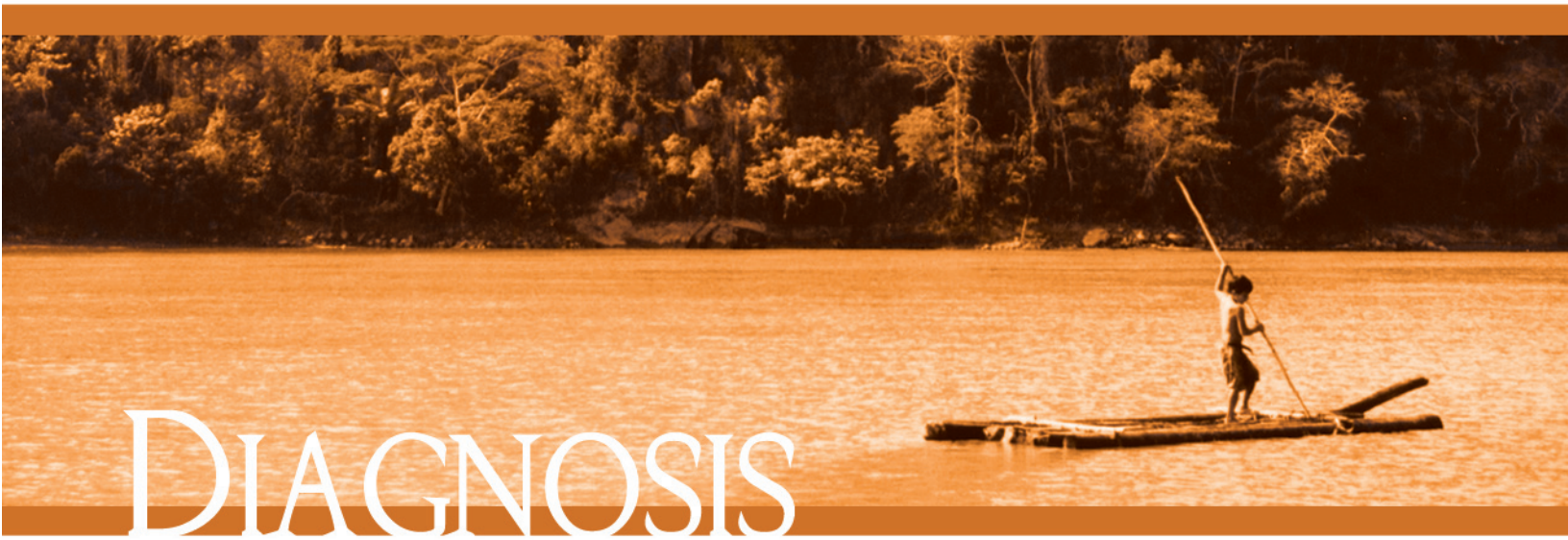

DIAGNOSIS

OF THE PILON LAJAS
BIOSPHERE RESERVE AND COMMUNAL LANDS

PARKS WATCH BOLIVIA

OCTOBER 2005

PARK PROFILE Series

PARKSWATCH
Strengthening Parks to Safeguard Biodiversity

ParksWatch was created in 1999 as a program of Duke University's Center for Tropical Conservation to document the state of protected areas throughout the Tropics, many of which present a dearth of information concerning their biological riches and the problems they face.

Through partnerships with in-country NGOs and individuals, ParksWatch conducts on-the-ground evaluations of protected areas, which analyze threats to their conservation viability, identify strategies for overcoming those threats, and help government agencies, NGOs and community groups succeed at the ultimate goal of strengthening parks in their role as the world's primary instrument for the protection of biodiversity.

The publication of this report was made possible by a grant from the Critical Ecosystems Partnership Fund (CEPF) and the contributions of anonymous donors.

PARKSWATCH BOLIVIA

ParksWatch-Bolivia is member of the ParksWatch network of NGOs, headquartered at Duke University, North Carolina, USA. ParksWatch has other active programs in Mexico, Guatemala, Venezuela, Peru, Brazil, and Argentina, and plans to initiate new programs in other countries and continents.

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PARKSWATCH

SERNAP

Acknowledgements

This Park Profile was written by Stéphane Pauquet, Research Associate at ParksWatch. Data collection was undertaken by a team composed of Mr. Pauquet, Dimitri de Boissieu (Ecologist), Stéphane Doizon (Geographer), Pierrick Jean (Agronomist), and Menuka Scetbon-Didi (Photographer and Ethnologist).

In parallel to our field observations, this report is based primarily on interviews and discussions with the staff and managers of the Pilón Lajas Biosphere Reserve and the Bolivian park administration (SERNAP) in La Paz, as well as individuals assisting the park independently or as employees of non-governmental organizations.

The author is extremely grateful to all the above-mentioned persons for the information, views and insights that they shared and for their comments on the draft report. Informants were speaking in their personal capacity and their views may not be the official policy of the organizations they represent. Many other individuals have kindly contributed information included in the report and the author would like to extend his thanks to them as well. The author has made his best effort to ensure the accuracy of the information contained in this report and apologizes for any inadvertent errors.

Citation: Pauquet, S. 2005. Diagnosis of the Pilón Lajas Biosphere Reserve and Communal Lands. ParksWatch Park Profile Series [http://www.parkswatch.org/parkprofiles/pdf/plbr_eng.pdf].

An interactive version of this report is available in two languages (English and Spanish) at the following URL: http://www.parkswatch.org/parkprofile.php?l=eng&country=bol&park=plbr

Designed by: Stéphane Pauquet

Photo credits: When not expressly indicated: ParksWatch archive. When initials are used: MSD: Menuka Scetbon-Didi; SP: Stéphane Pauquet.

October 2005

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List of Acronyms and Abbreviations

ACF Agrupación Comunal Forestal

AIPAC Asociación Integral de Productores Agropecuarios de Cascada

AOPEB Asociación de Organizaciones de Productores Ecológicos de Bolivia

APABIO Asociación de Productores Agroecológicos de Biomiel

ASIPA Asociación Integral de Productores Agropecuarios

ASPAE Asociación de Productores Agroecológicos

BOLFOR Sustainable Forest Management Project

BR Biosphere Reserve

BR-TCO Biosphere Reserve and Communal Lands

CESA Centro de Servicios Agropecuarios

CI Conservation International

CIDOB Confederación de Pueblos y Comunidades Indígenas del Oriente, Chaco y Amazonia Boliviana

CIPLA Central Indígena del Pueblo Leco de Apolo

CIPTA Consejo Indígena del Pueblo Tacana

COSUDE Swiss International Technical Cooperation

CPIB Central de Pueblos Indígenas del Beni

CRTM Consejo Regional Tsimane Mosetene

CSUTCB Confederación Sindical Unica de Trabajadores Campesinos de Bolivia

DED German Social and Technical Cooperation Service

DFID Department For International Development - British Embassy

DGB Dirección General de Biodiversidad

DGIS Dutch Cooperation Agency (now called NEDA)

DNCB Dirección Nacional de Conservación de la Biodiversidad

D.S. Decreto Supremo

EU European Union

FAICAB Federación Agropecuaria Integral de Colonizadores de Alto Beni

FAN Fundación Amigos de la Naturaleza

FEACAB Federación Especial Agropecuaria de Colonizadores de Alto Beni

FEAPB Federación Especial Agraria Puerta del Beni

FECAR Federación Especial de Colonizadores Agropecuarios de Rurrenabaque

FECY Federación Especial de Colonizadores de Yucumo

FEPAY Federación Sindical de Productores Agropecuarios de Yucumo

FESPAI Federación Sindical de Productores Agroecológicos

GEF Global Environment Fund

GCT Gran Consejo Tsimane

ha Hectare or hectares

ICIB Instituto para la Conservación e Investigación de la Biodiversidad

IE Instituto de Ecología, UMSA

IMNA Integrated Management Natural Area

INC Instituto Nacional de Colonización

INRA Instituto Nacional de Reforma Agraria

ITTO International Tropical Timber Organization

KfW Kreditanstalt für Wiederaufbau (German International Cooperation Bank)

LIDEMA Liga de Defensa del Medio Ambiente

MAB Man and the Biosphere (UNESCO)

MDSP Ministerio de Desarrollo Sostenible y Planificación

MHNNKM Museo de Historia Natural Noel Kempff Mercado

MST Movimiento Sin Tierra

NGO Non-governmental organization

NP National Park

NP-IMNA National Park and Integrated Management Natural Area

NTFP Non-Timber Forest Product

OCIT Organización de Comunidades Originarias Tacanas

PA Protected Area

PAF Plan de Acción Forestal para Bolivia

PRAIA Programa Regional de Apoyo a los Pueblos Indígenas Amazónicos

PRISA-Bolivia Proyecto de Implementación de Sistemas Agroecológicos en Bolivia

RGAP Reglamento General de Áreas Protegidas

RGGA Reglamento General de Gestión Ambiental

SA Superintendencia Agraria

SAN-TCO Saneamiento de Tierras Comunitarias de Origen

SAN-INT Saneamiento Interno

SAN-SIM Saneamiento Simple

SERNAP Servicio Nacional de Áreas Protegidas

SIF Superintendencia Forestal

SNAP Sistema Nacional de Áreas Protegidas

TAM Transporte Aereo Militar

TCO Tierra Comunitaria de Origen (Indigenous Communal Lands)

TES Turismo Ecológico Social

TI Territorio Indígena

TNC The Nature Conservancy

TREX Tropical Research and Exploration

UNESCO United Nations Educational, Scientific and Cultural Organization

USAID United States Agency for International Development

VAIPO Vice Ministerio de Asuntos Indígenas y Pueblos Originarios

VSF Veterinarios Sin Fronteras

WCS Wildlife Conservation Society

WWF World Wide Fund for Nature

Objectives and Methods

ParksWatch is a non-profit organization headquartered at Duke University's Center for Tropical Conservation in Durham, North Carolina, USA. Its mission is to protect biological diversity by collecting, analyzing, and disseminating up-to-date information on the state of protected areas.

ParksWatch works through partnerships with individuals and local organizations in seven Latin American countries (Mexico, Guatemala, Venezuela, Peru, Brazil, Bolivia and Argentina) to conduct on-the-ground evaluations of protected areas, assessing their levels of implementation and identifying threats. Results of each evaluation are compiled into cross-disciplinary diagnostic reports called "Park Profiles."

Each Park profile prescribes actions to abate or remove the most serious threats and lists recommendations to improve each area's management. These reports are posted on our website (www.parkswatch.org) and printed copies provided to government agencies, conservation organizations, and other stakeholders involved in the park's management. Based on the results of our findings, our partners undertake a variety of activities to support park management and raise awareness among conservation specialists and the general public. Such activities may include the organization of forums, meetings, and workshops or involvement in media campaigns, production of video documentaries and the publication of newspaper articles.

With their journalistic style, widespread distribution, and photographic documentation, our park profiles are also meant to inform citizens of existing threats to their nation's protected areas. Our ultimate goals are to help improve political support, foster adaptive management, promote the adoption of best practices, and instigate the level of implementation needed to guarantee effective biodiversity conservation inside protected areas.

Along with other studies, our reports contribute to the baseline information available for each protected area, against which future evaluations and monitoring activities can be compared in order to measure conservation outcomes. Furthermore, the use of a standardized methodology allows us to draw comparisons between different protected areas within one country or between different countries. Alas, we intend to revisit each park every three or four years to update our database and measure changes in conservation status from a selection of key indicators.

Description of this evaluation

This evaluation started with the compilation of all the available reference material in the libraries of the Bolivian Park Service (Servicio Nacional de Areas Protegidas, SERNAP), the Wildlife Conservation Society (WCS), Conservation International, LIDEMA (Liga de Defensa del Medio Ambiente), and Trópico (databases, technical and scientific reports, journal and newspaper articles, etc.).

After this first revision, we planned our fieldwork with the reserve director (Juan Carlos Miranda) for the various field visits, which concentrated on the park's most relevant sites in the company of park rangers and several other stakeholders (such as local NGO staff, researchers, and colonist

and indigenous leaders).

The interviews (mostly semi-structured) made to these and other stakeholders were based on ParksWatch's standardized survey form, a Scorecard-based questionnaire that considers a broad range of aspects related to park management and focuses on both direct threats (such as land invasions, deforestation, and oil exploration) and indirect threats (such as budget shortfalls, lack of personnel, political interests, and macroeconomic forces).

The data obtained in this way were incorporated to the ParksWatch database and summed to the results of our literature review for the elaboration of the present report.

Below is a brief description of description of the interviews conducted and sites visited, in chronological order[1]:

2003-2004

- **Rurrenabaque:** First meeting and interview with the director of the reserve. Planning of field visits.

- **Suapi Station:** Interview with the three park rangers on duty and assessment of facilities. Visit of the station's viewing area, and inspection of the immediate surroundings. We were able to note the abundant presence of peccaries and tapirs and even observed jaguar tracks. During our descent of the Beni river back to Rurrenabaque ,interview with a group of tourists returning from a tour to Madidi National Park. They informed us that they had fished and built rafts during their stay - two activities supposedly prohibited in the park.

- **Torewa Community (Madidi NP-IMNA):** Visit of the surrounding forests with a local leader, who described us the area's ecotourism potential. During our hike, we came across a troop of peccaries of at least 50 individuals. The following day, we attended a meeting between the director of the reserve and the community about a community ecotourism project currently under development. Other participants included members of INRA (Instituto Nacional de Reforma Agraria), CIPTA (Consejo Indígena del Pueblo Tacana), CIPLA (Central Indígena del Pueblo Leco de Apolo) and CIDOB (Confederación de Pueblos y Comunidades Indígenas del Oriente, Chaco y Amazonia Boliviana).

- **Rurrenabaque:** Interview with José Ayala, a consultant with Conservation International. Review of available bibliographic material in the reserve's principal office and in Conservation International's library.

- **Alto Colorado Station:** Interview with the rangers on duty at the Alto Colorado and Pino stations, who assembled for an environmental education campaign in colonist communities. In the evening, we attended the presentation of an educational video with those present.

1 Pilón Lajas Biosphere Reserve and Indigenous Territory (Pilón Lajas RB-TCO) and Madidi National Park and Integrated Natural Management Area (Madidi PN-ANMI) are contiguous, and their main offices are close to one another (in Rurrenabaque and San Buenaventura respectively, towns that are just separated by the Beni river). As a result, these two areas were evaluated simultaneously, according to the availability of their respective directors and park guards.

Visit of the area with two park rangers and 8 hour walk to Laguna Azul, site of several ecotourism and resource extraction projects in the planning and development phase.

- **Rurrenabaque:** Interview with Roberto de Urioste, biologist and coordinator of a social ecotourism project with ICIB (Instituto para la Conservación e Investigación de la Biodiversidad). Interview with Daniel Robison (ex-scientific coordinator of Veterinarians Without Borders' Pilón Lajas Project), who supervised the elaboration of Pilón Lajas' first Management Plan (1998-2002) and the preparation phase of the new one. We met with a representative of CRTM (Consejo Regional Tsimane y Mosetene) and conducted a second interview with Mr. Juan Carlos Miranda. We attended a meeting of local indigenous leaders and a conservation valuation workshop organized by Mario Diego Lilienfeld and Roberto Daza, from the SERNAP. The following day, we organized a workshop about the threats to the reserve with the six park rangers present. Final interview with the reserve director and encounter with the person in charge of "ranking" ecotourist operators in Rurrenabaque.

- **Km 34 and Km 30 (ranger station and Forestry Service control gate):** Interview with the rangers on duty and staff from the Forestry Service, involved in the resolution of a conflict with a group of colonists trying to reclaim possession of seized timber boards and threatening retaliation against any park ranger that would stand in the way of their sale.

2005

- **Rurrenabaque and La Paz:** Data update session with the director and series of interviews with Marco Octavio Ribera, in charge of the Natural Resource Management Program of the GEF-II Project and involved with the reserve since the early days of its implementation.

The National System of Protected Areas of Bolivia

Despite the creation of the first protected area in 1939 (Sajama National Park), Bolivia's National System of Protected Areas (SNAP) is one of the youngest in Latin America. Established in 1992 through the Law of the Environment, its fundamental objectives are the conservation of representative samples of the country's major ecosystems and it is administered by the Servicio Nacional de Áreas Protegidas (SERNAP), under the jurisdiction of the Ministry of Sustainable Development and Planning (MDSP). The SERNAP is responsible for defining and enforcing the laws and regulations pertaining to the management of the country's genetic and biological resources, as well as to administer and implement the Convention of Biological Diversity signed by Bolivia at the Rio Conference (1992) and ratified in 1994.

Although generally supportive of the creation of protected areas, the Bolivian government does not support them financially. As a matter of fact, the management of the SNAP relies almost entirely on international funding (GEF, Dutch government, KfW, IADB, etc.) and on the manpower and additional resources provided by non-governmental organizations (NGOs) (CI, WCS, GTZ, TNC, CARE, WWF, FAN, Trópico, etc).

At present the SNAP is composed of twenty nationally recognized protected areas, covering approximately 16.8 million hectares (15.3% of the national territory) and divided into National Parks, National Reserves, Biosphere Reserves (a category still not recognized by the national legislation), Wildlife Reserves and Integrated Management Natural Areas (equivalent to Multiple-Use Zones). In parallel to the SNAP, there is a growing contingent of protected areas of lesser hierarchy, such as Forest Reserves, Watershed Protection Areas, and Departmental, Regional, and Municipal Parks and Reserves. Another important zoning category is the Reserva Natural de Inmovilización, which corresponds to a temporary ordinance until a final status is defined based on the area's values and characteristics.

Each national or departmental protected area must form a Management Committee inviting spokesmen of the various cultural groups inhabiting its territory or surrounding area to participate in the decision-making process.

Since the creation of the Bolivian SNAP, significant achievements have been made in the following management areas:

(i) planning;

(ii) design and implementation of a monitoring and evaluation system;

(iii) establishment of operational protection corps;

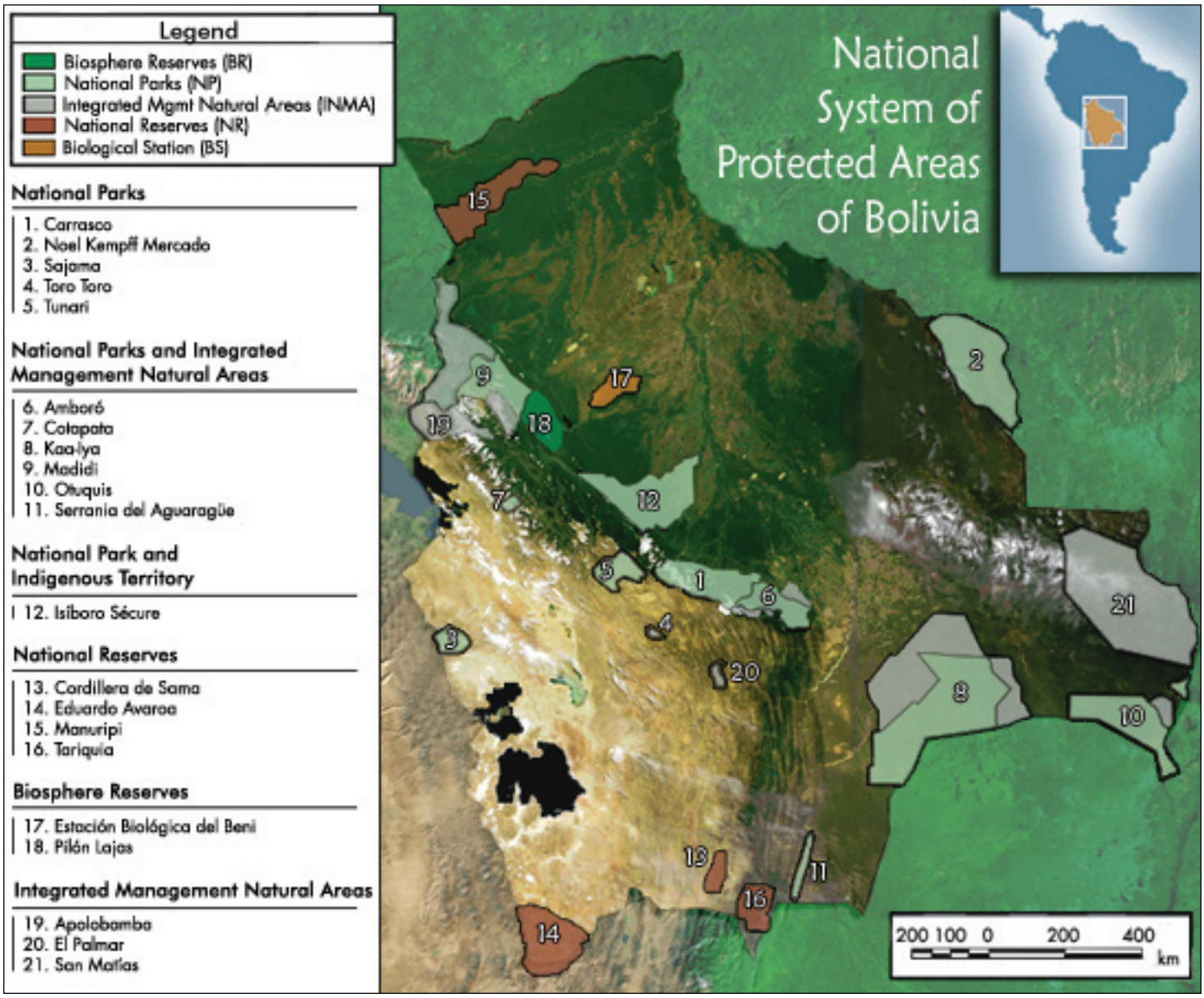
(iv) development of a training program for both park rangers and administrative staff;

(v) adoption of a set of policies for the public use of protected areas, and;

(vi) participation of local stakeholder groups in park decision-making.

