra Paraguay.

Natural grasslands are also targets for reforestation projects, generally for *Eucaliptus spp*. throughout Paraguay. The three critically endangered species of birds found in Paraguay are from grassland habitats. The expansion of plantation forestry will add to the list of threats faced by this habitat if not focused adequately. Efforts are underway by WWF to target abandoned agricultural areas for these plantations and expansion of other agricultural activities.

F2. *Ex-situ* Conservation

Paraguay is a natural seed bank for many plants of importance to human needs. The country harbors wild relatives of papaya, cassava, pineapple, guava, peanut, custard apple, potatoes, rice, prunes, and chili peppers. It has been the focus of efforts by the USDA to document and collect species for seed banks in the United States and Paraguay. The existence of these species has been taken into account in the process of priority setting for conservation in the Chaco. The deforestation and urbanization process may be taking its toll on these species.

It is an important first step that these plants have been highlighted in the National Strategy and Action Plan for Biodiversity Conservation (ENPAB). The proposed programs of action include support for ex-situ conservation and for promoting research and agricultural technology related to these species.

F3. Impacts of Infrastructure and Development Projects

Several projects of large scale throughout Paraguay and the region have been considered potential threats to conservation of biodiversity and maintenance of tropical forests. The projects

are frequently not adequately dealt with in terms of direct and indirect impacts. In particular many development projects are executed in a context devoid of adequate institutions for governance, capacity building and oversight, among other needs. See Map 3 on the following page.

Some of the projects that cause most concern and are in the process of design or execution are highlighted below:

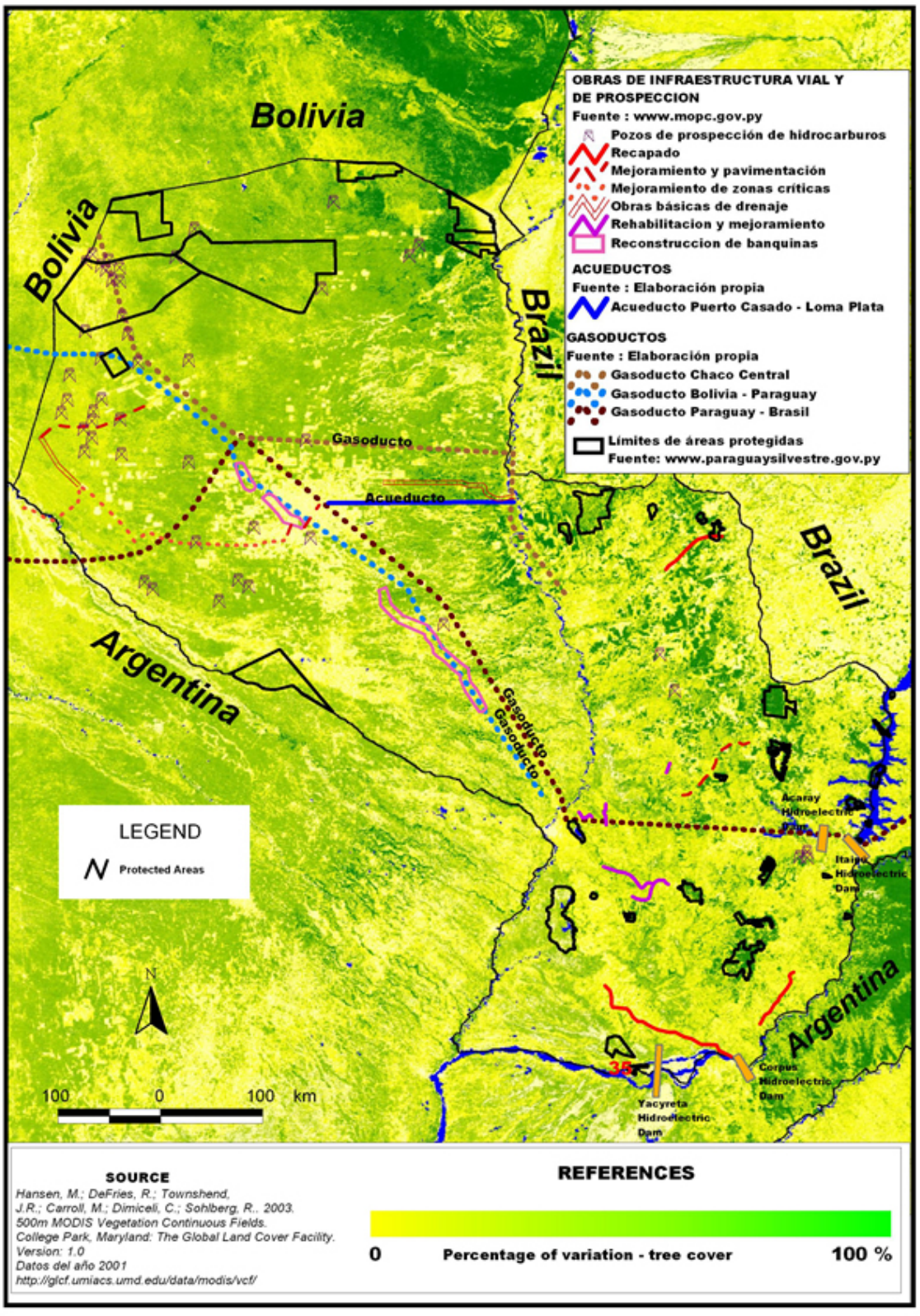
Paraguay-Paraná Waterway. The waterway which is to permit navigation along 3,400 km of waterway from the region of Brazil's Pantanal (Caceres) to Nueva Palmira in Uruguay. This would allow movement of goods such as soybeans and iron ore at a lower cost. The concerns range from effects that dredging would have on the dynamics of the river and wetlands of international importance along the Paraguay River to indirect effects of promoting expansion of soybean cultivation in the upper reaches of the Alto Paraguay Basin generating sedimentation and plowing under regions of important biodiversity.

The project has had a "stop and go" history. There are NGO networks dedicated to monitoring the processes in the various countries that are involved and interested in the waterway. Reports indicate that some work has been done to dredge the stretches in Argentina but the waterway has not proceeded in its original conception, which was to straighten meanders and dredge a canal to 10 feet, among other important physical alterations to the rivers.

Western Corridors. The Western Corridors project is a road improvement project carried out by the Ministry of Public Works of the Government of Paraguay and financed by the Inter-American Development Bank and the Andean Development Bank. The road would allow transit from east to west across the Paraguayan Chaco permitting access to Pacific ports.

Specific concerns are deforestation, soil erosion, displacement and impacts to indigenous communities and pressure on protected areas among others. The deforestation has been increasing over the last few years in the areas of influence of the project particularly for the establishment of ranches. Reports in the media over the last year indicate that members of the Ayoreo indigenous communities which have only recently come in contact with the wider world, are at risk from the road given their close proximity and insecure land tenure. Direct observations of the road show signs of real impacts that are not adequately mitigated, including hunting around construction camps, increased deforestation and fires. It also seems that projects originally included to strengthen protected areas have not been included in the final project mitigation package.