Protected Areas of Bolivia

Management Category	Number	Area (Ha)
National Park	5	2,592,029
National Park and Integrated Management Natural Area	6	7,133,336
National Park and Indigenous Territory (or Communal Lands)	1	1,236,296
National Reserve	4	1,887,332
Biosphere Reserve	2	535,170
Integrated Management Natural Area	3	3,450,217
TOTAL	**21**	**16,834,380**



SERNAP's policies and strategic agenda are presented in Appendix 1.

Pilón Lajas Biosphere Reserve and Communal Lands

Date of last field evaluation	April 2005
Name	Pilón Lajas
Category	Biosphere Reserve and Communal Lands
Year created	1992
Area	400,000 ha
Main objectives	- Conservation of biological diversity; - Improvement of living conditions of resident and adjacent indigenous communities (see Appendix 2)
Location	In the departments of La Paz (Sud Yungas, Larecaja and Franz Tamayo provinces) and Beni (Ballivian province), in their northern and western portions, respectively
Ecoregions	Montane Moist to Perhumid Evergreen Forest, Seasonally Moist Lowland Tropical Forest
Habitats	Cloud forests, Sub-Andean rain forests, pluvial piedmont forests, seasonally moist basal forests, riparian forests, swampland palm groves, and edaphic savannas

Summary

Description

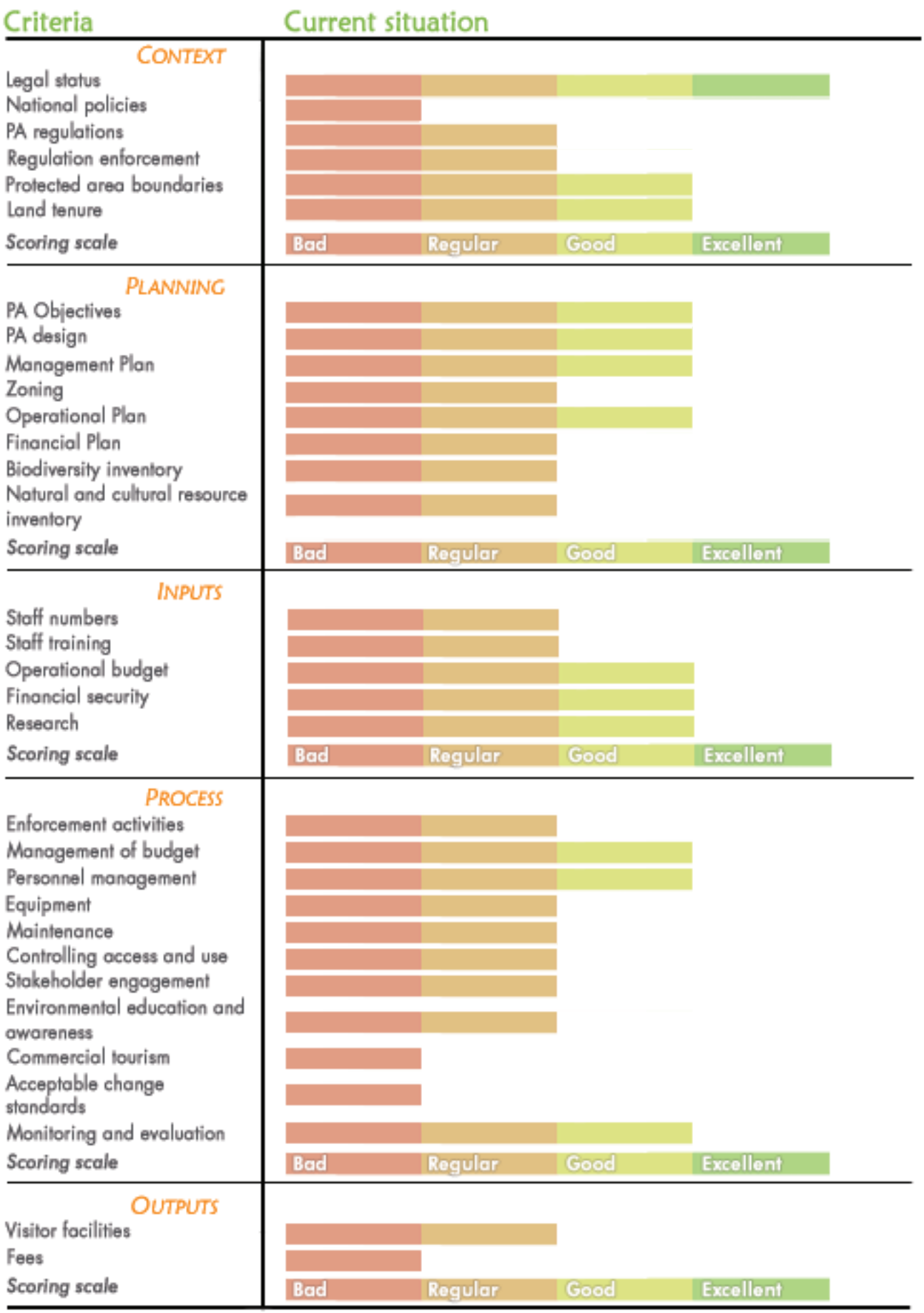
Pilón Lajas Biosphere Reserve and Communal Lands (*Reserva de Biosfera y Tierra Comunitaria de Origen Pilón Lajas*, RB-TCO) is located 350 km northeast of La Paz and 50 km west of San Borja. It is found in the Mountainous Yungas and Madeira Moist Forest biogeographic subregions. Its mountains shelter the headwaters of the Beni watershed, which feeds extensive cattle ranches in the Beni Plains.

Biodiversity

Area-wide, systematic inventories of Pilón Lajas' biodiversity have yet to be conducted, but because of its similarity and proximity to Madidi NP and the diversity of habitats generated by its high altitudinal gradients, Pilón Lajas is likely to harbor an exceptionally rich flora and fauna, and is probably a hotspot for endemic species. Estimates suggest that Pilón Lajas may harbor between 2,000 and 3,000 plant species. As of this writing, 73 mammal, 485 bird, 58 reptile, 36 amphibian, and 103 fish species have been recorded in the reserve.

Threats

Heavy pressure for land and natural resources in the surrounding areas has made land invasions the principal threat to the protected area. In fact, if deterioration continues at its current pace, it is feared that its most accessible areas will be colonized and many important conservation targets will disappear over the mid-term. Social conflict, population growth, illegal timber exploitation, poaching, unauthorized fishing, the landless peasant's movement, and a number of development projects in its zone of influence have created a situation in which Pilón Lajas BR-TCO is considered threatened.



[Adaptation of the WWF Tracking Tool]

RATING: 42/96

Description

Geographic location

Pilón Lajas Biosphere Reserve and Communal Lands is located 350 km northeast of La Paz and 50 km west of San Borja (Beni), between the departments of La Paz (Sud Yungas, Larecaja, and Franz Tamayo provinces) and Beni (José Ballivian province). It lies between latitudes 14°25' and 15°27' South and longitudes 66°55' a 67°40' West, and encompasses approximately 400,000 ha.

In addition to boasting one of the highest suspected biodiversity indices in Bolivia, the Pilón Lajas Reserve is part of a transboundary PA compound, approximately 4 million ha in extension, connecting four protected areas in Southern Peru and Northwestern Bolivia.

On its eastern side, the reserve is flanked by the country's main road to the North, and the El Sillar-Yucumo-Rurrenabaque colonization zone, intermediate between the Alto Beni colonization area to the southwest and the Iturralde de La Paz agricultural frontier to the north. On its western side, the Beni river forms a natural border with Madidi National Park-Integrated Natural Management Area, a largely untouched swath of 2 million ha of tropical forests.

Access

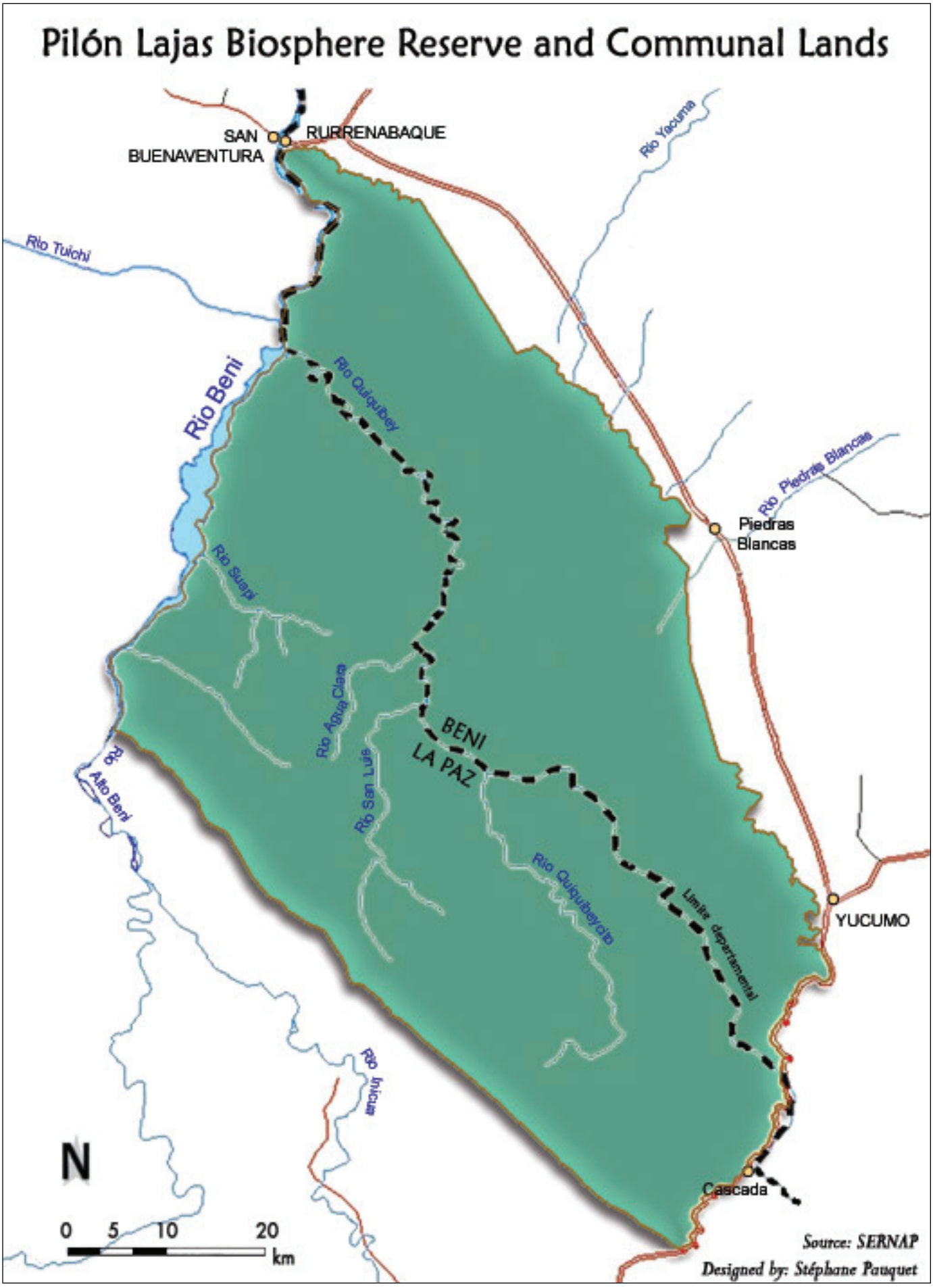
Two routes provide access to Pilón Lajas' immediate surroundings: La Paz-Yucumo-San Borja and Guayaramerín-Riberalta-Reyes-Rurrenabaque-Yucumo. Despite recent improvements, the state of the road is constantly deteriorated by use, heavy rains, and the lack of proper maintenance.

Two airlines regularly use the small airport located in Rurrenabaque: TAM (*Transporte Aereo Militar*) and Amaszonas.

From Rurrenabaque, access to the reserve is via boat on the Beni river. Streams and old forest roads off of the Yucumo-Rurrenabaque road provide access to the entire eastern portion of the reserve. These tertiary roads provide access to 74% of the reserve's perimeter; however, they are only practicable during the dry season.

Roads constructed illegally during the logging era (between 1993 and 1996) provide access to the area from the Quiquibey-Charal area, and affect extremely fragile Sub-Andean ecosystems.

From Rurrenabaque, the main access to the reserve is via the Beni river. Photo: SP


Pilón Lajas Biosphere Reserve and Communal Lands
SAN BUENAVENTURA
RURRENABAQUE
Río Yacuma
Río Tuichi
Río Beni
Río Quiquibey
Río Piedras Blancas
Piedras Blancas
Río Suapi
Río Agua Clara
BENI
LA PAZ
Río San Luis
Río Alto Beni
Río Quiquibey Chico
Límite departamental
YUCUMO
Río Inicua
Cascada
N
0 5 10 20
km
Source: SERNAP
Designed by: Stéphane Pauquet

Physical description

The area is located at the encounter of two biogeographical subregions: montane cloud forests (Yungas) and the Madeira Humid Forest . Most of the protected area's northern portion is formed by the Pilón Mountain Range, while its southern portion extends over the Chepite and Muchanes Mountains, reaching an altitude of 2,000 m. Flanking the wide alluvial valley of the Quiquibey river, these mountains are the last of the Andean foothills before the floodplains of the Beni department (with an average elevation of 300 m asl).

3D satellite view of the Pilón Lajas BR-TCO (EarthSat/Google Earth)

The geology of the area is extremely varied, with unevenly-aged strata and diverse chemical and physical properties. Among the various geological formations are intrusive, sandstone, and lutite rocks from the Devonian, Permian, Carboniferous, and Cretaceous Periods in addition to less prevalent Silurian and Ordovician rocks. Tertiary formations are found primarily in synclines, which occupy an important portion of the area. Lowland soils are primarily alluvial and colluvial with quaternary sediments. The agricultural potential of the area is limited by these sandy soils characterized by low organic content.

Hydrography

Watershed protection is one of the principal objectives specified in the reserve's declaration decree.

Pilón Lajas' hydrographic network is part of the larger Amazon basin. Specifically, it is part of the Beni and Mamoré river basins' drainage system. Because of its orographic situation, the area is divided in four sub-watersheds[1]:

- Quiquibey river basin (by far the largest)
- Yacuma river basin
- Maniqui river basin
- Beni river basin

The Yacuma and Maniqui rivers are affluents of the Mamoré, and the Quiquibey and other minor rivers flow directly into Beni river.

MODIS/TERRA Satellite view of the Pilón Lajas BR-TCO

Climate

Hot and humid winds from the northwest and the presence of mountains result in high annual rainfall, between 1 ,800 mm to 3,500 mm[2]. The Pilón range is the most humid, especially near the town of Yucumo in the southeast, which is one of the most climatically unstable areas in the country[3]. Average annual temperatures range between 6 and 26°C, depending on the altitude.

1 VSF. 1998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

2 Terceros, L.F. and M. Sandoval. 1994. Caracterización física de la Reserva de biosfera Territorio Indígena Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 41 pp.

3 Muñoz, R. 1991 . In VSF. 1998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

Biodiversity

Few biological studies have been conducted in the reserve, and as a result, the biota is poorly known. Yet, because of the area's geological heterogeneity and climatic conditions, biological diversity and endemism are believed to be extremely high. In a permanent sample site, located in the upper reaches of the Pilón mountains, Killeen (1993) registered the highest floristic diversity in any studied Bolivian montane forest[4], and all of the other investigations conducted in the area' suggest an extremely high biodiversity.

Of the reserve's great variety of ecosystems, the most remarkable for their richness in species and endemisms are: cloud forests, Sub-Andean rain forests, pluvial piedmont forests, seasonally moist basal forests, riparian forests and swamp, palm groves (of *Mauritia flexuosa* palms) and edaphic savannas at the summit some of the higher mountains[5].

Due to the difficulty of access, these mountains harbor the reserve's most pristine ecosystems, while the rest of the area has been subjected to human intervention for many decades, albeit at different levels of intensity.

The Pilón Mountains harbor some of the country's most diverse forest ecosystems. Photo: MSD

a) Flora

The reserve's floristic richness is extremely high, estimated between 2,000 and 3,000 vascular plants[6].

4 Killeen, T. 1993. Perfil ambiental del Territorio Indígena y Reserva de biosfera Pilón Lajas. Technical report. SERINCO. Santa Cruz. 26 pp.

5 Ribera, M. O. 1999. Aspectos generales sobre la conservación de la biodiversidad y áreas protegidas en Bolivia. 100 pp.

6 Killeen, T. 1993. Perfil ambiental del Territorio Indígena y Reserva de biosfera Pilón Lajas. Technical report.

Of the approximately 162 timber species found in the reserve[7], several are precious hardwoods, including big-leaf mahogany (*Swietenia macrophylla*), cedar (*Cedrela* sp.) and roble (*Amburana cearensis*). An additional 26 valuable timber species are also known to exist in the reserve, including almendrillo (*Dipteryx odorata*), cuchi (*Astronium urundeuva*), ochoó (*Hura crepitans*), palo maría (*Calophyllum brasiliense*) and verdolago (*Terminalia* sp.); Finally, 33 less-valuable timber species have been registered, including bibosi (*Ficus* sp.); momoqui (*Caesalpinia* sp.), mara macho (*Tapirira guianensis*) and trompillo (*Guarea* sp).

One of the reserve's distinctive floristic features is its palm diversity. Notable species include pachiuva (*Socratea exorrhiza*), tembe (*Bactris gasipaes*), copa (*Iriartea deltoidea*), motacú (*Scheela princeps*), various species of chontas (*Astrocaryum* spp.), jatatas (*Geonoma* spp.), and ivory palm (*Phytelephas macrocarpa*).

Three of four macro-regions with nationally important floristic richness, as categorized by Moraes and Beck, occur in the reserve[8]. The same authors specifically mention the Beu Mountains and its grasses growing on quartzite soils as an area of outstanding scientific interest.

Another area of interest is the high, dense/semi-dense forest found at intermediate altitudes, where Cornejo (1994) found high natural rates of mahogany and cedar regeneration, a phenomenon that has not been observed in any other part of the country[9].

b) Fauna

Even though the area has severely suffered from past human activities, the local fauna is as exceptionally rich as its flora. A total of 755 animal species have already registered, including 73 mammals, 485 birds, 103 fish, 58 reptiles, and 36 amphibians[10]. Threatened species include

SERINCO. Santa Cruz. 26 pp.