Other projects. The list of other projects with potential impacts that should be monitored over the next few years according to the ENPAB include: the aqueduct project in the Chaco, petroleum exploration in that region (that caused the rescinding of a decree that created Medanos del Chaco National Park in 2003 which fortunately was reverted back to park in mid-2004), and the establishment of a new dam along the Paraná River called Corpus. In addition, the Rural Roads Project funded by the IADB and soon ready for implementation also should contain mitigation packages considering biodiversity and tropical forests.



Map prepared by Guyra Paraguay

Map 3. Important Infrastructure Projects and Protected Areas

The tendency in the last few years has been to seek other sources of funding for infrastructure projects that may have much social and environmental conditionality added to them if done through the multilateral financial institutions such as World Bank and IADB. Such is the case of Ruta X in northeastern Paraguay finally built with Brazilian Development Bank funding, which also may be funding a new bridge from Brazil into the Chaco shortly and the Corridors road co-funded by the *Corporación Andina de Fomento* (CAF).

G. Findings (Needs and Opportunities) and Recommendations

As the introduction to this report discusses, this Section 118/119 Assessment as part of the development of USAID/Paraguay's new Strategic Plan (FY 2006-2011), was undertaken with three specific objectives in mind, namely:

- To ensure that activities and investments foreseen are not likely to lead to adverse environmental impacts on tropical forestry or biodiversity
- To identify opportunities for synergistic support for tropical forestry and biodiversity conservation within the new overall portfolio
- To consider other needs and opportunities for USAID assistance in these areas that might be considered by the Mission as it goes forward with its program planning

In effect, this Assessment is expected to assist USAID/Paraguay to further justify its role and support for tropical forestry and biodiversity conservation.

G1. Overall Findings

The Assessment Team's findings support USAID's strategic approach. The Assessment Team can also report that its understanding of the planned activities for the next strategic program period suggests that:

- There will be little likelihood of adverse environmental impacts on tropical forests and biodiversity.

Furthermore, the Assessment Team shares USAID/Paraguay's conviction that:

For the near to medium term, its overall vision statement and strategic approach — "reforming the system from within and from the bottom-up" — is both relevant and appropriate. The Assessment Team believes that this approach will lead to effective programming and achievable results related to the conservation of tropical forests and biodiversity, given the present situation in Paraguay.

The synergistic focus on democratic reforms by fostering alliances and building constituencies can and must provide the driving force behind a rising groundswell of citizens and better informed local leaders demanding greater attention and more policy enforcement from central government. These efforts are fundamental to sustaining the promising site-based interventions and activities in many sectors but especially in the environment sector.

Furthermore, USAID's programs across the globe have consistently highlighted the fundamental importance of the governance dimension for effective natural resources management. The wise use and just sharing of natural resources often constitute a first echelon of collective decision-making and as such, a prima facie example of governance issues facing decentralized local governments (municipalities and departments in the case of Paraguay). Creating and/or strengthening local interest groups – stakeholders and private sector entrepreneurs – at the local level can also be vitally important for defending protected areas or countering unwise and unsustainable land-use decisions based on corruption and clientalism. Private sector enterprises marketing sustainably produced products are by definition making a contribution to conservation.

G2. Specific Needs and Opportunities and Recommended Actions to Address Them

The remaining sections of this report present a series of overall findings about the needs and opportunities identified by the Assessment Team and make recommendations (of both a near and medium-term type) for consideration of USAID/Paraguay as it moves forward with program planning for the next strategic plan.

Intransigent Sector Externalities. The lack of an adequate policy framework and/or political will to impose it, failure to enforce the existing norms and laws, and the legacy of corruption and patronage, combine to make quick progress in conservation at the national level unlikely, particularly as concerns the forestry sector. There is, however, a markedly improved setting for dialogue and governance within the environmental community, principally between SEAM, the NGO community and local governments. This comes though at a time of great pressure on natural ecosystems from both expansion of soybean and mechanized farming in the Eastern Region and growth in expansive livestock interests in the Western (Chaco) Region of the country. While the needs remain great, USAID/Paraguay must choose carefully in the near to medium term to ensure achievement of real results and the sustainability of its investments and their outcomes.

- *Bottom-Up; the alternative to the failed top-down efforts.* Resolving the larger issues will eventually be achieved by stimulating the development of a larger and better informed conservation constituency (stakeholders brokering their competing interests, better informed leaders, civil society and a concerned citizenry) which can advocate for policy change. The steps to building and strengthening this constituency include:

    - Building from the bottom up, using case materials of successful ongoing activities to illustrate what can be achieved (making the conservation message more positive) for example, by quantifying the potential benefits from ecotourism to landowners of private reserves
    - Developing a better understanding of the values associated with both conservation and degradation of the natural resource base
    - Ensuring that the conservation paradigm, particularly among USAID partners more fully embraces and supports both development and poverty reduction
    - Continuing to work with municipal and departmental governments to stimulate a groundswell of localized capability that can demand and “draw-down” support from

central government (and its partners) for wise stewardship of the environment — the reverse of the top-down approach. As an example, one could cite the concerns of the municipal governments and local residents of the lakeside community just outside of Asunción about the impacts of watershed degradation and burning in the hills of the Yvytyrusú Managed Natural Reserve and their impact on sedimentation flowing into the lake.

- *Vision is not enough; the country needs evidence of the possible*. The Assessment Team has observed that despite the fact that there is a well-reasoned body of literature related to the forest and biodiversity conservation and development in Paraguay, the sector generally lacks the macro-economic or even micro-economic analysis that will be required to make wise sector choices. With so much to do and only modest resources available (from government, the donor community or the private sector), it will be incumbent on decision makers to prioritize program components and address them logically and sequentially. These choices will be difficult to make without adequate understanding and capacity for land use, sustainable development and conservation economics. The Assessment Team notes that sound economic management of natural resources is one of the predominant capabilities of the United States, and within USAID programs, in the environment sector.

- *Pulling together what is known*. In the near term, USAID/Paraguay should consider funding a study that, similar to the recently contracted soybean sector study, looks more broadly and from a macro-economic perspective at the values involved in land-use options. There are too few studies of this nature that an interested or enlightened policy maker could use to guide a reform agenda and convince others. Start with a local group to do an annotated bibliography of sector related references and bring in an experienced natural resources sector economist to work with them on the analysis of what is known. Similarly, USAID/Paraguay may wish to consider a report similar to the Retrospective Study of the impacts of the environment program carried out by USAID/Bolivia as an additional step in this direction.

Unrealized Biodiversity Conservation Goals. Although Paraguay is far from reaching its own stated goals in terms of biodiversity conservation and the development of the protected area system, it is much better off than many other countries in the region because of the extent of relatively undegraded forest areas in the Chaco.

- *Higher Priority and Profile for the Chaco*. Avoiding the mistakes of the Oriente in the Chaco is an opportunity of national, regional and global importance. The country needs to avoid accelerated and irrational land-use choices in the Chaco. Unfortunately, there are some near- to medium-term reasons to be concerned, especially given the fact that the effects of degradation will be more lasting and difficult and expensive to counter. The area is ecologically more fragile than the Oriente. Desertification is too abstract a term; what does it really mean to Paraguay and its future development perspectives and the people and communities of the Chaco? Heaven help the nation if the advancement of the agricultural frontier cannot be contained and rationalized in the Chaco.

- Going back to the externalities mentioned above, *USAID should also continue to support more reservation of land in protected areas*, especially by encouraging Government/ SEAM/CONAM to embrace and support private sector efforts. In addition, there is a need to establish a list of reservation priorities among candidate remnant natural areas; total area under protection or the number of such areas is not enough.

- Many of the so-called *Natural Protected Areas are under significant threat*. What to do? These threats must be understood. The conservation sector needs a prioritized approach to reservation and subsequent conservation investments, particularly in light of very limited Government capabilities. At the same time, there is a need to avoid raising expectations or proposing unattainable goals. USAID/Paraguay should encourage the Government to take an affirmative policy stance by drawing a line in the sand about avoiding conversion of protected areas as a good start to consolidating the SINASIP.

- *Public-Private Management of Protected Areas*. The most promising biodiversity conservation option available to Paraguay in the near term would appear to be official sanction of public-private management arrangements for protected areas, something that has proven highly effective across the region and the globe. This can best be achieved by working to develop more information on the proposed models of public-private conservation efforts and why they make sense. Government will be more likely to support arrangements...and/or a limited number of clearly articulated arrangements...if it can understand the implications for its own roles and responsibilities and those with whom it will be partnering.

- *Training/Awareness Raising for GOP authorities*. One actionable option for USAID/Paraguay in the near to medium term would be to arrange for a study tour by government leaders and officials to another country where such “co-management” options have been successfully implemented. Both Bolivia and Mexico should be considered; the latter is especially important because most of its protected areas are biosphere reserves owned by local communities and private individuals wherein it has been necessary to find management options and patterns that blend production and conservation imperatives.

- *Managed Natural Resources Reserves*. The San Rafael example is extremely promising but has been and remains a challenge for all concerned because of the constant pressures on the many landowners involved. The best way to more effective "managed natural resources reserves" would be by better defining the conservation rules, trade-offs and benefits both among the landowners themselves and with the partners who will work with them to implement them. At present, conservation partners spend an inordinate amount of time and effort striving to maintain the conservation imperatives which bind the landowners to the reserve and its precepts. Brokering these complex organizational agreements among so many different landowners has very high transaction costs which absorb the time, resources and energy of the partners which might otherwise be used for enhancing actual management of the reserve. All concerned also believe that more formalized governmental recognition and support for these managed natural reserves would provide guarantees that would also alleviate pressures on landowners who wish to cooperate.

Beyond the Bilateral Program. USAID as an agency of the U.S. Government can and is increasingly playing a wider role related to options for conservation beyond the bilateral programs in a number of countries. The Assessment Team recommends that USAID raise the issues of non-conversion of protected areas and support for the public-private partnership approach to protected area management as important issues for policy dialogue with Government related to the TFCA.

- *TFCA–An Upcoming Opportunity*. Are there opportunities for a conservation related sector reform agenda as conditionality for a TFCA agreement? A debt for nature swap of US$12 million would be one of the largest commitments by the donor community to the conservation agenda in Paraguay to date. Will the TFCA negotiation provide a platform for policy dialogue? Should it? The Assessment Team would suggest that the Mission raise the issues of non-conversion of protected areas by INDERT and the public-private partnership approach to protected area management as important issues for policy dialogue with Government related to the TFCA.

- *Large-scale infrastructure projects* financed primarily by the IADB can exacerbate the problems of meeting national conservation and development imperatives. There is a pressing need to ensure that these programs are avoiding, mitigating or compensating for adverse environmental impacts related to conservation of natural ecosystems, regional development plans, wildlife protection and indigenous communities. The Assessment Team believes that the USAID Mission look into and invoke the principles associated with the **Pelosi Amendment** to ensure that the environmental management, mitigation and monitoring measures foreseen for large-scale multilateral bank investment programs are being addressed, for example, in the case of the Western Corridors Road (the Bi-Oceanic Corridor) Projects and the Rural Roads Project. This is a near-term option and one on which the Mission can seek the advice and assistance of USAID/Washington.

- *Global Climate Change Options*. Paraguay has already successfully negotiated at least two carbon sequestration agreements favoring biodiversity conservation, for example, for the *Reserva de Mbaracuyá,* Paraguay's first globally recognized biosphere reserve. Doubtless, there are additional areas that could be targeted for such arrangements. These financial mechanisms can provide for an endowment to fund protected area conservation programs and make best sense in sites where in the near to medium term it will be difficult to generate tangible benefits for local people or communities but whose long-term conservation is of global significance, such as the remote Medanos National Park in the Chaco. This is another area wherein the Mission could seek near-term assistance and support from USAID/Washington.

- *Watershed Management Opportunities*. No country that sells as much hydro power or derives so much of its national budget from this unique source as does Paraguay can afford to be unconcerned about watershed stability and siltation and sedimentation in its river systems. The Assessment Team recommends that over the medium term USAID/Paraguay explore the opportunities for regional cooperation with neighboring USAID Missions in Brazil and Bolivia to focus on this important issue.

- *Roads and Erosion; an unrecognized challenge*. At the more local level, although there seems to be some recognition of the issues related to new roads, this should be widened to take account of the very significant impact that *caminos vecinales* and *caminos distritales* are having on erosion. Very few of these roads deal adequately with run-off and water management and as a result contribute heavily to localized erosion that winds up in the nation's watercourses. This lack of good drainage management also causes much higher maintenance costs for the agencies and municipalities that must maintain these roads. This could be an appropriate near- to medium-term area for cross-sectoral focus with the Democracy and Governance SO Team and its cooperators.

Forestry strategy in Paraguay: *quo vadis*? Faced with significant deforestation across the Eastern half of the country, those concerned with the forestry sector propose two major program areas – reservation and conservation of remaining block of intact forest and the need for large-scale reforestation. Are there other opportunities and needs both in capacity building and technological interventions? For example, sustainable management of natural forest areas in the East and in the Chaco — how can these be addressed? Among the options to be considered:

- *Forestry Sector Reform Agenda is essentially stalled*. Are there opportunities, similar to what was raised above, for a forestry sector reform agenda as conditionality for a TFCA agreement? The Assessment Team believes that the potential TFCA agreement is a near-term opportunity to get the Government's attention focused on the forestry sector needs and opportunities, particularly the stalled reform agenda put forth by the *Mesa Forestal Nacional*. The Mission could likely press this agenda by providing modest support for and working with the *Mesa Forestal Nacional* as a mechanism for addressing forestry sector reform.