7 Bascopé et al. 1996. En VSF. 998. Plan de Manejo 997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

8 Moraes, M. and S. Beck. 1992. Capítulo III, Diversidad florística en Bolivia. En Marconi (Ed.). Conservación de la diversidad biológica en Bolivia. CDC. La Paz. 574 pp.

9 Cornejo, G. 1994. Caracterización de la vegetación, Reserva de biosfera Territorio Indígena Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 92 pp.

10 VSF. 998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final

black spider monkey (*Ateles paniscus*), lowland tapir (*Tapirus terrestris*), spectacled bear (*Tremarctos ornatus*) - which appears to be restricted to open, high, cloud forests in the higher altitudes, jaguar (*Panthera onca*) - one of the five felines registered in the area -, as well as giant otter (*Pteronura brasiliensis*), and long-tailed otter (*Lutra longicaudis*), whose populations are slowly recovering from the era of pelt hunting.

The giant otter (Pteronura brasiliensis) is slowly recovering from a near local extinction during the era of pelt hunting in the 1970s and 80s.
Photo: Lisa Davenport

Other notable species include the harpy eagle (*Harpia harpyja*), black and chestnut eagle (*Oroaetus isidori*), giant armadillo (*Priodontes maximus*), red howler monkey (*Alouatta seniculus*), Muscovy duck (*Cairina moschata*), yellow-spotted Amazon river turtle (*Podocnemis unifilis*) and black caiman (*Melanosuchus niger*).

It is estimated that the protected area harbors more than 700 bird species[11]. Among this group, the parrot family (Psittacidae) stands out with 14 registered species, as does the tanager family (Thraupinae) with 47 species, and 9 species of toucans (Ramphastidae). There are also many threatened species, mostly smaller birds, in the protected area, such as *Terenura sharpei* and *Ampelion rufaxilla*.

Management

Background

The territory that is today Pilón Lajas Biosphere Reserve was originally proposed in 1975 as a 280,000 ha National Park. However, the Bolivian government only acknowledged its existence in 1977, when it was recategorized and declared a UNESCO Biosphere Reserve[12]. For various reasons, the first 8 years lacked any kind of administration.

version. Veterinarios Sin Fronteras.

11 Ribera, M. O. 1999. Aspectos generales sobre la conservación de la biodiversidad y áreas protegidas en Bolivia. 100 pp.

12 Robison, D., I. Brugioni, L. Marcus and E. Guayao. 1997. Aportes sobre experiencias de manejo de las areas protegidas del Beni. Implementación de la RB-TCO Pilón Lajas: una experiencia de admnistración compartida de un área de doble condición.

In 1978, the Yucumo-Rurrenabaque road was opened, which led to widespread colonization and logging in the region.

During the 1980s, the Bolivian government promoted colonization in the region in the framework of the "Yucumo-Rurrenabaque Colonization Project". Overall, due in part to widespread corruption in the land granting process, the government failed to comply with many aspects of this policy, including technical assistance and provision of infrastructure and services.

On April 9, 1992, as a result of the 1990 March for Territory and Dignity and subsequent demands by the local indigenous communities for the creation of a National Park and Indigenous Territory - the Pilón Lajas Biosphere Reserve was declared by D.S. N°23,110 within the borders of the newly created Pilón Lajas Indigenous Territory (now Communal Lands). Since that date, the protected area officially encompasses 400,000 ha.

Box N°1: A hazardous co-administration experiment with a foreign NGO

Between 1993 and 1994, the French NGO Veterinarians without Borders (Veterinarios Sin Fronteras - VSF)[13], conducted the first evaluation of the Pilón Lajas area with funds from the European Union. Results were used to help elaborate the reserve's 5-year management plan the following year, with financing from the Swiss Agency for Development and Cooperation's (COSUDE) bilateral debt swap fund. Unfortunately, due to lack of time and the disinterest on the part of the colonists, this "participative" diagnosis was completed without their involvement, a move that would later fall under heavy criticism.

In February 1996, VSF and the Ministry of Sustainable Development and Environment signed a five-year, co-management agreement (via the DNCB, today's SERNAP) that included an explicit directive to respect the region's development dynamics. With support from various European Union donors[14], VSF undertook the preliminary actions required to plan and manage the protected

13 VSF had been active in the zone since 1989, when they took on a project from Save The Children, providing technical agricultural/domestic animal production assistance to colonist communities.

14 The Dutch Embassy (DGIS) (34%), the Embassy of Great Britian (DFID) (29.2%) and the EU (33.4%).

area.

During this same year, the Management Committee was formed and included grassroots organizations, governmental agencies (DNCB, VAIPO, and the area's administration), VSF and the Municipal Government of Rurrenabaque. Shortly after its creation, additional members joined the committee, such that it grew to have broad, local participation in accordance with the new Local Participation and Decentralized Administration Laws.

The same period saw the promulgation of the National Agrarian Reform Institute Law (INRA). In April 1997, this new land granting institution awarded the Pilón Lajas indigenous territory an Executive Land Title called Indigenous Communal Lands (*Tierra Comunitaria de Origen*, TCO, Title N°TCO-0803-0003). Compared to the previously mentioned legal entity (*Territorio Indígena*, TI), this title consolidated collective use rights and access to the lands of the indigenous Chimane and Mosetene groups, who were represented at the time by Tsimane Mosetene Regional Council (CRTM). Since this time, the protected area and indigenous territory has been called *Reserva de Biosfera y Tierra Comunitaria de Origen Pilón Lajas* (RB-TCO), or Pilón Lajas Biosphere Reserve and Communal Lands.

Eventually, however, serious conflicts between local organizations (indigenous and colonist) compromised VSF's management, and it was forced to return reserve administration to the government (DNCB) in order to ensure the continuance of its development projects in the area.

"[...] Colonists and logging groups have permanently harassed VSF. In fact, it was so extreme that some of its members were kept hostage when colonists stormed the NGO's local offices in May 1996. Apparently, to justify their acts, demonstrators blamed the lack of dialogue between VSF and local colonist and logging organizations, but the underlying motive is that they [the loggers] wanted to keep the status quo, maintaining open access to the reserve's forest resources as they had in the past. In early 1998, tensions with VSF intensified so much that the Ministry of Sustainable Development decided that the DGB should administer the reserve instead of VSF[15]."

This transfer of authority, effective in May 1998, led to today's administrative structure, which thanks to VSF's continued financial support (through 2000) helped to successfully transform the reserve from one of the most conflict-ridden regions to one of the best-implemented protected areas in Bolivia[16].

Administration and staff

Due to its dual categorization as both a Biosphere Reserve and Indigenous Communal Lands, the mission of Pilón Lajas seeks to combine conservation of the reserve's biological richness with sustainable development of the area's indigenous communities, who depend on a wide range of natural resources for survival (either via direct use or commercialization).

15 Pavez, I. 1998. Rurrenabaque: motosierristas y dilemas para la conservación de los bosques. In P. Pacheco and D. Kaimowitz (Eds.). Municipios y gestión forestal en el trópico boliviano. 489 pp.

16 MHNNKM. 2000. Análisis de la situación social e institucional y sistema de información geográfico de las áreas protegidas de la Amazonia boliviana. Museo de Historia Natural Noel Kempff Mercado. 180 pp.

The management team is composed of a director, one chief ranger, 16 park rangers, one secretary, and one driver (in charge of the vehicle maintenance). Recently, a social participation technician was hired to strengthen relations between the different reserve stakeholders. A specialist in environmental communication and education is planned to be hired with funds from a joint CI-USAID project.

Due to a lack of financial resources over the last two years (the reserve's image is less "prestigious" than that of adjacent Madidi NP, and as a result has more difficulties raising money)[17], the protection corps' activities have been restricted to control and patrol operations. This fails to address the problem that improving relations between the reserve's administration and local people, particularly colonists, requires permanent dialogue and constant reminders regarding the area's objectives, development opportunities, and requests that they [the locals] support the reserve with its most urgent needs.

Every year there is a delay in the payment installments of the GEF-II Project funds, which represent more than 60% of the reserve's annual budget. This delay has not only affected park guard salaries (and staff salaries in general) during the first three to four months of the last three years, but it has also caused interruptions in fundamental control and enforcement activities. In many cases when park guards are absent, lawbreakers return to the area and resume prohibited activities, including hunting, fishing, logging, and slash and burn agriculture.

The fact that 70% of the reserve's budget[18] comes from foreign sources makes it vulnerable to the whims of international aid, which could compromise its ability to comply with the programs outlined in the Management Plan. One of the main problems associated with this situation is a drastic reduction of promised grant money during times of economic crisis, such as a 996 episode in which the EU decided to withhold all of VSF's payments. Lack of financial resources also means that the protection corps does not have basic equipment needed to carry out its duties and the SERNAP has not been able to complete its training program.

The reserve director is cognizant of these problems and worries a lot about them, especially since his

One of the reserve's singularities is the presence of a woman among the protection corps. Photo: MSD

17 Environmental Education and Interpretation, Infrastructure, Equipment and Maintanence, and Natural Resource Management are only partially or indirectly funded via programs and projects sponsored by organizations like CI, World Wildlife Fund (WWF), and Wildlife Conservation Society (WCS).

18 Pilón Lajas' 2004 yearly budget was US$ 270,000 (US), principally from GEF-II (World Bank) and USAID's PL-480 Project. US$ 65,000 were earmarked to build an interpretation center and two new camps on the Beni river.

upcoming year's budget depends almost entirely on pending GEF funds for Bolivia's National System of Protected Areas (SNAP) (GEF-III). He expects yet another payment delay at the beginning of 2006.

In spite of the lack of funds and personnel, the reserve's staff has successfully initiated awareness-raising activities on the aspect of land titling (in the framework of the INRA Law), and six park guards have been trained in environmental communication and education. They also participated in a series of courses on forest fire prevention and management (with CARE-Bolivia), and in the near future several rangers should receive training aimed at improving relations with the local communities (both indigenous and colonist) and better interface with tourists.

The park transport infrastructure includes a jeep, a truck, five motorcycles, two four-wheelers, and two boats (in poor condition) for patrols within and outside of the protected area. The reserve is in the process of soliciting two new boats and CI financing to repair older vehicles.

The army occasionally collaborates with the reserve's protection corps (in 2003, 60 soldiers were called upon to stop an illegal settlement), but the logistical support required seriously limits collaboration possibilities.

Recently, the reserve and its counterpart organization, Wildlife Conservation Society (WCS) updated the Management Plan using funds from CI. The new Management Plan, whose technical assessment was being reviewed at the time of this writing, emphasizes the reserve's social components, as is demonstrated by the series of "auto-diagnosis" workshops conducted with the indigenous and colonist communities. The colonist communities acknowledge that they were consulted more during this process than during the elaboration of the first Management Plan, and are therefore more likely to approve it. The current situation is consequently one of greater recognition for the protected area (Biosphere Reserve) than for the Communal Lands (TCO). In this context, recognizing that one of the reserve's priorities to involve local people in the management process is the strengthening of the Tsimane Mosetene Regional Council (CRTM), another important milestone is the signing of an agreement between this institution and the reserve's administration for a coordinated management of the area.

One of the newly acquired motorcycles in front of the reserve's central office in Rurrenabaque. The lack of vehicles is a serious impediment to a proper surveillance of the area.

Instead of planning new scientific studies, the team responsible for the drafting of the new Management Plan's has chosen to systematize the dispersed scientific knowledge on the area.

Local participation

Despite the many successes of the Management Committee's (such as combating illegal logging and improving stakeholder involvement in the Management Plan), it suffered from poor representation by indigenous groups in front of the colonist voice. This imbalance has created tensions between the two groups and led to the suspension of the Management Committe in January 1998.

With the arrival of the current director in 2002, the Management Committee was reactivated, and today indigenous organizations are better represented. The Management Committee includes representatives from: i) four municipalities with jurisdiction over the area; ii) Tsimane Mosetene Regional Council (CRTM) and Tsimane Great Council (*Gran Consejo Tsimane*, GCT); iii) six indigenous communities of the area; iv) the reserve administration; and v) the SERNAP.

But there is presently another factor undermining the legitimacy of the Management Committee's decisions: as a result of problems in naming a person to represent the various colonist federations present in the area, this sector currently has no representation on the committee at all. According to the reserve's director, the committee will probably have to allow three representatives (and therefore, three votes) from the colonist sector in order to resolve this problem.

A final concern for the Management Committee is that the level of participation of the different members is seriously imbalanced: during the meetings, municipal representatives have a much more active role than the indigenous representatives, indicative of the traditional power structure that the Law of Public Participation and Management Committees intended to dismantle. The trend was accentuated by the recent transfer of the presidency from CRTM to the Municipal Government of Rurrenabaque. Even though the indigenous people's passive participation during the Management Committee meetings is partially offset in quarterly Assemblies of Indigenous Leaders, recent declines in relations between CRTM and the reserve administration are contributing to a gradual erosion of the co-administration concept. This concern will be discussed further in the *Pressures and Threats* section.

Zoning

The zoning plan proposed in 1997 was based on natural resource use patterns of that time, while unauthorized loggers still operated in the Quiquibey river Valley. Their presence depressed faunal populations, and pushed indigenous hunting areas further from the river. Once forestry activities diminished, indigenous hunters were able to return to hunting around rivers and streams closer to their communities[19]. The 1997-2001 Management Plan redefined the hunting zone based on these changes, and reserved between 30,000 and 40,000 ha for forestry management in another zone.

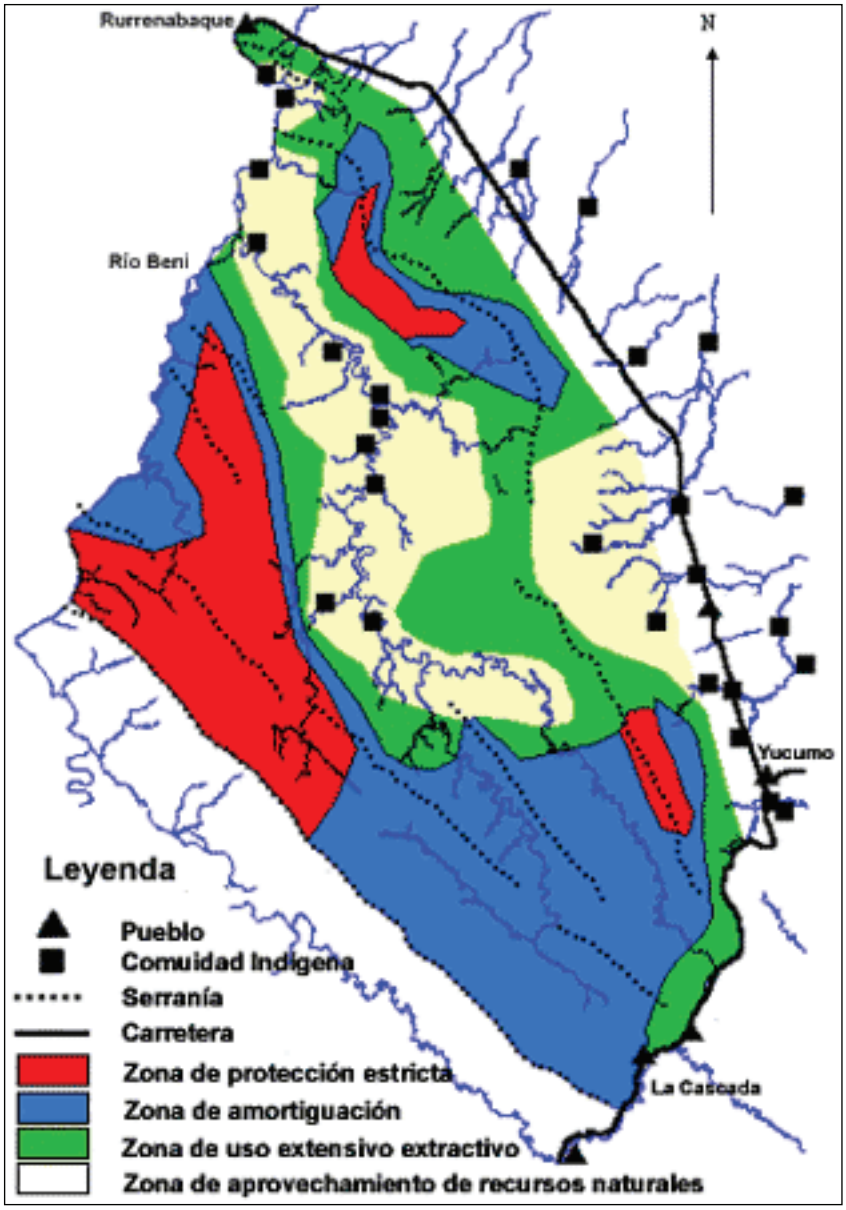
19 De Vries, A. 1998. Territorios indígenas en las tierras bajas de Bolivia: un análisis de su estado a 998. CIDOB/ CPTI/Dutch Development Cooperation Agency. 78 pp.

Current reserve zoning includes six distinct zones:

Zoning category	Authorized uses	% of area
Core zone	Conservation and scientific research	17
Buffer zone	Conservation and watershed protection	33
Extensive, extractive use zone	Hunting, fishing, and gathering by indigenous communities	25
Natural resource use zone	Sustainable development of indigenous communities	25
Intensive, non-extractive use zone	Tourism and recreational activities	n/a
Special use zone	Public infrastructure	0,01

Approximately half of the reserve is zoned for conservation (core zone and buffer zone), while the other 50% is designated primarily for community natural resource management; the indigenous communities have traditionally used this area.

As seen on the map, the 1997-2001 Management Plan identifies three areas of special biological interest that are proposed as core zones: 1) Beu and Chepite Mountains (including forest on alluvial terraces, close to the Suapi river, which is the only example of relatively pristine Amazonian forest below 500 m asl; 2) the cloud forest at the top of Pilón Mountain, which is one of the most diverse forests in the country; and 3) the Bala Mountains, which despite the fact that they were part of a forestry concession (Monte Redondo), are still relatively unaffected and unstudied because of their inaccessibility.



The zoning map proposed in the 1997 Management Plan must be revised to take account of the current human landscape. Source: VSF, 1997

These three zones are the only areas where vegetation remains untouched by human activities. As a result, they represent the only opportunity for preservation of pristine ecosystems in the reserve.

Infrastructure

The management staff work out of a central office in Rurrenabaque and five field stations:

- Suapi
- Asunción del Quiquibey
- Km 34 (VSF's former center of operations)
- Alto Colorado
- El Pino

Certain ranger stations, such as this one (Pino), need a complete overhaul. Poto: SP

Station conditions vary sensibly: Pino station (shown on the picture) needs a complete overhaul, while Suapi and Colorado stations are in good condition. There are not enough boats, and a new outboard motor is needed for patrolling the Quiquibey river.

In order to increase control of timber exploitation and improve coordination with Madidi National Park's protection corps, there are plans for building a new station at Susy (along Beni river), close to the reserve's entrance, by the end of this year. An "usufruct" contract is about to be signed with the community for the right to use the land. Funds are also available to build another station at La Cascada, where administrators are thinking of buying land. In the event that community relations deteriorate, they would still be able to continue operations from this station.

Construction of the interpretation center (a joint ICIB and CI project, with USAID funding), originally programmed for 2004, has been delayed until SERNAP's central office grants approval. Work on the station in Cascada (an area of intense colonization) was halted as well because of delays in INRA's appraisal process, associated with TCO's land titling process in 2004.

Overall, while there have been some advances, the reserve still lacks adequate infrastructure both for enforcement and tourism activities.

Human Landscape

Human occupation

The Pilón Lajas BR-TCO lies within the area of influence of the Rurrenabaque-Yucumo[20] Colonization Project promoted by the Bolivian government at the end of the 70's and concretized by the construction of the road to Rurrenabaque[21].

The initial plan projected colonization to cover more than 150,000 ha in the area, but due to a lack of resources, projections were reduced to 75,000 ha. Nonetheless, analyses of satellite images revealed that more than 75,000 ha have actually been colonized, essentially through unplanned settlements[22].

Four ethnic groups (Chimanes, Mosetenes and Tacanas, and some representatives of the Esse-Ejja ethnic group) converge in this territory, and, since the last century, mestizos[23] originating from the Beni department and La Paz departments have settled in the area during the quinine bark, rubber, fur, and logging booms. Over the last 25 years, and since the opening of the Yucumo-Rurrenabaque road, the region has also undergone considerable changes associated with the arrival of large numbers of colonists from the altiplano highlands, Yungas, and Alto Beni. In addition, a number of logging companies operated inside the reserve until very recently (2001).

Principal population centers in this region of the Bolivian Amazon include:

Locality	Residents
Rurrenabaque	4.959
San Buenaventura	1.670
Yucumo	1.400
San Borja	1.670

Within the colonization area along the road, the most important settlements include: Nuevos Horizontes, El Palmar, Charal, El Sillar, La Cascada and Inicua.

At the time of the census carried out in 1996 by VSF during the elaboration of the Management

20 CESA. 1985. Diagnóstico socioeconómico de la zona de colonización de Yucumo-Rurrenabaque. Technical report. La Paz. 82 pp.

21 This road is part of a transoceanic road project that intends to unite Peru and Chile's Pacific coasts with Argentina and Brazil's Atlantic coasts.

22 Rasse, E. 1994. Dynamique des modes d'exploitation agricole de la forêt sur le front pionnier de Yucumo en amazonie bolivienne. Master thesis. ESAT/CNEARC/VSF, Montpellier, France. 171 pp.

23 Locally called "camba", a result of intermixing between Amazonian indigenous groups and Spanish or Creole peoples during the migrations that occurred since colonial times.

Plan, there were 1,380 indigenous people and 4,859 colonists living in approximately 25 communities within the reserve and adjacent lands (6 of the 25 communities were considered to be within the reserve). The reserve's population of approximately 650 people is divided in the following demographic categories: 36.4% Chimán, 10.8% Mosetene, 33% Tacana, and 19.8% Other (mestizo or non-indigenous)[24]. Almost all of the Tacana people live within reserve borders, while most of the Chimanes live in the buffer zone[25]. These figures are compounded by a growing number of colonists in the upper Quiquibey river (currently around 50 families). It should be noted that these cannot penetrate lower valley zones because of the difficult topography.

Within the reserve, the indigenous communities are mostly located in the piedmont, close to the road, and along the banks of the Beni river (four Tacana communities) and the Quiquibey river (10 communities comprised of mostly Mosente families, and a few Chimane families). Traditionally, the indigenous families carry out subsistence activities such as fishing, hunting, agriculture, and in some Quiquibey river communities, they harvest jatata palm (Geonoma deversa) for roof construction. Nonetheless, a significant number of indigenous people have given up traditional farming in order to go work for colonist farmers. Some also collaborate with chainsaw operators engaging in illegal logging.

The Chimane and Tacana people have occupied the zone in a semi-nomadic way for over 150 years. Traditionally, the Tacana's ancestral territories extended more towards the north and northwest. Today, there are eleven communities founded between 35 and 70 years ago, eight that are between 6 and 34 years old, and only four communities that are 5 years old or less. Mosetene communities vary in age between 25 and 50 years. Of the 25 settlements included in the 1996 census, 59% claimed that the abundance of bush meat attracted them to the area[26].

The lands adjacent to the reserve's eastern border are home to a large colonist population, occupying approximately 200,000 ha along the Yucumo-Rurrenabaque road. These communities impart considerable pressure on the protected area's resources. Most settlers originate from the altiplano and arrived in one of two migration waves: the first occurred between 1978 and 1980 when the Yucumo-Rurrenabaque road was built, and the second wave occurred between 1983 and 1987 as a consequence of both an intense drought in the department of Potosí and the closure of the State mines.

Since the last census, it is believed that internal growth has led to an increase in the population of the region, but there are no recent data available. However, a new census of the reserve and area of influence is planned for this year (2005).

24 Robison, D. 2000. Los primeros pasos para un monitoreo social y medio ambiental de la Tierra Comunitaria de Origen y Reserva de biosfera Pilón Lajas. In C. Miranda and I. Oetting. (Eds.) Experiencias de monitoreo socio-ambiental en Reservas de la Biosfera y otras áreas protegidas en la Amazonía. UNESCO. La Paz, Bolivia. 432 pp.

25 Silva, R. 1996. Primer taller de discusión con la población indígena para la elaboración de un Plan de Manejo, RB-TI Pilón Lajas. Final report. Veterinarios Sin Fronteras. 8 pp.

26 Ibid.

Southeast of the reserve, the colonist town of Yucumo is the main population center. Photo: SP

Social characteristics and organizational aspects

Tsimane and Mosetene Regional Council (CRTM), an affiliate of the CIDOB and Beni's Indigenous People's Council (*Central de Pueblos Indígenas de Beni* - CPIB) leads and represents the Pilón Lajas Communal Lands. CRTM's office adjacent to the reserve's administration until 2004 promoted a satisfying coordination between the two institutions, a situation which has since deteriorated (see below). CRTM, as well as other local indigenous organizations (especially the Great Tsimane Council, GCT), is relatively independent of the Municipal Government. Their relations are limited to creating specific agreements for basic service improvements[27].

CRTM and GCT have recently entered a conflict with the Tacanas People Organization (*Organización de Comunidades Originarias Tacanas* - OCIT), which is laying claim to and demanding the titling of its communal territory, which overlaps the northeastern portion of the Pilón Lajas TCO.

Colonists living in the reserve's area of influence are organized in thirteen centers, and are grouped into four federations that represent their interests at the local and national levels: FECAR (*Federación Especial de Colonizadores Agropecuarios de Rurrenabaque*), FEPAY, (*Federación Sindical de Productores Agropecuarios de Yucumo* - ex-FECY), FEAPB (*Federación Especial Agraria Puerta del Beni*) and FEACAB (*Federación Agropecuaria Integral de Colonizadores de Alto Beni*), located in Cascada.

These federations represent small farmers' unions that are further grouped into rural centers, according to the following distribution: FECAR represents six centers in Rurrenabaque municipality: Capilla, Cauchal, Nuevos Horizontes, Piedras Blancas, Palmar and Collana; FESPAI represents four centers: Palmar, Yucumo, Charal and Quiquibey; and FEACAB represents the

27 Pavez, I. 1998. Rurrenabaque: motosierristas y dilemas para la conservación de los bosques. In P. Pacheco and D. Kaimowitz (Eds.). Municipios y gestión forestal en el trópico boliviano. 489 pp.

Central Cascada.

The colonists' primary activities are farming, timber extraction, small-scale cattle raising, and to a lesser extent hunting and fishing. The principal pressure they exert on the reserve natural resources is through the clearing and burning of the piedmont forests to convert them to agricultural land. This practice affects almost the entire southern and eastern portions of the protected area.

More than 10 years after its creation, a large share of the local population remains to be convinced of the legitimacy and importance of the reserve. Photo: MSD

The colonist population is obviously increasing due to both internal growth and the constant influx of new migrants. However, it should be noted that this process may have slowed in recent years due to a northern shift of the colonization pressure (Ixiamas region and along the Beni river). The communities along the Yucumo-Rurrenabaque road are even considered to be fueling this sustained colonization wave, one of the most coveted destinations being the interior of the reserve[28].

As was previously mentioned, a new census is planned for 2005 in order to provide accurate statistics for the new Management Plan.

Economic activities and use of natural resources

The coexistence of different groups with conflictive interests along the reserve's entire eastern border has generated serious anthropogenic pressures that negatively impact not only the forest resources, but also the indigenous communities which rely on those resources for survival.

A significant portion of the reserve has been subjected to intense human activity for many years. The combination of past commercial hunting, the pressure exerted on the fauna by the timber companies during their operations, and ongoing subsistence hunting as well as uncontrolled land conversions have caused a significant depletion of the fauna, and have created extensive areas of secondary growth and degraded soils.buscando reducir las presiones sobre la tierra con la implementación de sistemas silvopastoriles y agroforestales que al mismo tiempo incrementen los ingresos de los pobladores.

28 Ribera, M.O. 2002. Diagnóstico resumen - Reserva de biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

a) Logging

At the time implementation of the reserve began (1996), there were nine timber companies working in the reserve and its area of influence. None of them operated according to the Forestry Law in force at the time and they did not observe the regulations provided by the Supreme Decree N°22,407 (1990 Ecological Historical Ban). In addition to extracting more timber than permitted, most worked without forestry permits, technicians, management plans, or maps of the reserve's borders.

Without exception, these companies sought the most valuable species - mahogany (*Swietenia macrophylla*), cedar (*Cedrela* sp.) and roble (*Amburana cearensis*). They did not implement any reforestation or other recovery technique that could have led to sustainable use of the timber resources. Instead, they depleted the richest stands found between in the piedmont, low montane, and riparian forests (especially along the Quiquibey river).

Their predatory practices and secondary activities also generated serious environmental damage. In order to extract timber, they built roads - many of which were unstable and unsafe as well as environmentally destructive. These roads had no drainage systems; they were opened on steep slopes; and small creeks were dammed with logs in order to facilitate the crossing of machinery. The use of dynamite was also common to open passages along certain mountain stretches[29].

Before its creation, a significant part of the reserve was exploited for its valuable timber resources. Small-scale illegal logging is still taking place within the PA. Photo: SP

The new Forestry Law of 1996 and the institutionalization of the Forest Service in mid 1997 (with the opening of local offices in Rurrenabaque and San Borja) precipitated the exodus of questionable logging companies, which had generated rejection in the local population because of their systematic tax evasions. The two timber companies whose concessions were retained under the new forestry regime (Monte Redondo and Berna Sucesores) were finally forced out several years later. Berna Sucesores withdrew in 2001 after Conservation International, with support from the Global Conservation Fund and the Gordon and Betty Moore Foundation, led a compensatory negotiation with the company.

Individual illegal loggers (chainsaw operators) were also operating in the area. Typically, they worked for clients from nearby towns or for timber companies. They penetrated the forest in search of valuable timber species, opening new trails or using abandoned forestry roads, and were generally found working in the former concession areas around Quiquibey river or in areas previously occupied by Selva Negra and SERIMA Companies[30]. Locals from the Mosetene communities Asunción

29 Bascope, F., P. Saravia, B. Orosco and R. Saravia. 1996. Evaluación de impacto ambiental debido a la explotación maderera en la Reserva de biosfera - Territorio Indígena Pilón Lajas y sugerencias para su manejo integral sostenible. Technical report. On behalf of Veterinarios Sin Fronteras. 39 pp.

30 Pavez, I. 1998. Rurrenabaque: motosierristas y dilemas para la conservación de los bosques. In P. Pacheco and

del Quiquibey and Gredal actively participated in these activities, while Chimanes worked as *rumberos*[31].

When the chainsaw operators were unable to find mahogany, cedar or roble, they sought the following species: gabún (*Otoba parvifolia*), sangre de toro (*Virola peruviana*), tajibo (*Tabebuia* sp.), verdolago (*Terminalia* sp.) and cachichira (*Sloanea cf. obtusifolia*).

Overall, individual chainsaw operators cause less environmental damage than logging companies and their heavy machinery. Yet, chainsaw logging techniques are inefficient and waste a considerable amount of wood per tree in the process, meaning that more trees must be cut using this method to reap the desired volume of marketable timber. This lucrative activity, despite its illegality, supplied most of the wood consumed in the Beni Department[32]. Up until the end of 1997, when the new Forestry Law was implemented, all segments of the local population were in some way or another involved in chainsaw logging, either directly or indirectly, from indigenous people to local elites in Rurrenabaque and other nearby towns.

Roads opened by logging companies operating inside the reserve until the end of the 90's. The last timber concession, owned by the Berna Sucesores firm, was finally closed in 2001.

Implementation of the new forestry regime and a series of actions taken by the reserve's protection corps have successfully reduced logging over the last few years. Nonetheless, the threat to the relict stands of valuable timber remains high. Chainsaw operators are trying to legalize their situation and regain access to the forest via establishment of Communal Forestry Groups (*Agrupaciones Comunales Forestales* - ACFs). Given the fact that certain uses are permitted within the protected area and that the 'Indigenous Communal Lands' category grants the indigenous people a collective title to the land, the question of banning loggers access to the reserve's forestry resources is more a political than a legal issue. Indeed, in spite of being legally allowed to prevent loggers from entering their territory, there is no guarantee that the indigenous communities will be able to do so.

D. Kaimowitz (Eds.). Municipios y gestión forestal en el trópico boliviano. 489 pp.

31 People who guide loggers to stands of valuable tree species within the forest.

32 PAF. 1995. Situación del sector forestal del departamento del Beni. Plan de Acción Forestal para Bolivia. La Paz. 116 pp.

This problem is compounded by the fact that even within the indigenous community there are individuals requesting the creation of ACFs (from both the Chimane and Mosetene ethnic groups), creating intense division among indigenous leaders.

It should be noted that up until now, indigenous forestry has been focused on domestic and communal use (for example building schools, banks, offices, and tourism lodges) and that Tsimane Great Council's proposal to commercialize timber from the zone has been rejected in favor of ecotourism development as a source of economic growth[33].

b) Collection of non-timber forest products

Indigenous communities gather a wide variety of non-timber forest products (NTFPs) such as fruit, seeds, fibers, resins and latex, medicinal plants, honey, and turtle eggs.

There is a strong demand in local and regional markets for hearts of palm (from *Euterpe precatoria*) and palm fronds (from *Geonoma deversa*, an understory palm) from species preferred for roof construction. Both resources were once abundant in the area, but overharvesting has reduced both species' distribution throughout accessible zones. It does not appear that harvest techniques damage the forest; however, once overharvest occurs - affecting and significantly reducing these species' natural regeneration - it can transform the forest from primary (or virgin) forest to a residual (disturbed) forest.

Used mainly in the fabrication of roofs, the jatata (Geonoma deversa) palm frond is one of several NTFPs that have the potential to yield economic benefits for the residents of the reserve. Nonetheless, at present harvest rates this resource is being rapidly exhausted. Photo: MSD

Other NTFPs harvested (and sold locally) include wild fruits like ocoró (*Rheedia* sp.), achachairú (*Rheedia madruno*) and paquió (*Himenaea courbaril*), and palm fruits including motacú (*Attalea princeps*), chima or tembe (*Bactris gasipaes*) and majo (*Jessenia bataua*).

Some trees, lianas, grasses, and palms are collected for handicrafts and medication, although their harvest is on a much smaller scale than the previously mentioned products. Local crafts include mats, baskets, bows, and wooden boats, among others[34].

33 Ribera, M.O. 2004. Reporte de sobrevuelo a la RB-TCO Pilón Lajas. Unpublished.

34 VSF. 1998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

c) Agriculture and livestock raising

Agriculture is one of the most important subsistence activities for the indigenous people in and around the area. The three main crops farmed after land conversion are rice, corn (maize) and yucca; the first two are always farmed, but people from the East also grow yucca. To a lesser degree, they grow other crops such as plantains, citrus, papaya, mango, annatto, cherimoya, avocado, bananas, tomato, yams, beans, sugar cane, and pineapple.

Locations of agricultural plots prepared every year vary depending on the family and ethnic group, but in general as close to the settlement as possible. The majority of the indigenous families farm a total area less than 3 ha in size (summing up of all of their areas in active production)[35].

Both the Mosetene and Chimane people conduct their agricultural activities at the nuclear family level, although the most difficult chores, like parcel clearing and rice harvest, are usually done with the help of extended family members[36].

A current trend among some indigenous communities, especially the Chimane communities located in the colonization zone (El Dorado, Caripo, Canaan, Yacumita, Río Pando, Núcleo 24, Bajo Colorado, San Bernardo, Chocolatal, and Santa Rosita), is to increase production of crops in high demand in regional markets (like rice, yucca, and plantain) in order to sell surpluses. As a result, farm areas tend to increase in size and crop diversity tends to be simplified over time, leading to a loss in agrobiodiversity[37].

The average size of indigenous agricultural plots has tended to increase in recent years, influenced by the market logic introduced to the area by the colonist population. Photo: SP

Raising livestock is not common within the protected area, primarily carried out by the Chimane communities settled along the road, using techniques adapted from the

35 Silva, R. 1997. Características demográficas y socioeconómicas de la población indígena: Recomendaciones para un plan de manejo orientado a una mejora de su calidad de vida. Territorio Indígena Reserva de biosfera Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 52 pp.

36 Balza, R. 1998. Análisis de la factibilidad social para el aprovechamiento de recursos maderables bajo la responsabilidad de los indígenas de la TCO-RB Pilón Lajas. Informe final. On behalf of Veterinarios Sin Fronteras.

37 Ribera, M.O. 2002. Diagnóstico resumen - Reserva de biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

colonists.

Guided by market forces, colonists' short-term productive cycles are based on the slash-and-burn of primary forest and planting of rice and corn in Year One. In Year Two, they plant yucca. In year three, the farm plot is left fallow or pasture grasses are planted for cattle. This typical cycle, practiced on medium-sized parcels (between 2 and 6 ha), leads to soil erosion problems and lowered productivity. The use of agrochemicals is common among the colonists despite the scale of operations[38].

Several non-governmental organizations (VSF, DED, CESA) have been working with colonist settlements, primarily promoting and implementing silvopasture and agroforestry systems in an effort to reduce pressure on the land, and to help farmers increase their earnings, but most of these alternative development projects have failed to provide viable solutions.

A clear trend from forest to cattle pasture can be seen in the agricultural landscape between Yucumo and Rurrenabaque, in which the oldest communities (near Yucumo) have more pastureland dedicated to raising cattle than the newer settlements.

d) Hunting and fishing

Subsistence hunting is one of the main factors affecting the fauna of Pilón Lajas. Bush meat and fish are the most important sources of protein for the area's indigenous groups.

Commercial hunting of wildlife has significantly declined since the close of the pelt trade for caiman, boa, otter, and cats[39]. There is still a local market for fresh and cured bush meat and for river turtle eggs, as well as for live animals (especially birds and monkeys), which indigenous and nearby inhabitants keep as pets.

In the past, hunting pressure exerted by timber company workers and illegal loggers seriously affected medium and large mammals in the reserve (especially lowland tapirs, peccaries, deer, monkeys, pacas, and tinamou). Today, the populations of these preferred prey are slowly recuperating.

The lowest animal densities are found along the Rurrenabaque-Yucumo road, in zones of influence surrounding logging roads, and in a 10-20 km belt surrounding navigable rivers. The only true fauna refuges are found in inaccessible patches of primary forest.

Hunting and fishing complement agricultural activities year-round. Subsistence hunting is intensified between March and May when the frugivorous animals are well-fed. Fishing is intensified between August and December, during the dry season.

38 Escóbar, V. 1996. Estudio inicial de alternativas de industrialización y mercado para productos agroforestales de la Reserva de biosfera y Territorio Indígena Pilón Lajas. Informe final. On behalf of Veterinarios Sin Fronteras.

39 Barrera, S., J. Guerra, F. Osorio, J. Sarmiento, and L. Villalba. 1994. Territorio Indígena-Reserva de biosfera Pilón Lajas. Reconocimiento preliminar de la fauna. Technical report. CBF-IE/VSF. La Paz. 57 pp.

In addition to providing important protein in the diet, hunting and fishing provides a significant means for maintaining group cohesion through the sharing of catches with family members. As in other forested regions of the country, the use of firearms among the indigenous communities along the Quiquibey river is on the rise, although all families still rely on bows and arrows[40].

In the case of hunting territories, there is a certain degree of overlap between the different communities' hunting zones, particularly in areas with more prey. In the case of fishing territories, the fishermen have introduced and respect relatively strict space distributions within and between communities.