- *The real costs of deforestation*. This lack of good economic data is nowhere more important than in understanding the impact of deforestation… the real costs of deforestation. Although the loss of the Eastern forest areas is greatly lamented by all concerned, whether wood industries or NGOs, there has been no real assessment of the values of what is being lost or decapitalized as a result of deforestation. Large-scale conversion of forests to soybean farming or extensive livestock raising may bring economic development benefits but these systems also need to internalize the costs of what has been lost, lest they become burdens for future generations of the Nation. As a sequel to its ongoing study on the expansion of soybean cultivation, USAID/Paraguay may wish to commission a study of the economic effects of deforestation to complement the findings about the development of agribusiness in the country. The Assessment Team believes that this is a core issue that begs for real quantification if the policy and program opportunities for the future are to be adequately addressed.

- *Where are the forest resources of Paraguay?* One cannot help but notice that in the main the forestry related literature and much of the programs related to forestry target the Eastern half of the country. This is in sharp contrast to the reality that much of the Chaco is still forested, albeit with savannah forest formations. These forest areas of the West in the Chaco offer significant productive potential that needs to be carefully developed so as to

avoid further unwarranted deforestation and the likelihood of desertification that would accompany it. Similarly, the environmental services of the forests of the Chaco cannot be understated; they will be key elements to the long-term environmental stability of the eventual land-use mosaic and agricultural productivity (whether for crop or livestock based systems) of this semi-arid area. Is there or should there be a landscape oriented sustainable development strategy for the Chaco and the institutional capability to implement it? The Assessment Team believes that should a TFCA agreement be reached with the Government of Paraguay, that an important share of the resources it generates should be devoted to forest conservation in the Chaco.

- *Is reforestation really a solution?* Directly related to the lack of a clear strategy for the forestry sector in Paraguay, this issue focuses on whether in reality reforestation can or should be the solution to the deforestation problem. To slow or halt deforestation, there must be a clear recognition of why it is taking place (its causes) and these must be dealt with. Otherwise, there is a strong likelihood that the pace of deforestation will continue and reforestation programs will be unable to keep up (as is the case globally). Furthermore, over-emphasis on reforestation may delay the political conviction that will be needed to deal with the causes. Policy makers hearing about reforestation as "the" key forestry sector strategy (see the recommendations of the *Mesa Forestal Nacional*) will mistake it as an eventual solution to the forestry problems of the country and be less inclined to take on the real issues of the causes and costs associated with deforestation. As part of the study on the real costs of deforestation mentioned above, the Assessment Team would recommend some initial calculations on both the feasibility and costs of wholesale reforestation as a policy-oriented reality check.

- *Building a body of understanding and a constituency for wise stewardship of the forest resources*. Faced with the challenges and opportunities of the forestry sector in Paraguay, and the limited resources available to finance its development, the best choice in the near to medium term would be to build upon the small success stories and nurture them so as to gradually enhance an understanding of the values and opportunities they present. The Assessment Team believes that both the Government and its donor partners (including USAID) would be wise to continue to support small-scale activities aimed at the sustainable use of forest resources as the country grows out of the more intransigent policy, governance and capacity issues which hinder its development. Such case histories could become the substance of the considerations of groups like the Mesa Forestal Nacional and lead to the development of both understanding and support among the larger constituency that will be needed to prompt real policy change.

- *Community forestry or agroforestry?* The Assessment Team has not seen much reference to the scope for community or agroforestry as part of forestry sector development strategy in Paraguay. This may be an oversight but in the opinion of many, community forestry has been the most significant paradigm shift in the forestry sector globally. These approaches fit well with what have been USAID's comparative advantages in many countries around the world – the promotion of community-based natural resources management. At a minimum, USAID should encourage the inclusion of community forestry or agroforestry

type interventions as part of the work undertaken by the conservation community, both governmental and NGO-based, in the buffer zones around the protected areas.

- *Wood industries in Paraguay; paying for conservation in the marketplace*. Wood production and conversion industries based on the natural forests were once an important component of the PIB and the export trade. Is there any scope for rejuvenating them? Is declining supply against continuing demand driving up values (prices) and can these realities be an advantage for Paraguay? There would appear to be opportunities for both technological innovation and strengthened entrepreneurial capabilities in the wood industry sector which would provide advantages in the regional and global marketplace. The wood and timber industry is facing a much different situation than that under which it evolved in Paraguay...low opportunity costs for raw materials, an undemanding and undifferentiated marketplace resulting in little need for efficiency. The challenge of today is to be competitive in an increasingly globalized marketplace wherein it may be more of a question of managing costs, raising the quality of the products and services, and enhancing business management skills. These are the same conditions implicit in the approach of the Paraguay Vende project and there would appear to be several near-term opportunities related to wood industries that this project might take up, especially because it is being implemented by the same contractor (Chemonics) that was responsible for similar successful efforts under the Bolivia Sustainable Forestry (BOLFOR) project and its spin-off, the Amazon Center for Forestry Development (CADEFOR) in neighboring Bolivia. Sustainably managed natural forests are a prima facie case of conservation being paid for in the marketplace.

USAID's successes: building NGO capacity should continue. Five years of work with the local NGO conservation community and the lessons learned in the process may be more valuable than their physical achievements. USAID/Paraguay should continue to support the local NGO conservation community by helping them to identify these lessons learned with the idea of consolidating/expanding the gains made on institutional development for the future.

- Agreements to work with these local NGOs should *include an institutional strengthening grant component* that starts with a SWOT analysis and provides targeted assistance to enhance their internal capacities thus ensuring effective and efficient capabilities.

- Also ensure that those NGOs working in the buffer zones around the protected natural areas are *incorporating natural resources management technologies* that work toward more sustainable farming systems, including soil and water conservation, community forestry and agroforestry, as mentioned above.

- The Assessment Team recommends that USAID *encourage its local NGO partners to re-vitalize the existing network approach* so as to enable them to speak with one voice on sector policy issues and perhaps combine efforts for support services such as training, production of publications, computer and Internet services. The effort could be modeled after the very successful LIDEMA (*Liga de Defensa del Medio Ambiente*) experience in Bolivia in which USAID there played a catalytic role.

- The Assessment Team *endorses the present Mission engagements with the U.S.-based Conservation PVOs*; the overhead issue is a myth. However, it is indeed important to tighten up monitoring so as to be sure to discern cause and effect instead of just multifaceted programs which, while successful, are difficult to replicate.

- Many of the NGOs feature environmental education and ecotourism opportunities are parts of their programs. The Assessment Team believes *that outdoor recreation opportunities* wherein local people, particularly the middle class derive important amenity benefits from the ability to escape from their increasingly urbanized lifestyles can also be a vehicle for environmental education on a very tangible scale. The Team would also recommend that in the near term, Mission partners engaged with municipal governments also consider promoting outdoor recreation opportunities are real municipal services for the same reason and because they can enhance local economies.