The most common traditional fishing methods include: bow and arrow, hand nets, traps made out of chuchío or charo (*Gynerium sagittatum*) and poisoning with barbasco, a natural toxin made from the leaves of the sacha bush (*Tephrosia vogelii*), or from resin of the ochoó tree (*Hura crepitans*)[41]. Commonly-used, introduced equipment includes fishing poles and hooks, and throw-nets called "malladeras". Colonists, many of which come from mining zones, also use these nets and dynamite.

Small-scale, illegal, commercial fishing occurs in the area to supply Rurrenabaque's market and other nearby areas. Desired species include the larger ones, such as barred sorubim (*Pseudoplatystoma fasciatum* and *P. tigrinum*), sábalo (*Prochilodus nigricans*), dorado, mamure (*Brycon* sp.) pacú (*Colossoma macropomum*), bagre (*Pimelodus clarias*) and blanquillo (Pimelodidae). These species are found in the upper watersheds because of reproductive migrations toward Andean and sub-Andean zones. Indigenous people also consume other, smaller-sized fish.

In the context of the dual categorization of Pilón Lajas as a Biosphere Reserve and Communal Lands, it should be noted that governmental policies for populating the country's lowlands (mostly by highland colonists) over the last several decades have usually been accompanied by the acculturation of the native population. Typically, indigenous people slowly adopt foreign lifestyles that lack a vision of sustainable resource use (characterized by a predatory production logic, intensive soil use, and social inequity). In addition, there are many reports of mistreatments from colonists, examples of which include land invasions, discrimination, labor exploitation, and even direct physical violence.

This acculturation phenomenon is particularly strong in Chimane communities along the Yucumo-Rurrenabaque road (Alto Colorado, Núcleo 24, etc.), where a growing number of indigenous families are adopting colonist-style production models, including the conversion of forest into pastureland for cattle. However, because of the predominace of poor soils inappropriate for agricultural development, production has turned extensive, with shorter rest periods and lower levels of productivity, which threatens to lead to a '*fallow crisis*'[42].

40 Ribera, M.O. 2002. Diagnóstico resumen - Reserva de biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

41 VSF. 1998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

42 Ribera, M.O. 2004. Reporte de sobrevuelo a la RB-TCO Pilón Lajas. Unpublished.

The inclination towards accelerated development alternatives demonstrated by many indigenous leaders and directors (who express, for example, their desire to bring television to their communities) weakens the theory that indigenous groups will continue to act as protectors of the forest, based on values and knowledge acquired over the centuries. In search of quick development, reserve residents risk losing their traditional practices and the natural resource wealth that has allowed them to survive until now.

Tourism

Tourism in the reserve is still incipient. Of the 13,000 national and international tourists visiting the zone every year, only 200 to 300 people visit Pilón Lajas while practically 00% visit the plains (pampas) east of Rurrenabaque and Madidi National Park[43]. Pilón Lajas faces two major difficulties for developing tourism: 1) it is hard to access during the rainy season, and 2) presents low densities of charismatic animals, i.e. those species most frequently coveted by tourists.

In spite of these obstacles, the reserve's tourism potential is very high. Attractions include several navigable rivers, a beautiful lake (Laguna Azul), several archeological sites, and numerous indigenous settlements. Current tourism infrastructure and service offerings are only beginning, in large part due to a 1999 decision by the indigenous people and the reserve administration to prohibit tourism operations until there were regulations in place to control it. For now, the only tourist activities permitted within the area are one ecotourism lodge, Mapajo, managed by the Chimane-

43 Robison, D. 2000. Los primeros pasos para un monitoreo social y medio ambiental de la Tierra Comunitaria de Origen y Reserva de Biosfera Pilón Lajas. In C. Miranda and I. Oetting (Eds.). Experiencias de monitoreo socio-ambiental en Reservas de la Biosfera y otras áreas protegidas en la Amazonía. UNESCO. La Paz, Bolivia. 432 pp.

Mosetene community Asunción del Quiquibey, and two other projects detailed below.

Defining the criteria on how best to open Pilón Lajas to tourism is a current topic of debate. One document has been drafted to regulate ecotourism in the protected area[44], placing special emphasis on the production of tangible benefits for the local communities. The Municipal Government of Rurrenabaque and the tourism agencies seeking access to the area support the proposal.

The jungle town of Rurrenabaque, main access point to Pilon Lajas, receives more than 13,000 tourists annually. However, at present the reserve captures only a very reduced fraction of this visitor flow. Photo: SP

The approval of this Tourism Regulation Plan seems hindered by a general lack of interest on the part of certain indigenous communities and even the CRTM (whose Strategic Development Plan completely ignores this issue). At the same time, some tourist agencies have begun direct discussions with certain communities to start offering joint tourism packages. These discussions weaken the hope of coordinating efforts across the indigenous territory, or exercizing any effective control on this activity. A limited number of tour agencies should receive permits as an experiment, while the tourism development model wished for the area will be left to decide at a

44 *Reglamento de Ordenamiento Turístico.*

latter date. The reserve director considers that the indigenous people should have priority, but not exclusivity, when it comes to tourism operations within the reserve.

Box N°2: Main ecotourism projects in and around the Pilón-Lajas BR-TCO

The three ecotourism projects in the reserve and its area of influence are:

- Mapajo Ecotourism Lodge

This project began in 1998 with support from the embassies of the United Kingdom and Canada, the Regional Amazonian Indigenous People Support Program (PRAIA), and the United Nation's Development Program. The investment totaled US$ 200,000 (compared to the US$ 1.5 million investment in Chalalán in Madidi Integrated Natural Management Area). Mapajo changed its status from that of project to a small community business when it started operating two years ago (under its new name: Mapajo Ecoturismo Indígena S.R.L.), paying rent to the communities for use of the infrastructure. This year, approximately 200 tourists arrived, traveling from Rurrenabaque on the Beni river. Conservation International helps promote the lodge and PRAIA provides a technician. A product of joint efforts between Asunción de Quiquibey and five surrounding communities, the emphasis differs from Madidi's Chalalán Ecolodge in that it focuses more on the area's cultural values (all infrastructure reflects and respects traditional styles and the community operates a crafts center). The fact that this project has not yet benefited all communities has created several skeptics among the partners who had hoped for quick results. Some of them have started their own lodges independently of Mapajo, while others (Real Beni) have decided to abandon their tourist offering because of the problems encountered in the distribution of incomes.

- Social Ecological Tourism Project (Proyecto de Turismo Ecológico Social, TES)

Supported by the Swiss international aid agency (PADER COSUDE) and the Vice Ministry of Tourism and based on training courses offered by VSF several years ago, this is an agroforestry project with the communities of La Unión, Playa Ancha, and Nuevos Horizontes. Community members work to make forest products and crafts for sale to tourists.

- Agroecotourism Project in Cebú

This project is a result of a collaboration between VSF, DED, PADER COSUDE, the Vice Minister of Tourism, and the Municipal Government of Rurrenabaque. Conservation International and ICIB oversee and support the project with USAID funds. The project promotes visits to agricultural and craft sites in Cebú (7 km from Rurrenabaque). Other activities including horseback riding and construction of a canopy observation platform are planned.

Conservation and Research Programs

Since Ted Parker's first ornithological study (1989) of the area[45], several specific flora and fauna inventory studies have been conducted in the region. Information used to write the 1997-2001 Management Plan relied on an exhaustive diagnosis conducted by VSF in 1995 and a series of technical studies carried out between 1996 and 1997 on the area's flora and fauna, natural resources, the legal situation of logging companies, land tenure, archeology, ecotourism, and the impact of gold mining on local rivers[46].

The collections of the Noel Kempff Mercado Natural History Museum (MHNNKM) built upon Smith's floristic inventories (conducted between 1998 and 1991) under an agreement to produce a preliminary list of plant species for the reserve. The list was based on 1,300 specimens sampled in the piedmont forests between Rurrenabaque and Yucumo, in the valley of the Quiquibey river, and in the Pilón and Bala mountain ranges[47]. The authors of these species list drew attention to significant information gaps, indicating that future efforts should focus on the southeastern portion of the area (Inicuano) and the least accessible zones of the Pilón and Bala mountains, where soil conditions have favored the development of matorrales rich in endemic species and species with very restricted geographic ranges[48]. Concerning animal species, inventories are still needed, especially of amphibians, reptiles, and small mammals (marsupials, bats, and rodents).

Interpreting Landsat satellite images (1990, 1:100,000 scale), Hinojosa (1994) created a preliminary vegetation map for the area, composed of 11 classes. This map was updated by MHNNKM in 2000 and has since been refined by the Wildlife Conservation Society (WCS) team in La Paz.

Aside from the few studies mentioned, there has been limited scientific activity in the area, in part because of nearby protected areas with active science programs. In 2003, there were two theses conducted in the area: "*The State of Conservation of Upper Quiquibey river's Ichthyofauna*"

45 Parker, T. 1989. An avifaunal survey of the Chimanes ecosystem program area of northern Bolivia. Technical report. Conservation International, Washington, D.C.

46 VSF. 1998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

47 Smith, D. and T. Killeen. 1994. Annotated checklist of the vascular plants of the Serranía de Pilón Lajas and the adjacent piedmont, Ballivian Province, Beni, Bolivia.

48 Ribera, M.O. 2004. Reporte de sobrevuelo a la RB-TCO Pilón Lajas. Unpublished.

and "*Animals Used in Traditional Medicine in Asunción del Quiquibey and Alto Colorado Native Communities*"[49].

Current research projects include an evaluation of the area's reptiles (MHNNKM) and a study of the fish associations and fishing practices in the colonization zone (led by the *Colección Boliviana de Fauna* - CBF).

Because of the reserve's high potential for applied investigation in ethnobotany and the sustainable use of wildlife species, a person should be contracted to promote, coordinate, and evaluate research, and to take further actions within the area based on results. Currently active institutions concentrate efforts on strengthening the area and developing alternative economic sources for local populations, both of which have produced few results to date.

Institutions with activities in the area include ICIB (*Instituto para la Conservación e Investigación de la Biodiversidad*), German Aid (*Deutscher EntwicklungsDienst* - DED), WCS, and Conservation International (CI). CI is supporting the constitution of an Interinstitutional Coordination Council.

ICIB and CI are implementing the environmental communication and education component of the larger "*Carrasco National Park and Pilón Lajas Biosphere Reserve-Communal Lands Management Strengthening Project*", financed by USAID. Part of their work includes creating the reserves' environmental education and communication strategy, a work still in progress after the hiring of an environmental education specialist was delayed. Other activities include:

- natural resource management and support of sustainable economic initiatives (vanilla, jatata, ecotourism);
- strengthening of CRTM;
- construction of a nature interpretation center (pending approval from SERNAP's central unit);
- support to land titling; evaluation of tourist services (a comparative analysis of various Rurrenabaque operators using a ranking system).

DED's project focuses on social participation and management in the area corresponding to the FECAR federation (in the Rurrenabaque area). They have two experts working to identify and categorize women's needs in the colonization zones in order to present the results to the municipal government and other likely supporters.

WCS provides technical support in tourism (including self regulation of hunting activities around the community) to Asunción del Quiquibey as part of its Living Landscapes Project. WCS is also in the process of implementing a monitoring system in the reserve. In addition, WCS has used the experience acquired with the drafting of the Madidi NP-IMNA Management Plan to lead the update of the reserve's own Management Plan.

49 "Estado de conservación de la ictiofauna en la parte alta del río Quiquibey" and "Animales utilizados en la medicina tradicional en las comunidades originarias Asunción del Quiquibey y Alto Colorado", respectively.

Other organizations working in the area include PRISA-Bolivia, who developed two small agroforestry projects in the Yucumo area and CARITAS who has promoted rural development in Yucumo for several years.

With funds from the Natural Resource Management Component of GEF-II Project, the SERNAP is supporting AIPAC (*Asociación Integral de Productores Agropecuarios de Cascada*) plans to promote ecological coffee production and a beekeepers association (APABIO) in the Cascada area.

Production of organic coffee in La Cascada. Photo: SP

Pressures and Threats

Pressures and threats to Pilón Lajas Biosphere Reserve and Communal Lands include:

Pressures

- Social conflicts and invasions into the reserve
- Illegal logging
- Hunting and fishing
- Development projects in the reserve's area of influence

Threats

- Coordination problems between the reserve administration and the CRTM
- New human settlements - Landless Peasants' Movement
- Oil exploration

The expansion of the agricultural frontier into the reserve is threatening its last remnants of piedmont forest. Photo: MSD

Pressures

Social conflicts and invasions into the reserve

The high demand for natural resources has caused a series of social conflicts between inhabitants in and around the reserve. Some stakeholders have provoked and manipulated many of these conflicts using misinformation to promote their own interests.

While the exodus of the logging companies at the end of the 1990s definitely resolved some of the natural resource conflicts, today's primary social conflict is related to land availability. The two underlying factors for this conflict are: The impoverishment of land parcels (25 ha/ family), which were unfit for agriculture but which were nevertheless granted by the National Colonization Institute (INC) during the 1980s; Natural population growth and continuous increase in the demand for land, which has resulted in the division of the available land into smaller plots, such as had already happened on the altiplano in the past decades, fuelling the peasant's migration to the lowlands when the size of the family plots had become insufficient to feed all their members.

These circumstances, compounded by a lack of health and education services, lead to a deteriorating quality of life. People in these circumstances tend to seek new lands, placing the reserve's foothills where soil is relatively fertile and slopes are moderate under increased invasion pressure.

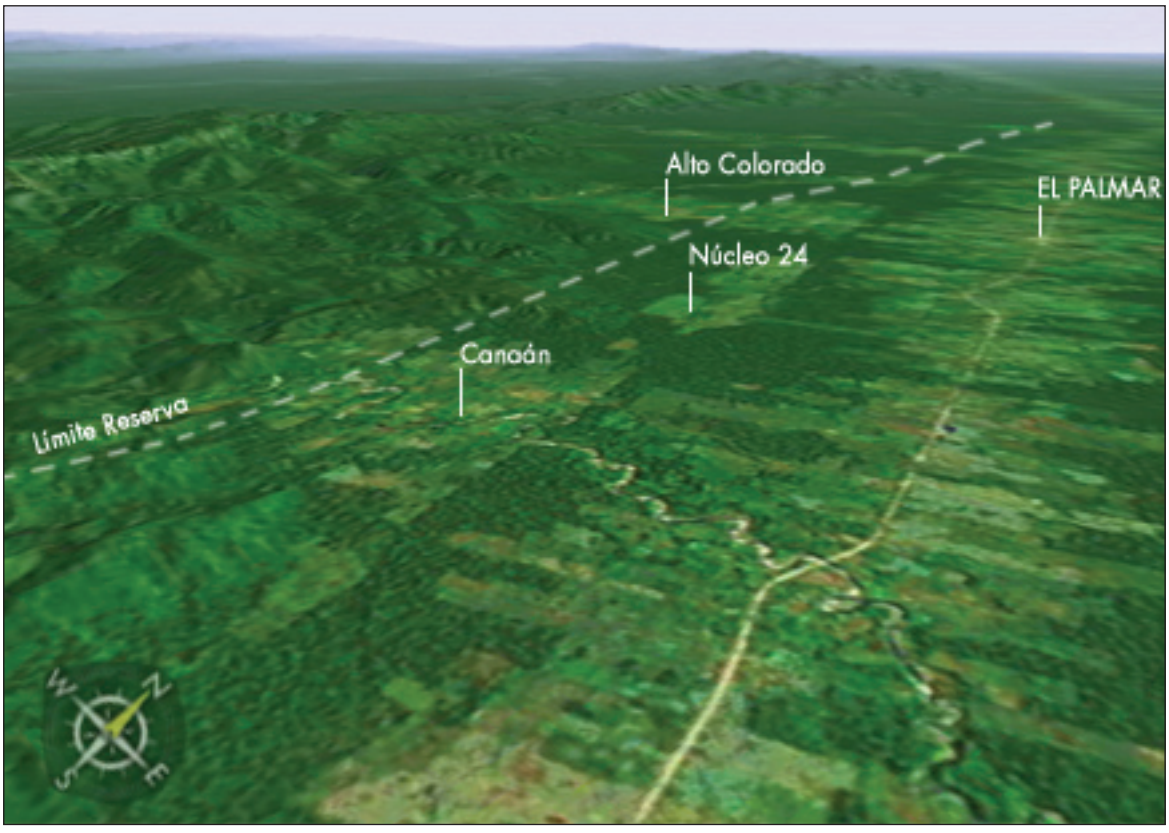
An overflight conducted in February 2004 in the framework of the Resource Management component of the GEF-II Project provided insight on the alarming magnitude of the agricultural frontier expansion into the reserve [50]. Approximately 20% (15,000 ha) of the reserve's eastern side have apparently already been affected. This survey did not even include clearings in other zones like Cascada or Carmen Florida close to Beni river, where requests for the degazetting of the reserve are frequently issued[51].

Over the last ten years, deforestation has converted forested land into a mosaic of agricultural plots, stretches of fallow land, and planted pastures. Deforested areas in the south (Colorado river and Yucumo) and secondary vegetation between the road and the mountains are contiguous in nature (following a 'fishbone' pattern along access routes). Towards the north (Aroma - Villa Imperial, Nuevos Horizontes, Playa Ancha), further from the road (2-4 km inside reserve borders) deforestation still occurs in isolated patches.

50 Ribera, M.O. 2004. Reporte de sobrevuelo a la RB-TCO Pilón Lajas. Unpublished.

51 Ten significant foothill and mountain ecosystems requiring intervention areas have been identified from Rurrenabaque to the Casacada region: a) The area next to Rurrenabaque to Hondo river; b) Cebú; c) Rinconada -Cauchal -6 de Julio; d) Nuevos Horizontes - Unión; e) Villa El Carmen - Playa Ancha - Collana - San Bartolomé; f) Piedras Blancas - San Fermín - Ingavi; g) Aroma - Palmar - Yacuma - Hermanos Katari - Villa imperial, which includes the area between the Colorado river and the Alto Colorado community; h) Canaan - Pacajes; i) Yucumo; j) Quiquibey - Charal - Cascada.

Aerial photography from a February 2004 overflight, showing forest fragmentation in the Canaan-Pacajes area, in the southeastern part of the reserve. Photo: M.O. Ribera



View of a stretch of the Yucumo-Rurrenabaque, revealing a fishbone deforestation pattern and extensive encroachment into the reserve. Source: EarthSat/Google Earth.

There are three possible explanations for this non-linear expansion:

(i) the presence of better soils (although subject to erosion) in the higher parts of the foothills;

(ii) people seeking to avoid control measures; and/or

iii) people occupying areas in hopes of obtaining a title to the land.

The large number of sawmills along the Yucumo-Rurrenabaque road is a clear indication of the lack of enforcement of the new Forestry Regime. Photo: SP

Poor coordination between the reserve's administration and CRTM almost invariably benefited the colonists during INRA's fieldwork in 2003 to determine land titles. Many land holdings were recognized and are to be titled in the future public results notification, in spite of the fact that second generation colonists are almost entirely responsible for these encroachments, and therefore illegal.

In the most affected zones including Playa Ancha, Piedras Blancas, Villa Imperial, Ingavi-Aroma, Colorado river, and Yucumo, large, mixed-age agricultural mosaics prevail. They vary in size between 50 and 200 ha, and often connect with one another to form extended, deforested zones (one such zone spans more than 1,200 ha).

In addition to this situation, small- and medium-sized sawmills operate with or without permission from the Forest Service. The mills purchase wood originating from these cleared parcels, often employing the "*habilito*" credit system, in which the mill provides a cash credit or other products or goods in exchange for wood. Species include ochoó, laurel, verdolago, mascajo, mapajo, cachichira and other medium-quality species. It seems that raising cattle is no longer the main motivation for extensive deforestation; rather this wood-for-cash/goods system appears to be the

Cattle ranching by colonists on indigenous lands inside the reserve. Photos: SP

main incentive. Low cattle densities in most of the deforested areas tend to confirm this theory.

Land encroachments not only cause large-scale habitat loss and impact fragile soils, they may also threaten the customs and traditional living of indigenous peoples. Since colonization began, many indigenous communities have had to abandon their territories or reduce their hunting grounds because of problems cohabitating with colonists. In places, they have adopted productive systems unsuited for the regional soil conditions including converting forests to pasture for raising cattle.

As a result of these changes, colonists, and even cooperatives and associations, now occupy the land most appropriate for agriculture in the reserve's area of influence (lands that the indigenous people used to occupy and manage). The colonists often do not cultivate these lands, yet they exercise purported property rights when dealing with indigenous people[52].

To stop this continuous encroachment and settle the land ownership, a land titling was proposed soon after the designation of the Communal Lands - TCO) designation. VSF's preliminary efforts in 1997 (which were never completed because of serious conflicts between colonist and indigenous representatives) identified 128 requests for property titles (87 in the Beni Department, 41 in La Paz), of which 60 were partially or entirely within reserve borders[53].

Despite the urgency, the TCO land titling process (SAN-TCO) did not begin until the end of 2002 at CRTM's insistence and under INRA's direction. Today, the process has entered its final phase: field work is being concluded, property titles are being legally validated, and results are being publicly announced. In addition, the Agrarian Tribunal is reviewing several third-party appeals.

Probable results of this process include:

1. A 10-15% reduction of the Pilón Lajas TCO in favor of colonists who were settled prior to its creation. The Pilón Lajas Biosphere Reserve will not be reduced in size.

2. User rights of these private inholdings will be subjected to protected area regulations and other restrictions as specified by the reserve's administration.

This new division causes several new problems:

1. Colonists, who are about to receive property rights within the protected area, in general do not acknowledge that these rights are still subject to the general Biosphere Reserve regulations, which is not yet an official category within the National Protected Area Regulations (RGAP, D.S. N°24,781 , July 31 , 1997).

2. FESPAI federation leaders' interpretation of the SAN-TCO process has distorted the agreements and has led to tensions with the reserve's administration. Currently, colonists

52 Silva, R. 1997. Características demográficas y socioeconómicas de la población indígena: Recomendaciones para un plan de manejo orientado a una mejora de su calidad de vida. Territorio Indígena Reserva de Biosfera Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 52 pp.

53 República de Bolivia. 2001. Situación forestal de los territorios indígenas de las tierras bajas de Bolivia. Serie técnica XV.

are hoping for and Internal Titling (SAN-INT), which should have been done directly along with the SAN-TCO.

3. Two colonist settlements, Piedras Blancas and Riberas del Quiquibey (Alto Quiquibey), continue to expand their land holdings into the reserve, while refraining from participating in the titling procedures. This is creating strong tensions with the indigenous communities, who, according to those interviewed, are much less tolerant and even belligerent when it comes to new settlements within the Communal Lands (TCO). This is confirmed by the CRTM's tendency to adopt progressively more radical positions.

4. The SAN-TCO titling process gave the indigenous people an important role in defining the new TCO borders. Unfortunately, the communities selected a representative with insufficient negotiation skills in front of the colonists' demands. He even ceded significant areas to a pressure group motivated by logging interests in the TCO's southern zone (12,000 ha)[54]. The indigenous communities are now questioning the titling results and the administration has requested a new process (Simple Titling, SAN-SIM)[55] to determine the legitimacy of several third-party requests and to correct abuses. It should be noted that the reserve now has a lawyer to work with INRA to correct these types of irregularities.

These four points are threatening the long-awaited land titling process as well as long-term efforts to make peace with settlers, who have refused to accept the reserve's existence from the beginning and who demand revised demarcation (moving the reserve limits toward the mountain tops) and even total dissolution (particularly conflictive are areas within reserve borders, but outside of the TCO).

Another notable situation within these property rights conflicts is that members of the Tacana ethnicity have not been considered in the Pilón Lajas TCO titling, and as a result, some Tacana families risk eviction by certain uncompromising settlers (mostly in the Rurrenabaque zone). It is expected that the SAN-SIM process will resolve this situation as well, but very few indigenous families possess documents backing their property claims. Furthermore, the land titling procedures are based on the colonist system (lots, plots, etc.), which is incompatible with the indigenous land and resource use system.

54 In general, the TCO and Regional Council are unable to stand up to colonist demands; this situation is complicated by the growing division between indigenous communities within the reserve (west of the mountain range) and those that are close to the road, some of which are also within the reserve's borders. These communities have been aculturalized and are basically incorporated to the colonist economy, albeit with an underprivileged status.

55 This process is exercized only if and when requested in cadastral areas when a conflict of overlapping rights is detected in agrarian properties, national parks, state reserves, biodiversity reserves, and other legally classified areas.

Illegal logging

The creation of the Pilón Lajas reserve in an area ridden with forestry-related conflicts basically ensured that the protection of its remaining tracts of valuable timber would be no small feat[56]. Even though the area's zoning plan authorizes some logging activities in certain parts of the reserve, the most interesting stands are also found in "core" or "watershed protection" zones.

Today, species depleted during the logging boom - mahogany (*Swietenia macrophylla*), cedar (*Cedrela odorata*) and roble (*Amburana caerensis*) - only remain in poorly accessible areas, that is, on steep mountain slopes. Mahogany, for example, has been entirely extirpated from the area's piedmont forests.

Even though chainsaw logging has diminished significantly over the last few years due to the exhaustion of the precious woods, it still plays a significant role in the local economy (there are more than 15 sawmills between Yucumo and Rurrenabaque). The following locations are the most affected: Aroma-Villa Imperial, Nuevos Horizontes and Playa Ancha in the northeast and Quiquibey-Charal-Cascada in the southeast (corresponding to the previously mentioned deforested areas), where informants affirm that two truckloads of timber are removed daily[57].

Other points of contention include recurrent cut permit requests in Eden, Puente Yucumo, and San José and cases of illegal logging within the Chimane community of Alto Colorado (apparently organized by the Huallata family, a name associated with other breaches of the reserve's regulations), which led to tensions situation between the reserve's administration and the villagers when it came to deciding the fate of timber confiscated last year in this community (see photo).

Uncertain fate of mahogany boards decommissioned within the protected area. The reserve administration had a difficult time stopping the illegal sale of this timber. Photo: SP

Even though indigenous leaders claim to be against

56 Pavez, I. 1998. Rurrenabaque: motosierristas y dilemas para la conservación de los bosques. In P. Pacheco y D. Kaimowitz (Eds.). Municipios y gestión forestal en el trópico boliviano. 489 pp.

57 Ribera, M.O. 2002. Diagnóstico resumen - Reserva de biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

this demand and organized themselves to impede the sale of the timber (after an agreement had been met with the reserve to use it for communal purposes), when it came to applying the regulations the community demonstrated a strong opposition, supported by the CRTM, whose new president is also known to be involved in the timber trade.

Sawmill in the environs of the town of Rurrenabaque. Photo: SP

Another constant threat is Rurrenabaque Forestry Unit's (SIF) continued complacency towards municipal timber companies' requests to access the areas the old Management Plan proposed as forestry use zones[58]. In addition, SIF's serious technical deficiencies to properly regulate and control extraction have resulted in irregular and illegal logging within the TCO in order to supply wood to the local sawmills[59].

Notable deficiencies seriously limit the scope of the protection corps' efforts, including weaknesses in the current Management Plan and the area's forestry inventory, an insufficient number of park guards, and repeated delays in budget payments. For example, because of a lack of operating funds at the beginning of 2004, almost all of the park guards had to retreat to Rurrenabaque, thwarting the benefits of months, and possibly years of vigilance work in certain areas.

Additionally, limitations in the judicial system (for example, the inertia of the legal procedures, which imply a minimum of 15 days for the processing of any offense) make decommissioning illegal timber difficult, if not impossible, and the threat of violence an unavoidable reality. During our fieldwork, every park guard we met claimed to have been threatened by loggers at some point.

Even though the TCO leaders support park guard control efforts, some of their radical actions, such as the burning of confiscated timber in Cascada in April 2005, often tend to aggravate tensions.

58 Balza, R. 1998. Análisis de la factibilidad social para el aprovechamiento de recursos maderables bajo la responsabilidad de los indígenas de la TCO-RB Pilón Lajas. Informe final. On behalf of Veterinarios Sin Fronteras.

59 Ribera, M.O. Comunicación personal.

Hunting and fishing

Fishing is an important source of protein for indigenous communities, which all engage in this activity and throughout most rivers. Fishing is most intense between September and November.

A barred sorubim (Pseudoplatystoma fasciatum) caught by a colonist in the vicinity of the Torewa community. Photo: MSD

Unlike the indigenous people, who mostly fish for personal consumption, colonists fishing inside the reserve frequently do so for commercial purposes, against regulations. While in the northern part of the reserve, close to Rurrenabaque, the presence of tourism operators results in a certain level of control, since tour guides advise park guards when they see infractions, such protection is not afforded to the southern part of the reserve (Charal-Puente Quiquibey-Chonta), where dynamite and large nets are often used.

The most affected species include mamure pintado (*Brycon* sp.), sabalo (*Prochilodus* sp.), catfish (*Pimelodus clarias*), barred sorubim (*Pseudoplatystoma fasciatum*), dorado (*Salminus maxillosus*), pacú (*Colossoma macropomum*), piraiba (*Brachyplatystoma filamentosum*) and palometa real (*Astronotus ocellatus*).

In contrast, the effects of hunting are felt the hardest in the reserve's northern portion, because of its closeness to Rurrenabaque, the main bush meat market. Colonist hunters enter and leave the reserve at night in order to avoid the control measures implemented by both park guards and indigenous residents, using generally rivers to penetrate the reserve's core.

Species that are most threatened by illegal hunting include collared peccary (*Tayassu tajacu*), white-lipped peccary (*Tayassu pecari*), tapir (*Tapirus terrestris*), nine-banded armadillo (*Dasypus novemcinctus*), black spider monkey (*Ateles paniscus*), red howler monkey (*Alouatta seniculus*), South American coati (*Nasua nasua*), giant armadillo (*Priodontes maximus*), deer (*Mazama* sp.), and Spix's guan (*Penelope jacquacu*). Signs of hunting are regularly noted within the reserve, but most affected areas are concentrated in the road's area of influence and along the Beni river. Research is needed in order to evaluate population status of the species most vulnerable to overhunting.

Towards the end of the dry season (between August and September), when animals are at their lowest weights, most people dedicate efforts to collecting river turtle (Podocnemis unifilis) eggs found on river beaches[60].

60 Perry, A., A. Hennessey, B. Ríos y R. Silva. 1997. Evaluación del uso actual de la fauna en el Territorio Indígena - Reserva de biosfera Pilón Lajas y su área de influencia. Fundación de Investigación e Exploración Tropical (TREX). Proyecto Elaboración del Plan de Manejo TI-RB Pilón Lajas. On behalf of Veterinarios Sin Fronteras.

Development projects in the reserve's area of influence

The advancing agricultural frontier and its gradual encroachment into the reserve have spawned numerous development projects in the reserve's influence zone. Many of these projects, past and present, have generated perverse incentives that led to a further increase in invasion pressure[61].

Cattle raised for commercial purposes inside the reserve. Photo: SP

For example, at the beginning of the 90s, the non-governmental organization CESA provided cattle to people who had established pasture on the forested hills. An ongoing project in the Palmar-Yucumo called the "Heifer Program," financed by Heifer International and managed by PROGYN, donates cows to settler families and builds feeding centers that stimulate calf production. This project provides a direct incentive to convert primary forest to pastureland.

Another worrying aspect is the contradictory doublespeak of some development organizations. For example, the organizations ASPAE (*Asociación de Productores Agroecológicos in Yucumo*) and ASIPA (*Asociación Integral de Productores Agropecuarios*) support the expansion of grazing lands in forested zones within the TCO, while at the same time expounding sustainability, ecological production, and defense of the reserve. By granting deforestation permits for areas within the reserve, the Agrarian Service acts as an accomplice to this organized pillage.

Threats

Coordination problems between the reserve administration and the CRTM

Since the Management Committee's presidency transferred from the reserve to the Rurrenabaque Municipal Government, relations between the reserve's administration and the CRTM have deteriorated notably, and led to a growing tendency to separate the Reserve and TCO concepts.

61 Ribera, M.O. 2004. Reporte de sobrevuelo a la RB-TCO Pilón Lajas. Unpublished.

The joint administration of the Reserve and the TCO is proving to be a complex undertaking. The Municipal Government of Rurrenabaque, in principle against the TCO for considering it "*a lot of land for few people*"[62], is comforted in its position by the ever more radical attitude adopted by the CRTM towards the colonists' aspirations to open new lands for farming. In the past year this institution has even distanced itself from the reserve administration, using funds provided by IBIS-Denmark[63] to move its office away from the reserve property. Acts of violence from indigenous people against a park guard have also perpetuated an increasingly uncooperative situation.

According to the reserve's director, the fundamental problem in the relationship in this coordination shortfall is a lack of clearly-defined roles for the two institutions. Signing a formal co-administration agreement would help divide and define roles for joint management, but the director feels that the CRTM is not currently prepared to take charge of this responsibility.

Another problem is the deteriorating relations between indigenous communities and conservation groups. Some of the problem can be traced to Giuseppe Lamele, one of the consultants in charge of drafting the previous TCO Strategic Development Plan. Based on the perception that the process lacked social participation, he is reported to have launched a campaign to discredit conservation organizations, in particular Conservation International, with obvious negative repercussions and impacts all the way to SERNAP's headquarters in La Paz.

It is feared that further deterioration of relations between the two institutions with jurisdiction over the area will convert the dispute into fertile ground for those sectors that are against the reserve or the TCO, even when the recent municipal elections in December 2004 seem to have placed the reserve in a more favorable position with municipal governments (especially in Palos Blancos where the timber-dealing mayor left was replaced by a more neutral person).

New human settlements - Landless Peasants' Movement

The reserve's 1997 Management Plan described the risk of new colonization to the area as follows:

"*Even though it appears that the colonization phenomenon in the area has stabilized, two current factors could change this:*

> *1.The new transoceanic road project, uniting Chilean and Peruvian ports with the Atlantic, and Brazilian ports with the Pacific, which passes by Yucumo and Rurrenabaque and which could attract new settlements.*
>
> *2. A new unemployment crisis in the highlands that could provoke the arrival of new settlers, especially towards Yucumo-Rurrenabaque and other areas in the north of the La Paz department."*

62 Juan Carlos Miranda (personal communication).

63 IBIS-Denmark is an NGO supporting the strengthening of indigenous peoples' political and organizational capacities.

In Bolivia's current political and economic climate, both scenarios sound each passing day more and more like astute predictions than pessimistic conjectures.

Lack of agriculturally-suitable land as well as the recent, brutal emergence of the Landless Peasants' Movement (Movimiento Sin Tierra - MST) in Bolivia threaten the integrity of many protected areas, especially those that present agricultural potential, like Pilón Lajas BR-TCO.

At the beginning of 2004, the MST sent a group of emissaries in an effort to recognize lands for potential settlements near Laguna Azul. Its local leader, Eufrasio Jauregui is threatening to invade the area with 300 people originating from the town of Caranavi (200 km southwest of the reserve). This threat is not an isolated case. Fortunately, the municipal elections held in December 2005 resulted in a rejection of this political affiliation.

It is worth noting that the conflicts generated by this recent threat may actually act as a reconciling factor between indigenous communities and certain colonist federations, which are both fiercely opposed to the arrival of new colonizer groups.

Oil exploration

The Pilón Lajas BR-TCO is located in a zone that oil companies consider potentially rich in hydrocarbons. Gulf, Shell and TOTAL have carried out prospecting activities in the area since the 70s. Extraction of the hydrocarbon resources from reserve soil has yet to occur, but one of two new 2-D seismic exploration projects in the region threatens to disfigure a significant area.

If the first project, promoted by REPSOL, would only affect Madidi NP-IMNA by limiting the exploitation to the Tuichi Block, the project promoted by the Brazilian company PETROBRAS in its concession (Río Hondo Block) would affect both Madidi and Pilón Lajas.

This project proposes two oil drills:

- One drill outside of the protected area (Southern Line) with base stations in Palo Blancos, which is approved and should begin operations soon;
- One drill within the protected area (Northern Line), between Núcleo 24 and Inicua river, in the Beu mountain range.

Characteristic impact of an oil drilling field in a tropical forest.
Photo: Pegasus/Visuals Unlimited

Implementing this project would result in severe environmental damage for the area. Specifically, in order to carry out seismic drilling: 1) a corridor hundreds of kilometers long is needed, which will cross four mountain ranges in the internal buffer and strict protection zones, areas supposedly incompatible with hydrocarbon development; 2) dynamite will be used to perforate thousands of wells; 3) complex infrastructure, including a network of heliports will have to be installed to transport, unload, and store material and to house a large staff (ca. 150 people).

While colonist groups support the Northern Line because they see it as a source of employment, the indigenous people and the reserve administrators strongly oppose it. Despite this opposition, PETROBRAS is insisting on moving forward and is currently waiting for the Vice Ministry of the Environment to approve its environmental license.

The fact that the project is illegal[64] is an inconsequential detail when considering the political power oil companies in Bolivia. PETROBRAS already operates illegally in other parts of the country, including the Gran Chaco, with total impunity. PETROBRAS is also well known for its poor record on maintaining its installations and conducting restoration - leaving old wells or other infrastructure in precarious conditions.

The decision to open Pilón Lajas BR-TCO to hydrocarbon exploration depends heavily on current changes to the national legislation. Concomitant with revising the Hydrocarbon Law (promoted by the same popular movement that led to the resignation of Gonzalo Sanchez de Lozada from the presidency in October 2003) is an effort to promulgate a Law to replace the weak Protected Areas Act (RGAP, D.S. N°24,781).

At present, there seems to be no way out of this situation, especially considering the focus of the most recent protected area law project - unanimously rejected by all conservation organizations - which proposed to not only legalize mining, logging, and oil exploration and extraction in protected areas, but to also grant the promoters of these activities the status of legitimate stakeholders within these protected areas' Management Committees[65]. What is more, the Bolivian legislation contains norms that seriously threaten the existence and integrity of protected areas and Communal Lands (TCOs). For example, the Hydrocarbon Law authorizes expropriation of land situated on a petroleum concession for prospecting and/or extraction. While homes and their outbuildings are exempt from this norm, the INRA Law further establishes that "collective properties can be expropriated in exchange for compensation"[66].

Even under such tenuous legal standing, recent events have shown that jurisprudence can effect

64 The "Río Hondo" Hydrocarbon Concession was granted to PETROBRAS after the declaration of the Pilón Lajas BR. According to its legal creation decree, oil exploration and extraction activities are strictly prohibited.

65 National System of Protected Areas Law Project, July 25, 2003 (Proyecto de Ley del Sistema Nacional de Áreas Protegidas). This text would legalize mining, logging, and oil drilling in protected areas, except in core zones, parks, and sanctuaries. However, given the dispositions for the revision of zoning plans and recategorization of protected areas, even national parks and other strictly protected areas would become vulnerable to oil exploitation. In the weaker categories, such as Biosphere Reserves, only small, redefined core zones would be protected.

66 VSF. 998. Plan de Manejo 1997-2001 - Reserva de biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

conservation, such as in 2001 when national institutions and the civil sector of Santa Cruz presented such a strong opposition that they forced ANDINA (an Amoco subsidiary) to abandon its oil exploration project inside Amboró NP-IMNA. Pilón Lajas BR-TCO's dual categorization, coupled with its biological richness, may provoke a similar reaction, but to date the resistance has not reached beyond the local sphere.

Recommended Solutions

Social conflicts and invasions into the reserve

In Bolivia's currently highly unstable political, social, and economic situation, especially in the north of the La Paz Department, the topic of land tenure has become a magnet of social conflicts. Multiple syndicated colonist organizations are pressuring governmental agencies to address their demands, causing a general weakening of democratic institutions. In the Pilón Lajas region, most colonists resent the reserve because of the restrictions associated with it and because of what they see as lack of communication and transparency about its regulations and objectives. In this context, land invasions are virtually unstoppable, and the call for the protected area's degazetting issued by certain sectors constitutes a permanent threat.