APPENDIX 1

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APPENDIX 2

Terms of Reference of the Assessment

I. Background

As part of the documentation for the new five-year Strategic Plan, USAID/Paraguay is required by Sections 118 and 119 of the Foreign Assistance Act to complete an analysis of tropical forests and biological diversity in Paraguay. The concept paper for the new strategy has been submitted and is pending approval. This country analysis will mainly be one of compilation and review of existing information, coupled with analysis, synthesis, corroboration and feedback from major players.

Summary of relevant parts of FAA Sec 118 and 119:

> From Sec 118 Tropical Forests:
> (e) COUNTRY ANALYSIS REQUIREMENTS.—Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of—
>
> > (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and
> > (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.
>
> From Sec 119 Endangered Species:
> (d)85 COUNTRY ANALYSIS REQUIREMENTS.—Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of—
>
> > (1) the actions necessary in that country to conserve biological diversity, and
> > (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

II. Terms of Reference

The work will include an overall review of the current status of tropical forests and biological diversity in Paraguay. It is understood that the general level of effort assigned to the activities below will be approximately one third on tropical forestry and approximately two thirds biological diversity. The project team (Team Leader, TL, and Local Environmental Specialist, LES) will coordinate with USAID/Paraguay staff members. The work will be completed in two phases with a workshop with stakeholders to be carried out between Phase I and Phase II. The workshop is meant to seek feedback and comments from stakeholders on activities and stated objectives under the proposed strategy.

Activities required to complete this work will include:

Phase I.

1. Compile information related to, and describe the tropical forests and biological diversity of Paraguay, including their current status and trends (with a particular focus on USAID/Paraguay mission utility based on the approved concept paper).

2. Describe the factors affecting the management of these natural resources, including the principal issues and opportunities to sustainable management of tropical forests and biological diversity in Paraguay. This will include discussion of the threats to land conversion in the Chaco as well as in eastern Paraguay.

3. Review the current institutional infrastructure for the management of tropical forests and biodiversity, including a description of major organizations, both public and private, which have a role in this process. Interview key personnel of key institutions.

4. Review the legislative basis, both national and local, for the protection of biological resources, including tropical forests (and the Paraguayan Forestry Law), in Paraguay (including the ratification of international treaties and agreements such as CITES, the Convention on Biodiversity, Convention on Wetlands, and the Convention on Desertification, and the effectiveness of national implementation). Discuss the GOP's compliance with these treaties and agreements.

5. Review private/commercial sector aspects of the forestry and wood industry, including non-timber forest products, and including an analysis of national and international markets.

Phase I reports. At the end of Phase I the team will provide a 15 page report which discusses at least the first three items listed above. The information from this report will feed directly into the final report due at the end of Phase II, especially as it relates to Sections B, C, D and E (see below). The team will also prepare a 2-3 page summary and a draft agenda for the priority issues which should be discussed at the environmental stakeholders workshop.

Note: USAID/Paraguay will provide a vehicle, fuel, and driver for travel outside of Asunción during Phase I, and will organize and support the environmental stakeholders workshop between Phase I and Phase II.

Phase II.

1. Identify the priority actions (which are cost effective and implementable) necessary to achieve sustainable management of tropical forests and the conservation of biological diversity in Paraguay.

2. Identify the extent to which the actions proposed for support by USAID/Paraguay meet the needs thus identified, and recommend any further actions not described or outlined in the concept paper.

3. Analyze the effects of USAID/Paraguay's entire proposed strategy (FY 2006 – FY 2011) on Paraguay's tropical forests and biodiversity. In particular, the proposed strategic objectives of Economic Growth, Environment, and Democracy should be carefully reviewed.

Phase II report. The team will submit a draft and then a final country analysis report following the process described under Section VI, "Reporting and Deliverables" below. The outline and content of the report are described in Sections III and IV, below.

III. Outline of Paraguay Country Analysis of Tropical Forests and Biological Diversity

— Title page
— Table of contents
— List of appendices
— List of tables and figures
— Executive summary (no longer than 3 pages)

A. Introduction

B. Legislative and Institutional Structure Affecting Biological Resources

(1) Government of Paraguay
(2) Nongovernmental organizations
(3) Private sector
(4) Bilateral, international organizations, and other donors

C. Status and Management of Protected Areas and Endangered Species

D. Status and Management of Forest Resources

E. Conservation Outside of Protected Areas

(1) Managed natural systems
(2) Impacts of development projects
(3) Ex-situ conservation (e.g., zoos, seed banks)
(4) Land-use conversion threatening biodiversity and options for redressing problems

F. Major Issues in Tropical Forests and their Sustainable Management

G. Major Issues in Biological Diversity Conservation

H. Recommendations and Proposed Actions, including Review of Actions Proposed for Support by USAID/Paraguay

I. Appendices

(1) Biodata sketch of team members
(2) List of persons contacted
(3) Other appendices as appropriate

IV. Details for specific sections of the above outline

A. Introduction

This section of the assessment will provide an overview of the information available and used in the assessment. It should identify significant gaps, if any, in information on the status and management of tropical forest and biological diversity resources in Paraguay.

B. Legislative and Institutional Structure

The assessment should include a review of the current legislative and institutional infrastructure for the management of biological diversity and tropical forests. This review should include a description of major organizations, both public and private, which have a role in this process.

(1) Government of Paraguay

The background assessment should include a review of the legislative basis, both national and local, for the protection and management of biological resources, including tropical forests, in Paraguay. This should include a review of international treaties and agreements, which have been ratified by Paraguay (CITES, the Convention on Biodiversity, the Convention on Desertification, Ramsar Convention on wetlands, etc.), including a review of National Actions Plans, and the effectiveness of national implementation. Briefly describe the Forestry Law, but an analysis of this Law on the forestry sector should be included in Section F. A description should be provided of the Government of Paraguay (GOP) institutions responsible for tropical forest and biological diversity issues, and management of all natural resources, within Paraguay. It should assess the interest and commitment of the government to the conservation of biological diversity and tropical forests.

Sections B (1) and B (2) and B (3) should also include the identification and assessment of GOP, NGO, and private sector institutional and education and training programs to preserve and augment tropical forests and biological diversity, especially where endangered species are apparent.

(2) Nongovernmental organizations

This section should include a description of major organizations (public, private, indigenous and international) which have a role in conserving biological diversity and tropical forests and the levels of funding they contribute toward this issue.

(3) Private Sector

As the conceptual basis for sustainable forest management (and biodiversity-based tourism) includes tapping exports and markets, identify mayor players, and review private sector interests involved in tropical forestry and biological diversity. Also identify commercial and export issues, and information awareness needs of the private sector.