Two additional weaknesses combine to aggravate the problem:

a) the reserve borders were proposed without taking the local socio-cultural context and the area's agricultural potential into consideration, and;

b) protected area staff do not know where limits are and they do not effectively control the limits that are closest to the road[67].

In areas where the decree stipulates that the reserve limit is 5 km from the mountain range, there is no demarcation of this boundary, and it is

Exercizes such as this conservation valuation workshop require very few resources and allow to capitalize on the protection corps' experience while providing valuable training.
Photo: Roberto Daza

67 Only a recent overflight shed light on the magnitude of the advancing agricultural frontier. Neither reserve staff nor the indigenous council members were previously aware of its extent.

still necessary to come to an agreement with the closest settlers regarding the area's limits.

In concurrence with other institutions, ParksWatch considers that the reserve was poorly planned and the new Management Plan should revise the reserve's category and zoning using input and participation from the region's stakeholders. In addition, since Biosphere Reserves are not recognized in the Protected Areas General Regulation, the area should be recategorized to one of the management categories defined in this document. We consider the Integral Natural Management Area category to be the most compatible with its current management policies, while emphasizing the need to include areas of high conservation value in core zones.

A Titling Adjustment Process (SAN-SIM) should be conducted to correct abuses that occurred during the recent TCO titling process (SAN-TCO). Such a process will certainly be a delicate one, considering that both colonists and indigenous communities have adopted very radical positions. Based on this situation, we recommend that the park guards acquire a better knowledge of the area and that the efforts of the reserve administration be concentrated on improving relations with distinct social sectors and promote more participatory management via the Management Committee, whose composition must be urgently completed.

In addition, the protection corps should be trained in topics such as conflict resolution, disseminating information in local communities (environmental communication), environmental education, and alternative economic activities (that are compatible with conservation). Given SERNAP's chronic limitations related to training, staff should be participating in workshops organized by other entities at the local, region, national, and even international level. A recent example was CARE-Bolivia's training course for forest fire response and rescue.

Regarding recommendations for rezoning, the piedmont belt of medium and low lying hills in the reserves' eastern sector have been identified as one of the biologically richest Sub-Andean, Amazon tropical forests in the country, and maybe the world. It is also extremely fragile due to its geological and soil characteristics[68], and is one of the reserve's ecosystems most threatened by colonization. In this sector, the following zones, where agricultural frontier expansion is the most intense, should receive particular attention:

1) Colorado river's valley and foothills (towards Alto Colorado), where the mountains give way to rolling hills. Due to its easy accessibility, this area has seen the most extensive encroachment into the reserve borders and is under heavy logging pressure, including from indigenous families[69].

2) The plains facing the colonist communities of Playa Ancha and Nuevos Horizontes.

3) The Cascada-Alto Quiquibey zone, where colonist expansion and illegal chainsaw logging are progressing rapidly, facilitated by the reserve administration's weak capacity and the complacency of certain indigenous people.

68 Ribera, M.O. 2002. Diagnóstico resumen - Reserva de biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

69 Especially the Huallata family.

The reserve's entire highlands should be designated as a strict conservation zone because of their importance for watershed protection. All of the communities in the road's area of influence and a number of large cattle owners in the Beni Plains depend entirely on this water. Without exception, any and all products extracted from this area should be confiscated and those involved in their extraction sanctioned.

The cloud forests ensure a hydrological regulation function that benefits all the region's population. Photo: SP

Another recommendation is to promote awareness about and access to family planning in order to stifle the unsustainable population growth rate. The land is being rapidly exhausted, and it may not be long before all productive lands within the reserve are converted to human use. Institutions promoting alternative activities to reduce such pressure on the land should work with community members to develop awareness about the need to control family size.

Another serious problem detected is that many colonists waiting for property titles of reserve land do not accept to place to their production for conservation purposes. ParksWatch recommends two alternative solutions if negotiations between the reserve's administration and these families were to fail (both of which would be difficult to implement under current financial conditions):

a) Ecological service payments: funds could be raised to compensate property owners for respecting certain regulations (for example, not selling their lands, not deforesting, not burning, not littering, or not extracting natural resources).

b) Charges for grazing rights within the reserve: Guidelines and payment scales should be established by the TCO administration (CRTM) for grazing rights within the reserve. Not only would such a system establish a fair compensation mechanism for indigenous people deprived of their traditional lands, it would help them acquire a concrete basis for negotiating resource access with other groups. This model is a very common transaction in private cattle grazing fields.

Additional solutions recommended to resolve the encroachment threat are detailed in the *Development projects* section below.

New human settlements - Landless Peasants' Movement

Non-native immigrants looking to settle reserve land must be discouraged from arriving to the area in the first place, otherwise dangerous precedents will be set. Awareness should be raised regarding the negative effects new immigration waves would have on local development opportunities. Colonists should be dissuaded from inviting relatives and friends to settle the area, which is a common phenomenon in many colonist communities.

The area's administration should strictly block any new settlements and contain existing ones, seeking help from the police force or military if need be, as has already been the case in the past. One possible strategy to block new settlements is to strengthen the CRTM-Reserve alliance[70]. Baseline data on human population and deforestation are needed to monitor future land encroachment. A new census has been conducted as part of the process of updating the Management Plan, but according to the reserve director it does not reflect land use patterns in Tanaca communities near Rurrenabaque (past the Susy park guard station), where the agricultural frontier is advancing at a steady pace in order to meet the demand of local urban markets.

At the national level, the SERNAP must develop contingency plans and the capacity to enact rapid responses against future offenses from the MST. Successful implementation would require strengthening legal mechanisms for enforcing unauthorized trespassing and land invasions in protected areas.

Illegal logging

The titling of the Pilón Lajas TCO and subsequent creation of the biosphere reserve forced loggers to stop their activities, resulting in lost economic income for all those previously involved in the timber industry in the region. However, these people are unwilling to forfeit remaining commercial wood resources in the Quiquibey river valley and now seek to gain access via the creation of ACFs (Communal Forestry Groups) under dispositions of the 1997 Forestry Law.

From a legal point of view, the only way neighboring communities of Rurrenabaque or other companies could gain access to Pilón Lajas BR-TCO's forestry resources is via a subsidiary contract, voluntarily signed by indigenous people and the person(s) seeking access, as outlined in Article 29° (forestry concession) and Article 78° of the Forestry Law[71].

ParksWatch considers this option the best option to manage and use Pilón Lajas BR-TCO's forestry resources (in zones compatible with this use).

A serious obstacle for implementing sustainable forestry management is that commercial forestry

70 Proximity of SERNAP's and CRTM's offices should be taken advantage of so that indigenous people along with park guards are trained to conduct protection and patrol activities. CRTM could elect representatives from strategic areas to work with the park guards in control and vigilance operations.

71 Balza, R. 1998. Análisis de la factibilidad social para el aprovechamiento de recursos maderables bajo la responsabilidad de los indígenas de la TCO-RB Pilón Lajas. Informe final. On behalf of Veterinarios Sin Fronteras.

is not part of traditional indigenous culture, which is not familiar with concepts inherent to sustainable commercial management, such as planning, investment, surplus generation, marketing, and resource and personnel administration[72]. Therefore, a solid training component and continued guidance with involved communities must accompany any timber extraction authorization.

In order to better control logging within the reserve, a sufficient number of park guards should be assigned to the new Susy ranger station (Beni river) and legal procedures for seizure should be streamlined, since they currently hinder rather than help effective enforcement. We also recommend strictly regulating colonists' forestry activities in the reserve's area of influence. Contact persons should be designated (like special vigilance committees) in each community to inform reserve personnel of any illegal extractions from the reserve. Park guards would then verify the claims and take appropriate action. A culture of respect for the law and the reporting of infractions should gradually be promoted, both to eliminate furtive logging and as a way to involve more people in the protection of the reserve's forests.

Interventions should be aimed at purchasers and transporters and should avoid sanctioning communities, which would further deteriorate relations with reserve staff. Since putting park guard stations at every access point from the Yucumo-Rurrenabaque road is not feasible, trenches should be installed that would prohibit vehicle passage. It is also recommended to strengthen the Forestry Service's control posts in order to ensure a stricter control of truck cargo.

Finally, we also recommend that the area coordinate efforts with the President of the Tsimane Great Council (San Borja), Jorge Añez. It seems that he is the only indigenous counterbalance against logging in the reserve as it was he who promoted respecting the reserve according to signed agreements during the March for Dignity (*Marcha para la Dignidad*).

Hunting and fishing

Even though hunting and fishing pressure is much less today than it was during the logging boom, continued hunting and fishing of threatened and recovering populations represents a serious threat for several species. We recommend researching the activity in order to recommend and implement community control and fauna management measures.

Threats to the reserve's fauna stem from lack of vigilance. As a result, neither prohibition of inappropriate hunting/fishing methods (like dynamite use in the south) nor established hunting/fishing seasons are enforced.

Since the protection corps is small, sustainable hunting and fishing strategies must be developed in a participatory way with indigenous and colonist inhabitants, and their collaboration is needed to control hunting and fishing by outsiders.

A basic understanding of the most sought after species' biology and ecology (e.g. reproduction

72 Ibid.

The fresh footprint of a tapir (Tapirus terrestris). Photo: SP

periods and habits, local migrations, feeding habits) is a must, such as the unveiling of local source-sink dynamics. Building on these biological and ecological bases, the reserve's administration along with the communities could establish fauna management and protection areas; determine sustainable quantities, volumes, and catch sizes; agree on hunting/fishing seasons and activity restrictions in critical habitats; and develop territorial planning and other restriction mechanisms using local consensus.

The hunting of vulnerable species such as Spix's guan (*Penelope jacquacu*), helmeted curassow (*Crax unicornis*), black spider monkey (*Ateles paniscus*), and white-lipped peccary (*Tayassu pecari*) should be significantly reduced and monitored, and totally prohibited for the following species: spectacled bear (*Tremarctos ornatus*), giant otter (*Pteronura brasiliensis*), river otter (*Lutra longicaudis*), jaguar (*Panthera onca*), puma (*Puma concolor*), gato de monte, as well as the black caiman (*Melanosuchus niger*) and horned curassow (*Pauxi unicornis*) if it is found that populations of these species still exist in the area). In addition, hunting should be prohibited in the core zone and the ecotourism zone.

To reduce hunting pressure on the reserve, the communities should take on the responsibility of managing and controlling habitats and key vegetative species important for fauna around their communal territories. To do so, professionals are needed to advise and train them. Certain actions should be considered, such as establishing species-specific hunting/fishing seasons, not hunting animals with young, establishing minimum and maximum size limits for fish, and restricting the use of firearms. Also, IPD-BENI (*Instituto para la Promoción y Desarrollo del Beni*) has experience raising certain wildlife species. Learning from their experience could help implement small guan- or paca-raising farms.

Regarding poaching and illegal fishing, the procedures for seizure and imposing sanctions outlined in the General Protected Areas Act (RGAP) should be simplified in order to more reliably penalize offenders. Implementing associated regulations requires close coordination between the reserve's administration and local authorities. In addition, sanctions for those found guilty should be exemplary and severe in order to deter future offenders.

ParksWatch recommends implementing the Pilón Lajas BR-TCO Monitoring Program (as it was designed at the SNAP level[73]) as soon as possible as we consider it indispensable. The park guards could carry out the program during their patrols, and therefore would not depend on fluctuating external financing.

Secondly, permanent transects should be established in the area. These transects should coincide with park guard patrol routes so they can carry out permanent monitoring activities without

73 SERNAP's monitoring program proposes concentrating efforts on the following four aspects of park management : a) the state of the area's principal conservation objects; b) threats; c) surrounding socioeconomic situation; d) management effectiveness.

deviating significantly from their normal activities.

In addition, the protected area's monitoring system should help track global change indicators, such as precipitation and temperature (especially minimum temperature), whose variation could seriously affect biodiversity and water quality in local bodies of water, including Beni river, Quiquibey river, and Laguna Azul. These changes are usually the first indicators of ecosystem change[74].

The first stage of this monitoring program - the obtention of baseline data to map the most sensitive areas and the training of park rangers in data collection and the use of GPS devices - is already completed, but the implementation of the actual monitoring program has been put to a halt due to the lack of GPS devices.

Coordination problems between the reserve administration and the CRTM

Any future improvement in the level of coordination between the reserve's administration and CRTM depends essentially on the development and signing of a collaboration framework clearly specifying both institutions' roles and responsibilities, defining common objectives, and identifying the measures and resources needed to achieve them.

Concerning the accusations of poor local participation in the reserve's decision-making, it is recommended to strengthen the various entities responsible for stakeholder coordination, such as the newly created Interinstitutional Coordination Council (Coordinadora Interinstitucional), and to support initiatives promoting dialogue among different stakeholders (e.g. rural participatory appraisals, municipal environmental planning workshops, Management Committee meetings, training courses, environmental education campaigns, etc), emphasizing on the three main user groups: indigenous people, cambas (mestizos of the country's lowland areas, locally represented by the Municipal Governments of Rurrenabaque and San Borja) and collas (native of the highlands, principally represented by the colonist federations).

It is particularly recommended to provide the administration with resources to hire a technician responsible for training and counselling CRTM staff on sustainable development alternatives, with a view on harmonizing the reserve's management objectives with the development aspirations of the local population.

Oil exploration

Part of the conflict between the petroleum industry and protected areas is a deficient legal

74 Perry, A., A. Hennessey, B. Ríos, and R. Silva. 1997. Evaluación del uso actual de la fauna en el Territorio Indígena - Reserva de biosfera Pilón Lajas y su área de influencia. Fundación de Investigación e Exploración Tropical (TREX). Proyecto Elaboración del Plan de Manejo TI-RB Pilón Lajas, Veterinarios Sin Fronteras.

framework and a history of non-compliance. At least in the short-term, a potential solution is the popular opposition, as was seen in Amboró NP-IMNA with the ANDINA Oil Company. The indigenous community's ill-will towards PETROBRAS's exploration project[75] was captured in a letter signed by CRTM and other local development actors on July 29, 2004. SERNAP has for its part rejected any type of oil exploration activity in the reserve since its creation decree; it opposes granting this new concession; and, after analyzing PETROBRAS' Environmental Impact Study, has declared the two seismic exploration projects in the Río Hondo North Block non-viable[76].

Given this context, we offer the following reflections and recommendations:

Mechanisms for disseminating information and public consultations should be implemented concerning any petroleum-prospecting project in order to guarantee that all decisions are made with local participation (via community representatives).

The conflict between protected areas and the petroleum industry should be interpreted as a problem of decision-making within a mosaic of uses and not a Manichean problem (of yes or no). Therefore, zoning studies must be completed that may consider recategorizing certain sectors within the PETROBRAS oil concession without jeopardizing any sensitive area.

According to consultant Daniel Robison, scientific coordinator of VSF's Pilón Lajas Project until 2000, it is not in SERNAP's or its civil society allies' best interest to take an intransigently negative position when dealing with this conflict[77]. Considering that the legal framework does not favor protected areas, ParksWatch agrees with this recommendation. Instead of entering a conflict that could end up damaging other valuable conversation areas, it may be preferable to work towards an agreement that would consider permitting oil exploration and extraction in certain areas as long as proper environmental permits are secured. In this case, very strict regulations must be in place as well as clear guidelines for compensating any irreversible environmental impact as outlined in Title VI of the General Environmental Management Regulations (*Reglamento General de Gestión Ambiental*, Law N°1,333). This alternative, carefully applied and agreed upon, could strengthen the reserve's management.

Before initiating any exploration activities in Pilón Lajas BR-TCO, an expert team should be formed to help SERNAP[78] carry out corresponding monitoring activities and to ensure that those engaged in the activity comply with the environmental laws. Currently, SERNAP only has one specialist focusing on environmental impacts of large projects.

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75 Since petroleum royalties never reach local communities, the communities reject the petroleum industry. They perceive their activities as foreign exploitation of national natural resources. This fact explains why the communities tend to side with the protected area to push petroleum companies out and to support other economic development alternatives that are more beneficial to their quality of life, such as tourism and watershed protection for their crops.

76 Coello, J. Personal communication.

77 Robison, D. Personal communication.

78 Advances are being made in this way. SERNAP's technical committee is giving priority attention to the hydrocarbon conflict and has agreed to create a committee of specialists in order to take decisions related to this topic.

The protected areas will remain vulnerable to hydrocarbon exploration studies (mostly seismic) as long as Article 0 of the Hydrocarbon Law remains valid, which states that "*any person, Bolivian or foreign, can freely conduct in any part of national territory, surface inspections, including topographical, geological, geophysical, and geochemical studies and other research or tests...*", thus opening up the possibility of seismic studies in any part of a protected area. The only real defense is an alliance between society, NGOs, and the press to carry out a massive opposition campaign to stop exploration activities from occurring within protected areas. As already mentioned, this strategy has already achieved positive results in Amboró NP-IMNA.

Another course of action is to push for resolution of the conflict through the upcoming Constituent Assembly (*Asamblea Constituyente*). An effective lobby should seek to strengthen the legal standing of protected areas and should try to consolidate the rights of Bolivian citizens to live in a healthy environment. If lobbying activities resulted in better laws in the Bolivian Constitution, then any citizen would be able invoke this legal tool when natural resources were in jeopardy.

As for the indigenous communities, leadership abilities should be strengthened so that they can effectively manage a participatory system and that they are able to come to the table and enter discussions with powerful groups and transnational companies.

Development projects in the reserve's area of influence

Pilón Lajas' long-term conservation ultimately depends on the local population's willingness to trade unsustainable land use patterns for alternative production models that not only generate economic income but also effectively conserve the natural resource base and ecosystems.

There are actually very few development projects in the zone, but some of those represent serious threats to the reserve's integrity. One project of particular concern is the "Heifer Program", a cattle replacement project that began in 2000. In the absence of appropriate mechanisms, the reserve administration is incapable of monitoring or promoting integrated development projects in its area of influence. Undoubtedly, if the reserve administration had been involved at the time of project design, some of the impacts on the protected area could have been avoided.

This observation implies that the reserve director or other officer should be aware of all projects being elaborated both within the protected area and in its area of influence, and he/she must be able to anticipate problems that such projects may cause. Furthermore, he/she must participate in planning to try to reduce potential negative impacts and assure that the projects are truly relevant to resolving the zone's problems. Institutions and organizations working in the region need improved coordination in order to use available economic resources more efficiently and to avoid duplicating efforts. Therefore, the recently formed Interinstitutional Coordination Council should be strengthened.

There are also several technical deficiencies related to the process of assigning appropriate land uses, and as a result some highly fragile ecosystems are threatened. For example, the Agrarian Service certified land uses and even granted clearing permits for unsuitable land and reserve land.

The subsidies provided for cattle raising in the reserve's area of influence foster the clearing of its piedmont forests. Photo: SP

This obvious infraction of reserve regulations resulted from a lack of coordination between various agencies responsible for managing and controlling the area of influence and its resources (including SERNAP, INRA, SA, SIF, VAIPO, Ministry of Rural Farmer Issues, among others). In addition, gaps in the definition of each agencies' jurisdiction and responsibilities have contributed to enforcement failures. For example, in certain cases of illegal logging, the Forestry Service claimed that responsibility fell on SERNAP, while SERNAP claimed the opposite. Therefore, it is necessary to urgently delineate the specific duties and responsibilities of each agency operating in the area. In addition, a legal challenge should immediately be filed against the Agrarian Service (*Superintendencia Agraria*), and coordination efforts intensified so that this agency stops granting clearing permits for reserve land.

However, an obstacle to implementing this recommendation is the weak legal establishment in the region: there are very few lawyers in Rurrenabaque and other communities within the area of influence. One suggestion to overcome this deficiency is that Pilón Lajas' management could take advantage of the expert hired by CI-ITTO's project to support Madidi NP-IMNA or that resources be provided to hire a dedicated lawyer.

Thus far, in trying to resolve conflicts and problems related to economic development in the zone of influence, there have be no initiatives focusing on harvesting and commercializing low-

impact, non-timber forest products[79]. And, for example, VSF's Pilón Lajas Project chose not to focus on the understanding and improvement of existing productive systems (rice, yucca, cattle raising) due to the fact that these activities are associated with slash-and-burn agriculture.

The failure of two of VSF's alternative economic development programs demonstrates the risk associated with promoting initiatives that are not closely related to local conditions or reality, and/or that are elaborated without active, local participation. One project was tembe (*Bactris gasipaes*) cultivation, a palm species from which the heart can be harvested without cutting down the tree. It failed because it was not economically competitive relative to the products coming from Bolivia's Chapare region, Brazil, and Ecuador. The other project was pisciculture, but this was and remains economically uncompetitive in the zone.

Future projects must be designed in consultation with local beneficiaries in order to identify viable initiatives that people actually want. Consultations can occur and options be identified during rural participatory appraisals, municipal environmental planning workshops, and Management Committee meetings. The most important thing to remember is that dialogue between the three principal groups of inhabitants must be promoted: the indigenous people, cambas and collas.

Using results from these consultation processes, a variety of projects can be developed that would take advantage of a wide range of products. The following examples were identified in 1996 when the Management Plan was being elaborated[80]:

- Crops for the local market: majo (palm), lime, ocoró (*Garcinia madruno*), annatto, achachairú (*Garcinia macrophylla*), papaya, pineapple, passion fruit, and lemon grass (a plant with medicinal properties);
- Unprocessed crops that can be sold outside of local markets: jatata (*Geonoma deversa*) - whose palm fronds are woven and used to make roofs in home constructions, achiote, grapefruit, coconut, watermelon, and pumpkin;
- Crops for specialty processing: honey, passion fruit, vanilla, and tobacco; Crops for industrial processing: tembe palms, assai palm (*Euterpe precatoria*), pineapple, and cayú (a fruit similar to an apple, whose seeds are valued for their high oil content. According to the study's author, this is one of the most promising products in terms of producer convenience).

Additional specialty products that could be promoted in an effort to develop prospecting processes and increase biodiversity value include pepper, cacao, and medicinal plants.

Although the area's current productivity levels are not sufficient to install industrial processing plants, several potential alternatives have been identified[81]:

79 Ribera, M.O. 2002. Diagnóstico resumen - Reserva de biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

80 Escóbar, V. 1996. Estudio inicial de alternativas de industrialización y mercado para productos agroforestales de la Reserva de biosfera y Territorio Indígena Pilón Lajas. Informe final. On behalf of Veterinarios Sin Fronteras.

81 Ribera, M.O. 2002. Diagnóstico Resumen - RB-TCO Pilón Lajas. Unpublished.

- High density of Tembe (*Bactris gasipaes*) palms planted during the era of the Pilón Lajas Project, many of which have since reached fruiting age;
- Presence of old colonist families that have gained a certain level of understanding of the region's peculiarities and have achieved more stable and diverse production processes, especially those implementing agroforestry systems using fruit trees or other useful trees, like papayas, citrus trees, mango, cacao, and palms (motacú, tembe, asaí, majo).

Left: Natural vanilla near the Laguna Azul; Right: Jatata leaves (Geonoma deversa). Photo: MSD

Considering that serious financial support is needed for these initiatives (estimated at US$ 40 million according to the person responsible for GEF-II's Natural Resource Management component[82]), Pilón Lajas Project's evaluation report should be paid special attention, since it concluded that the overall financial package awarded by the European Commission (approximately US$ 4 million over 5 years, from 1996 to 2001) had been one of the main sources of conflict at that time[83]. To avoid repeating the same errors, we recommend analyzing in depth the factors that generated the stakeholders distrust of VSF, the institution in charge of managing the funds.

Before colonists can successfully adopt sustainable practices appropriate to local conditions, the land use capacity maps (CUMAT) must be revised and a program providing solid, technical, agriculture and forestry extension services implemented. It should be noted that achieving soil sustainability in the Yucumo-Rurrenabaque belt requires not only improving soil use in the short-term, but also strategies are needed to maintain fertility (maintain biomass levels and organic material in the ecosystem) over the long term[84]. Indigenous inhabitants will also benefit from the

82 Ribera, M.O. Personal communication.

83 McKean, S. and D. Robison. 2001. Sistematización de la experiencia del Proyecto Pilón Lajas – Documento Global. Agroecología Sierra y Selva, Rurrenabaque, Bolivia.

84 McKean, S. and D. Robison. 1994. El impacto del uso de la tierra en el área de influencia de la Reserva de Pilón Lajas y las posibles alternativas. Technical report. Agroecología Sierra y Selva/VSF. Santa Cruz. 103 pp.

transfer of knowledge of advances in natural forest management.

The region is suited for a form of semi-mechanized agriculture that does not cause significant, negative ecological damage. But, in intervened areas where forest is still part of the matrix (for example, in Santa Rosa, Chocolatal, San Bernardo, Bajo Colorado, Río Hondo, Yacumita, Canaán, Caripo, and El Dorado), we recommend forestry management and agroforestry using ACFs and Sustainable Management Plans, Property Management Plans, and monitoring programs.

Opening Pilón Lajas BR-TCO to tourism is likely to bring economic benefits to the area and more jobs for local inhabitants. Yet, future tourism activities could generate negative impacts. The construction of infrastructure should be done in harmony with the landscape, following a careful planning that takes the protected area's double condition into account at all times (and therefore searching to avoid negative impacts to both natural ecosystems and the indigenous peoples' cultural integrity).

Keeping this in mind, we recommend promoting tourism-related training courses. Specifically, topics should include managing community ecotourism businesses, improving transportation infrastructure, signs and lodging. We also recommend defining and implementing animal reintroduction zones specifically tied to tourism offerings. Health infrastructure should also be developed to combat diseases like malaria, yellow fever, and leishmaniasis. With appropriate advertising in Rurrenabaque tourism agencies, the planned interpretation center (in the reserve administration's main office in Rurrenabaque) can help drive the demand for tourism in the reserve.

In designing the region's development strategy, the failures of the "Alternative Development Program" (PDAR) in the Chapare province[85] should be seriously considered, especially the continual lack of access to markets.

Over the last few years, several institutions have helped to organize a crafts and local products fair in Rurrenabaque, intended to increase exposure and sales. Unfortunately, the craftsmen and producers lack the financial capital and capacity to tap into La Paz or foreign markets[86]. Some ideas to boost access to larger markets include: undertaking a larger promotional campaign; some sort of certification process for organic and socially-equitable products (like a Green Seal or Seal of Origin, such as those used in Europe for products like cheese and wine); or the development of a brand name for an association including all the regional craftsmen and producers, as used by AOPEB or Irupana Foods. If international markets are to be sought, quality standards must be established, efficient and flexible work methods must be created, and management capacities must be increased. The producer must also keep related responsibilities in mind before setting off to market, for example, he must deliver exact quantities, he must meet deadlines, and he must comply with the buyer's agreed-upon demands.

Finally, in considering regional development, conservation methods such as corridors and bioregional management should be included in the reserve's management. Pilón Lajas BR-TCO should also take

85 This program complements cocaine eradication campaigns led by the U.S. Government, and is being promoted by institutions like the European Union, USAID, the United Nations, and many other organizations.

86 One of the main supporters of this initiative has been the Rurrenabaque Mayor's Office in its "Productive Municipal Government" program, which provides financial support to local organizations and small businesses working to develop capacity for productive initiatives.

full advantage of its proximity to Madidi National Park, learning from its successes in channeling funding for the region's sustainable development.

Conclusion

The Pilón Lajas BR-TCO is one of the few protected areas in the country with shared administration, which makes it a particularly interesting case for both the MAB-UNESCO program worldwide and the SERNAP at the time of defining its strategy for future management of the national system of protected areas. However, the co-administrating entity, the CRTM, has benefited from a limited level of support in comparison with other such examples in the country (in particular the Capitanía del Bajo Izozog in Kaa-Iya NP), reason for which it hasn't yet fulfilled its role as co-manager of the vast territory placed under its jurisdiction.

Another factor constraining the reserve's management are the mistakes that were made at the time of its creation and implementation. In spite of the ambitious diagnosis and data collection effort undertaken (thanks higher than average financial resources) at its onset, this process didn't achieve the level of local participation warranted by the areas's socioeconomical context, in particular along the colonization axis bordering the reserve's to the east between the towns of Yucumo and Rurrenabaque.

The reserve's third structural problem is political, determined by a growing opposition from the country's productive sectors and local elites to the figure of Native Communal Lands and Indigenous Territories, whose legitimacy depends a lot on the facility of access to land and natural resources, in other words on a condition which in a scenario of unplanned development and rapid population growth deteriorates year after year.

Finally, due to a lack of direct income and governmental help, the reserve's budget relies almost entirely on foreign aid, making it vulnerable to the whims of international funding. This tends to impose a short-sighted approach to decision-making and can thwart long-term efforts when certain programs or activities need to be abandoned due to funding shortages, something which has happened repeatedly in the past few years.

Despite these worrying aspects, the reserve displays a relatively impressive level of implementation in regard of the challenges posed by the long distances, the chronic lack of resources and the complexity of the human landscape in which it is immersed. Considering that the forests it harbors are sufficiently important to secure a certain level of financial support, it can only be hoped that this situation will be maintained until the achievement of financial sustainability.

References

Allgoewer, K. 2003. Propuesta de plan de desarrollo turístico para la RB-TCO Pilón Lajas. On behalf of Agroecología Sierra y Selva and Conservation International.

Balza, R. 1998. Análisis de la factibilidad social para el aprovechamiento de recursos maderables bajo la responsabilidad de los indígenas de la TCO-RB Pilón Lajas. Final report. On behalf of Veterinarios Sin Fronteras.

Barrera, S., J. Guerra, F. Osorio, J. Sarmiento, and L. Villalba. 1994. Territorio Indígena-Reserva de Biosfera Pilón Lajas. Reconocimiento preliminar de la fauna. Technical report. CBF-IE/VSF. La Paz. 57 pp.

Bascopé, F., P. Saravia, B. Orosco, and R. Saravia. 1996. Evaluación de impacto ambiental debido a la explotación maderera en la Reserva de Biosfera - Territorio Indígena Pilón Lajas y sugerencias para su manejo integral sostenible. Technical report. On behalf of Veterinarios Sin Fronteras. 39 pp.

Bascopé et al. 1996. In VSF. 1998. Plan de Manejo 1997-2001 - Reserva de Biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

CESA. 1985. Diagnóstico socioeconómico de la zona de colonización de Yucumo-Rurrenabaque. Technical report. La Paz. 182 pp.

Cornejo, G. 1994. Caracterización de la vegetación, Reserva de Biosfera Territorio Indígena Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 92 pp.

De Vries, A. 1998. Territorios indígenas en las tierras bajas de Bolivia: un análisis de su estado a 1998. CIDOB/CPTI/Dutch Development Cooperation Service. 78 pp.

Escóbar, V. 1996. Estudio inicial de alternativas de industrialización y mercado para productos agroforestales de la Reserva de Biosfera y Territorio Indígena Pilón Lajas. Final report. On behalf of Veterinarios Sin Fronteras.

Killeen, T. 1993. Perfil ambiental del Territorio Indígena y Reserva de Biosfera Pilón Lajas. Technical report. SERINCO, Santa Cruz. 26 pp.

McKean, S. and D. Robison. 1994. El impacto del uso de la tierra en el área de influencia de la Reserva de Pilón Lajas y las posibles alternativas. Technical report. Agroecología Sierra y Selva/VSF. Santa Cruz. 103 pp.

McKean, S. and D. Robison. 2001. Sistematización de la experiencia del Proyecto Pilón Lajas – Documento Global. Agroecología Sierra y Selva, Rurrenabaque, Bolivia.

MHNNKM. 2000. Análisis de la situación social e institucional y sistema de información

geográfico de las áreas protegidas de la Amazonia boliviana. 180 pp.

Monjeau, J., M. Lilienfeld, J. Marquez, I. Goetting, E. Corrales, C. Danklmeier, J. Ramos, and C. Ugarte. 2003. Sistema de Monitoreo de Áreas Protegidas en Bolivia. SERNAP-GEF II. Report to the World Bank. 529 pp.

Moraes, M. and S. Beck. 1992. Capítulo III, Diversidad florística en Bolivia. En Marconi (Ed.). Conservación de la diversidad biológica en Bolivia. CDC. La Paz. 574 pp.

Muñoz, R. 1991. In VSF. 1998. Plan de Manejo 1997-2001 - Reserva de Biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

PAF. 1995. Situación del sector forestal del departamento del Beni. Plan de Acción Forestal para Bolivia. La Paz. 116 pp.

Parker, T. 1989. An avifaunal survey of the Chimanes ecosystem program area of northern Bolivia. Technical report. Conservation International, Washington, D.C.

Pavez, I. 1998. Rurrenabaque: motosierristas y dilemas para la conservación de los bosques. In P. Pacheco and D. Kaimowitz (Eds.). Municipios y gestión forestal en el trópico boliviano. 489 pp.

Perry, A., A. Hennessey, B. Ríos, and R. Silva. 1997. Evaluación del uso actual de la fauna en el Territorio Indígena - Reserva de Biosfera Pilón Lajas y su área de influencia. Fundación de Investigación e Exploración Tropical (TREX). Proyecto Elaboración del Plan de Manejo TI-RB Pilón Lajas. On behalf of Veterinarios Sin Fronteras.

Rasse, E. 1994. Dynamique des modes d'exploitation agricole de la forêt sur le front pionnier de Yucumo en Amazonie Bolivienne. Master Thesis. ESAT/CNEARC/VSF, Montpellier, France. 171 pp.

República de Bolivia. 2001. Situación forestal de los territorios indígenas de las tierras bajas de Bolivia. Technical Series XV.

Ribera, M. O. 1999. Aspectos generales sobre la conservación de la biodiversidad y áreas protegidas en Bolivia. 100 pp.

Ribera, M.O. 2002. Diagnóstico resumen - Reserva de Biosfera - Tierra Comunitaria de Origen Pilón Lajas. Unpublished.

Ribera, M.O. 2004. Reporte de sobrevuelo a la RB-TCO Pilón Lajas. Unpublished.

Robison, D., I. Brugioni, L. Marcus, and E. Guayao. 1997. Aportes sobre experiencias de manejo de las areas protegidas del Beni. Implementación de la RB-TCO Pilón Lajas: una experiencia de admnistración compartida de un área de doble condición.

Robison, D. 2000. Los primeros pasos para un monitoreo social y medio ambiental de

la Tierra Comunitaria de Origen y Reserva de Biosfera Pilón Lajas. In C. Miranda and I. Oetting. (Eds.) Experiencias de monitoreo socio-ambiental en Reservas de la Biosfera y otras áreas protegidas en la Amazonía. UNESCO. La Paz, Bolivia. 432 pp.

SERNAP. 2003. Plan Operativo Anual 2004 - RB-TCO Pilón Lajas. Rurrenabaque, Bolivia.

Silva, R. 1996. Primer taller de discusión con la población indígena para la elaboración de un Plan de Manejo, RB-TI Pilón Lajas. Final report. Veterinarios Sin Fronteras. 8 pp.

Silva, R. 1997. Características demográficas y socioeconómicas de la población indígena: Recomendaciones para un plan de manejo orientado a una mejora de su calidad de vida. Territorio Indígena Reserva de Biosfera Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 52 pp.

Smith, D. and T. Killeen. 1994. Annotated checklist of the vascular plants of the Serranía de Pilón Lajas and the adjacent piedmont, Ballivian Province, Beni, Bolivia.

Terceros, L.F. and M. Sandoval. 1994. Caracterización física de la Reserva de Biosfera Territorio Indígena Pilón Lajas. Technical report. On behalf of Veterinarios Sin Fronteras. 41 pp.

VSF. 1998. Plan de Manejo 1997-2001 - Reserva de Biosfera y Tierra Comunitaria de Origen Pilón Lajas. Final version. Veterinarios Sin Fronteras.

APPENDIX 1

Institutional Framework of the SERNAP

1/ Policies

The following outlines SERNAP's political framework, which forms the basis for establishing its objectives and selecting and implementing actions directed at meeting those objectives:

o Consolidate the SERNAP as an institution.

o Achieve financial sustainability for protected area management.

o Conserve biological and cultural diversity in the protected areas.

o Strengthen public participation in protected area management.

o Promote protected area management integration in national economic and social policies.

o Contribute to improving the living conditions of local residents.

o Guide personal and collective values, attitudes and practices towards protected area conservation.

o Promote protected area integration at the international level.

2/ Strategic agenda

The 2003-2004 Activity Report lists the following advancements in relation to the actions outlined in the 2004-2007 strategic agenda:

o Strengthening of public participation via co-administration agreements with associations of municipalities (*mancomunidades*) and farmer organizations.

o Joint establishment, among all SNAP stakeholders, of an effective, efficient, and transparent management model focusing on "Parks with People".

o Promotion and implementation of tourism strategies, policies, and activities in protected areas, with tangible benefits for local people and communities.

o Development of a conflict management and resolution system for preventive action against emerging conflicts within the SNAP.

o Launching of a national gap analysis to guarantee representation of the country's ecosystems within the SNAP and as a principal input for the design of its Master Plan.

o Laying the foundations for the achievement of financial sustainability and adoption of financial management policies for donor funds or internal revenues.

o Strengthening SERNAP's interinstitutional and intersectorial relations through establishment of crosscutting principles, policies, and strategic management plan.

o Implementing productive uses (sustainable use of natural resources, tourism, etc.) and land titling in protected areas.

Future work includes:

o Continue the prevention, management, and resolution of social conflicts related to protected areas.

o Implement the agenda of the Constitution of the National Consultative Council as a starting point for a social pact with grassroots organizations.

o Ensure the continuity of technical and financial support provided by such organizations as MAPZA-GTZ, GEF-World Bank, BIAP-KfW and other technical/financial aid agencies, in accordance with the SERNAP policies and strategic agenda and based on the harmonization and complementation of processes.

o Propose and approve a Supreme Decree for the institutional reorganization of the SERNAP in accordance with the reality and conditions determining the institution's current restructuring.

o Start the elaboration of a Master Plan for the SNAP.

o Conclude, adjust and initiate the elaboration of Management Plans in at least eight protected areas.

o Adjust and improve public and institutional participation mechanisms in protected area management.

APPENDIX 2

Objectives of the Pilón Lajas Biosphere Reserve and Communal Lands

Legal basis: D.S. N°23,110 of April 9, 1992

Pilón Lajas BR-TCO is part of the National Protected Areas System (SNAP), whose objective is "*to conserve biodiversity incorporating public participation to benefit current and future generations*" (D.S. Nº 24,781 - *Reglamento General de Áreas Protegidas*).

The Pilón Lajas Biosphere Reserve and Communal Lands was created to protect:

- a rich high diversity in animal and plant species;
- the headwaters of the region's main water courses, including the Quiquibey, Colorado, and Yacuma' rivers;
- traditional lands of numerous indigenous communities of Mosetene and Chimane origin;
- traditional knowledge of indigenous communities in western Bolivia.

Objectives of the Pilón Lajas Biosphere Reserve include:

1.- Conservation of biological diversity;

2.- Improvement of living conditions of resident communities;

3.- Improvement of living conditions of adjacent communities;

4.- Ensure and control the public use of the area.

Objectives as part of the international Man and the Biosphere Reserve Program (MAB-UNESCO):

.- Conservation function, "*to contribute to the conservation of landscapes, ecosystems, species, and genetic variation*". Actions related to achieving this objective include control and enforcement, scientific research, and environmental monitoring.

2.- Development function, "*to foster a economic and human development model that is socio-culturally and ecologically sustainable*". Actions and policies related to this objective include creating local

management capacity, natural resource use policies, zoning proposals, community extension and training, applied research, and ecotourism.

3.- Logistical function, "*to provide support for research, monitoring, education, and information exchange related to local, national, and global issues of conservation and development*". Actions and policies related to this objective include pure scientific and applied research, environmental education, and ecotourism.