(4) Bilateral, other donors and international organizations

This section should include a description of other donors and international organizations, both indigenous and external, which have a role in conserving biological diversity (including tropical forests) and the levels of funding they receive or contribute toward this issue. Their relationship with the government, membership, principal programs, and overall effectiveness should be identified.

C. Status and Management of Protected Areas and Endangered Species

This is a descriptive section that should include a brief inventory of declared and proposed national parks, wildlife refuges, forest reserves, sanctuaries, hunting preserves and other protected areas. The government agency, indigenous organization, or NGO managing each protected area should be identified, including all partners in cases of co-management. It should include a general assessment of the overall effectiveness of these areas in protecting plant and animal resources, and of their importance to Paraguay's economy (e.g., for providing tourist opportunities or for protecting important watersheds). An overall analysis of the management effectiveness in these areas should be included.

This section should also include a summary of threatened and endangered species found in Paraguay (along with references or appendix for more detailed information) and their status. It should identify their critical habitats and evaluate the major threats and opportunities to protection of their habitats. It should provide a general review of efforts that have been made for protection of these species and their habitats and assess their effectiveness.

D. Status and Management of Forest Resources

This section should include a brief description of the different types of forests in Paraguay. An assessment should be made of these forests economic importance to Paraguay, including values for wood, non-timber forest products, tourism, ecosystem services, etc. Existing management structures should be described, including those of the private forest industry and of rural communities. In the context of this section, briefly describe USAID-supported (and other major donor) actions to date

E. Conservation Outside of Protected Areas

This section should include a description of conservation activities in Paraguay which are being undertaken outside designated protected areas. This should include, but not be limited to review of:

(1) Managed natural ecosystems

This section should include a general description of the major Paraguayan ecosystems and an overall analysis of their present conservation status. The text should review the status of managed natural ecosystems including but not limited to:

— Forest resources
— Rangeland resources
— Wetlands
— Agricultural systems

The text should include a general discussion of the economic, ecological and social importance of these ecosystems to Paraguay, it should address their role in the regulation of erosion, management of water flow, and the maintenance of productive soils. This section should specifically address the relationship of these ecosystems to USAID/Paraguay proposed strategy.

(2) Impacts of development projects

The text should include a review of the impacts of internationally and locally funded major development projects on tropical forest and biological diversity resources. The text should review the regulatory framework concerning the implementation of development projects as they affect biological diversity, with emphasis on tropical forests, and any direct or indirect impacts on USAID/Paraguay proposed strategy. The text should specify the environmental review and permitting requirements of the GOP as they concern major projects. This is not a review of USAID environmental procedures (Reg. 216), but should set the stage in terms of overall impacts of major development projects, such as the Western Corridor Road System, Bridge Carmelo Peralta and Route to Loma Plata, Hidrovia and Paraguayan environmental regulations.

(3) *Ex-situ* conservation

This subsection should provide a brief description of ex-situ species conservation efforts being undertaken and/or planned in Paraguay. It should review any programs of natural history museums, herbariums, botanical gardens, zoos, captive breeding programs, and gene banks, including a summary of any existing conservation actions and data bases. This section should provide a summary of the activities being undertaken in Paraguay for the conservation of economically important species and germplasm. It should review the status of gene banks for crop and livestock species, native seed selection, and activities being undertaken to support the sustained production of commercially important wild plant and animal species (e.g., for forestry production, agriculture, hunting, fishing or commercial trade), and in-situ conservation of land races and wild relatives of important crops.

F. Major Issues in Tropical Forests and their Sustainable Management

This section of the assessment should provide a summary of the major issues requiring attention in order to improve the conservation and sustainable management of forest resources. Special attention should be given to the problems of assuring adequate protection of tropical forests. This section should include the principal threats and opportunities to sustainable management of tropical forests in Paraguay. It should cover the following issues:

- Assess the forestry legal framework in Paraguay and their management, including an analysis of its affects on important forestry species.
- The study should explore environmental education and communication strategies as applied to the forestry sector.

- Identify the relationship between land ownership patterns and effectiveness of sustainable forest management.
- Include an analysis of the principal threats to tropical forests and impediments to their management, such as illegal logging, Fire monitoring and control, conflict over natural resources and other issues as identified.
- Commercial potential for forest products, including a summary of existing marketing studies, as well as identification of potential for non-timber industries.
- Complete an analysis of forest management systems (refer to Section D), and identify which aspects of these systems seem to be working and successful, and which are not.
- Identify present and future requirements for the development of local institutions and training, both government and nongovernmental.
- Identify and prioritize major issues needing the most immediate attention.

G. Major Issues in Biological Diversity Conservation

This section of the assessment should provide a summary of the major issues requiring attention in order to improve the conservation of biological diversity in Paraguay. It should include the principal threats and opportunities to conservation of biodiversity. For example, the study should explore issues such as environmental education and communications strategies, illicit crops in protected areas, illegal logging and hunting in protected areas, uncontrolled tourism, regulatory environment, GOP institutional capacity, land tenure, etc. The present and future requirements for the development of local institutions and training, both government and nongovernmental, should be addressed. Issues concerning the management of protected areas should be reviewed. This section should prioritize issues needing most immediate attention.

H. Recommendations for Proposed Actions

This section should provide a review of proposed actions to address issues concerning tropical forests and biological diversity which may be implemented, with support from USAID, GOP, international development organizations, and local and international NGOs. Recommendations should be identified with regard to their relative priority and length of implementation period. If possible, discussions of proposed actions should include brief descriptions of their objectives and anticipated benefits.

Moreover, this section will identify the extent to which the actions proposed for support by USAID/Paraguay meet the needs thus identified, and recommend any further actions not described or outlined in the concept papers.

Analyze the overall effects (including potential negative impacts) of USAID/Paraguay's entire proposed strategy (FY 2006 – FY 2011) on Paraguay's tropical forests and biodiversity. In particular, the proposed strategic objectives of Economic Growth, Environment, and Democracy should be carefully reviewed.

I. Appendices

The assessment should include, but not be limited to the following appendices:

(1) Biodata sketch of team members
(2) List of persons and institutions contacted
(3) Maps as necessary

Other appendices may be added as appropriate to the objective of the biological diversity/tropical forest assessment.

V. Duration and Timing of Consultancy

This consultancy is for a total of 54 working days in Paraguay, 57 days total LOE overall, with travel to the interior as appropriate (probably for a week during Phase I). This includes 15 working days for the LES to carry out Phase I; 3 working days for the LES to assist and participate immediately before, during and after the one-day workshop with environmental stakeholders; and 15 working days for the LES to continue with information collection and processing, and refining the final report during and immediately following Phase II. Thus, a total of 33 days for the LES.

The balance of 54 in-country days includes 21 days of travel to Paraguay and work in Paraguay for the TL. In addition, the TL is allotted three days of LOE for travel home and to complete work on the final report after returning home. Hence, a total of 24 days for the TL, and 57 for the team overall, including international and in-country travel.

See the illustrative schedule and level of effort in Section VII below for more detail.

Phase I is will begin on/around October 4th and Phase II will begin on/around October 26th.

VI. Reporting and Deliverables

- For Phase I, the team will submit a 15 page report which covers at least the first three items in the list of activities under Phase I of the Terms of Reference, and as much of the next two items and the three items listed under Phase II as possible. Information in this report will feed directly into Section B, C, D and E, and possibly others, of the final report. The team will also use this information to prepare a 2-3 page summary in Spanish of major findings and issues for the stakeholders workshop as well as an agenda of priority issues for discussion at the workshop.

- For Phase II the team will work with the USAID/Paraguay Mission Environmental Officer (MEO) to finalize an activity schedule for Phase II by COB of the first day after the stakeholders workshop. The team will produce a complete draft report for review and comments by the Environment Strategic Objective Team 2-3 days later, and conduct a debriefing for the Environment Strategic Objective Team and other USAID representatives the following day. At this meeting the mission will make comments on the draft submitted. Comments will be incorporated and the consultant will produce a final draft report by COB 2-3 working days later. The TL will submit the final report to the MEO within two weeks after departure from country. The full report excluding the executive summary and appendices should have a length of approximately 20 pages. The TL will provide USAID/Paraguay five print copies of the final report in English.

VII. Illustrative Schedule and Level of Effort

Phasing	Activity	Schedule	LOE (days)	
			LES	TL
Prior to Phase I	USAID/Paraguay assembles relevant reports, etc.	Prior to week 1		
	Early LES/TL communications regarding data collection needs and detailed work planning	Prior to Week 1		
Phase I	LES collects and analyzes ecological and institutional information	Week 1	5	
	Team Leader arrives	Week 2	5	6
	Team collects info; holds consultations with mission; begins analyzing info and roughing out first report; makes preparations for field work			
	Team works in field	Week 3	5	6
	Team prepares Phase I report, 3-page summary for stakeholders workshop, and an agenda of discussion issues for the workshop			
Between phases	USAID conducts the stakeholders workshop, with technical support and participation of the team	Week 4	5	6
Phase II	Team consults with mission to prepare detailed work plan for 'Phase II and to follow up from the stakeholders workshop			
	Team conducts more information collection as needed; addresses needs for sustainable management of tropical forests and biodiversity; begins evaluating and developing recommendations regarding USAID/Paraguay's proposed strategy and associated project portfolio			
	Team submits first draft			
	Team incorporates mission comments; continues assembling information, consulting mission personnel, improving the draft, and refining recommendations	Week 5	5	3
	Team submits second draft			
Following Phase II	TL travels home	Following week 5	8	3
	Team continues to incorporate mission comments, assemble information, conduct analysis, and refine draft			
	Team submits final draft within 10 working days after Phase II			
TOTAL ELAPSED TIME		Approximately 6 weeks		
TOTAL LOE			33	24

Level of Effort:

1. International Biodiversity Specialist/Team Leader. This person will have the prime responsibility of formulating analysis and recommendations of the final report.
   - 21 work days in Paraguay (6 day work week permitted)
   - 3 days at home base

2. Local Environmental Specialist
   - 33 work days in Paraguay

VIII. Qualifications of the Consultants

This assignment requires one senior international (LAC) specialist in biodiversity management who will also be the team leader. The consultant should have knowledge of Spanish. However, the consultants also should have finely developed English language writing skills in order to complete a quality report in the time allowed.

1.Biodiversity Specialist – Team Leader

i. Knowledge of USAID environmental programs and procedures in Latin America, ability to lead the country analysis team.

ii. Demonstrated experience strategic planning and team management.

iii. Significant experience (7 years) with biodiversity and natural resource management in Latin America, also ecological and risk studies.

iv. A strong professional background (Ph.D. or Masters with five additional years of experience) in biodiversity and at least five years of experience in environmental management, research, or training in developing countries (preferably Latin America and the Caribbean),

v. Ability to communicate effectively in Spanish and English.

2. Local Environmental Specialist

i. Knowledge of USAID environmental programs and procedures, preferably in Latin America,

ii. Significant experience (8 years) with conservation of biological diversity or protected area management in Latin America (preferably including Paraguay),

iii. A strong professional background (Ph.D. or Masters with five additional years of experience) in conservation of biological diversity, protected area management, biology or related disciplines and at least five years of related experience in countries of Latin America, preferably in Paraguay.

APPENDIX 3

Brief Biographical Sketch of Assessment Team Members

Thomas M. Catterson holds a M. Sc. in international forestry from SUNY College of environmental science and forestry. He has more than 30 years of experience in international forestry and natural resources management for developing countries. Beginning as a Peace Corps volunteer in the late 1960s (Chile 1967), he has worked for FAO (community forestry officer at FAO HQ in Rome), USAID (senior forestry advisor for the Africa Bureau) and a development consulting company. Since 1991, he has been working as an independent international consultant in community management of forests and natural resources, forestry sector policy and institutional development and environmental review issues. His work has taken him to more than 74 countries in Latin America, Africa, Asia, and the Middle East where his clients have included a wide range of the major bilateral and multilateral development agencies, the private consulting sector and the international NGO/PVO community. His mother tongue is English but he also speaks fluent Spanish and good French.

Francis V. Fragano is a U.S. citizen but long-time resident of Paraguay, having spent much of elementary and high school there. He holds a B.S. in biology from Boston College and a M. Sc. from Rutgers University in environmental science. With more than 15 years of experience in the environment and natural resources sector, he initiated his career as a consultant in the United States but has worked in Paraguay, El Salvador and Argentina as well. After serving several years with USAID/Paraguay, he has consulted on short- and long-term assignments for the World Bank, Inter-american Development Bank and UNDP. He is an avid birdwatcher and served several years as founding board member and executive director of the Paraguayan partner of BirdLife International. He specializes in biodiversity conservation, protected areas and water resources programs. He is bilingual in English and Spanish but also manages some Guaraní, Portuguese, Italian, and French.

APPENDIX 4

List of Persons Consulted

Wayne Nilsesteuen	Director, USAID
Sergio Guzman	Deputy Director, USAID
Uwe Kurth	Mission Environmental Officer, USAID
Victor Vidal	Forestry Consultant, Tel. 603-360, e-mail: vcvidal@hotmail.com
Cesar Balbuena	Forestry Consultant, Tel. 258-151, e-mail: cesarbalbueno@cmm.com.py
Manuel Rodas	Executive Director, Paraguayan Wood Industry Association Tel. 441-182, e-mail: mrodas@rieder.net.py
Reinaldo Penner	Director Ejecutivo, Paraguay Vende, Tel. 209-110, e-mail: rpenner@paraguayvende.com.py
Tracy Shanks	Paraguay Vende
Juan Esteban Carron	Director Adjunto, Paraguay Vende, Tel. 209-110, e-mail: jcarron@paraguayvende.com.py
Cristina Sanchez	Gerente de Monitoreo de Resultados, Paraguay Vende, Tel. 209-110, e-mail: csanchez@paraquayvende.com.py
Wilfried Giesbrecht	Executive Director Fundación Desdel Chaco
David Sawatzky	Governor of Boqueron Department
Juan Pablo Cinto	Vice-Director, Instituto de Derecho Ambiental, Coordinador Ecoregional, Tel. 614-619, e-mail: juanpablo.cinto@idea.org.py
Aida Luz Aquino	Director, Bosque Atlántico del Alto Paraná, WWF, Tel. 300-733, e-mail: alaquino@wwf.org.py
Alberto Villalba	Program Coordinator, The Nature Conservancy
Carlos A. Galarza	Director Ejecutivo, CEAMSO, Tel. 504-011, e-mail: ceamscopy@rieder.net.py
Nelson Torales	Park Guard Teniente Enciso-Medanos National Parks
Christine Hostettler	Executive Director, PROCOSARA

Workshop Participants

Mercedes Juvinel, Consultora, Proyecto Finanzas Municipales, Tel. 225-193, e-mail: mjuvinel@finanzasmunicipales.com

Uwe Kurth, Mission Environmental Officer, USAID/Paraguay, Tel. 220-715, e-mail: ukurth@usaid.gov

Valdir Roberto Welte, FAO Representative, FAO of the UN, Tel. 574-342, e-mail: FAO-PY@fao.org

Stuart B. Pryor, Director, Sustainable Resources Foundation, Tel. 59521, e-mail: stuart@pla.net.py

Wilfried Giesbrecht, Gerente Ejecutivo, Fundación para el Desarrollo Sustentable del Chaco, Tel. 52191, e-mail: wgiesbrecht@desdelchaco.org.py

Walter Ratzlaff, Turismo, Chortitzer Komitee Ltda., Tel. 52301, e-mail: walter@lp.chortitzer.com.py

Reinaldo Penner, Director Ejecutivo, Paraguay Vende, Tel. 209-110, e-mail: rpenner@paraguayvende.com.py

Rafael Carlstein, Mesa Forestal Nacional

Damiana Mann, Servicio Forestal Nacional, MAG

Angel Parra, Guyra Paraguay, Tel. 227777

Nelida Rivarola, Centro de Datos para la Conservación, SEAM Tel. 615804

Mariana dos Santos, Consultor, JOBS, Tel. 220-984, e-mail: consultoria@jobs.com.py

Kelo Kriskovich, Gerente General, JOBS, Tel. 220-984, e-mail: kelo@jobs.com.py

APPENDIX 5

List of Protected Areas

(adapted from Ferreiro, F., Fragano, F. and Ugarte, E. 2004)

Public Areas

Protected Area Name	Management Category	Sub-system	Area (ha)
Defensores del Chaco ¤	Parque Nacional	Público	780.000
Tte. Enciso	Parque Nacional	Público	40.000
Río Negro	Parque Nacional	Público	123.786
Cerro Cabrera -Timane	Parque Nacional	Público	125.823
Chovoreca	Parque Nacional	Público	100.953
Ñacunday	Parque Nacional	Público	2000
Paso Bravo ¤	Parque Nacional	Público	93.000
Serranía San Luis ¤	Parque Nacional	Público	10.282
Bella Vista	Parque Nacional	Público	7.311
Cerro Corá ¤	Parque Nacional	Público	12.038
Caaguazú ¤	Parque Nacional	Público	16.000
Ybycuí ¤	Parque Nacional	Público	5.000
Lago Ypoá*	Parque Nacional	Público	100.000
Lago Ypacaraí* ¤	Parque Nacional	Público	16.000
Yabebyry*	Refugio de Vida Silvestre	Público	30.000
San Rafael* ¤	Reserva Recursos Manejados	Público	72.489
Yvytyrusú* ¤	Reserva Recursos Manejados	Público	24.000
Macizo Acahay	Monumento Natural	Público	2.500
Kuri'y*	Monumento Natural	Público	2.000
Cerros Koi y Chorori ¤	Monumento Natural	Público	17
Moisés Bertoni ¤	Monumento Científico	Público	200
Tinfunqué*	Parque Nacional	Público	280.000
Cerro Lambaré	Zona Nacional de Reserva	Público	
Capií bary	Reserva Ecológica	Público	3.082
Saltos del Guairá	Parque Nacional	Público	900
Total Area Public Subsystem			**1.847.381**

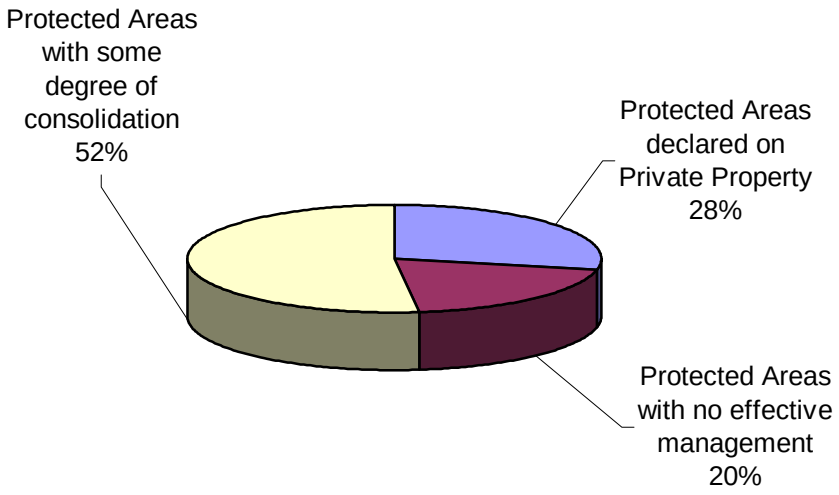
Private Protected Areas

Protected Area Name	Management Category	Sub-system	Area (ha)
Bosque Mbaracayú	Reserva Natural	Privado	64.405
Arroyo Blanco	Reserva Natural	Privado	5.714
Morombí	Reserva Natural	Privado	25.000
Ypetí	Reserva Natural	Privado	13.592
Total Private Subsystem			**108.711**

Special Areas

Protected Area Name	Management Category	Sub-system	Area (ha)
Mbaracayú	Refugio Biológico	Itaipú	1.436
Limoy	Refugio Biológico	Itaipú	13.396
Itabó	Refugio Biológico	Itaipú	17.879
Pikyry	Refugio Biológico	Itaipú	1.109
Tatí Yupí	Refugio Biológico	Itaipú	1.915
Carapa	Refugio Biológico	Itaipú	2.575
Isla Yacyretá	Refugio Vida Silvestre	Yacyretá	8.345
Total Special Areas			**46.655**

Original Data: Proyecto de Actualización del Plan Estratégico del SINASIP, PAR98/G33 - SEAM. 2003



Situation of the Public Protected Areas System (% of total system)
Adapted from Ferreiro, F. Fragano, F. and Ugarte, E. 2004