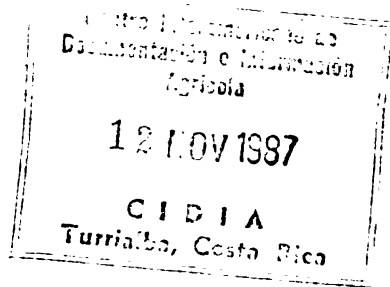


**LA AMISTAD BIOSPHERE RESERVE:  
TOWARDS SUSTAINABLE DEVELOPMENT**

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La publicación, impresión y distribución de este trabajo fueron patrocinadas por el Programa Suizo de Cooperación al Desarrollo, COSUDE, por medio de INFORAT: Información y Documentación Forestal para América Tropical.

**CENTRO AGRONÓMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA,  
CATIE**

**Departamento de Recursos Naturales Renovables**

**Turrialba, Costa Rica, 1987**

12 NOV 1987

C I D I A  
Turrialba, Costa Rica

TORRES, H.\* , HURTADO DE MENDOZA, L.\*\* , MASTERSON, D.\*\*\* 1987. La  
Amistad biosphere reserve: towards sustainable development.  
Turrialba, Costa Rica, CATIE. 12 p. 10 ref.

#### RESUMEN

La Reserva de la Biósfera de La Amistad fue creada por UNESCO en 1982. Se trata de un conjunto de áreas silvestres protegidas y reservas indígenas que cubre unas 500,000 Has del territorio de Costa Rica. Entre 1985-1987 un equipo interdisciplinario del Programa de Areas Silvestres del CATIE y del Servicio de Parques Nacionales de Costa Rica realizaron un proyecto de planificación para generar una estrategia regional de conservación y desarrollo.

En este artículo se presenta información básica sobre los recursos naturales y culturales de La Amistad; se identifican y evalúan los problemas más cruciales para la conservación y manejo del área; y se describe brevemente el proceso de planificación efectuado. Se concluye que para lograr una protección efectiva de los valores naturales y culturales, así como de los recursos genéticos de la Reserva, es preciso reconciliar principios que conciernen a la evolución cultural, al desarrollo económico y a la conservación de recursos naturales.

#### SUMMARY

The La Amistad Biosphere Reserve was created by UNESCO in 1982. It is formed by a number of protected wildlands and indian reserves comprising some 500,000 Has in Costa Rica. From 1985 to 1987 an interdisciplinary team conformed by CATIE's Wildlands Program and the Costa Rican National Park Service has implemented a planning project in order to produce a regional conservation and development strategy.

In this article basic information on natural and cultural resources in La Amistad is forwarded; some critical problems on conservation and management are identified and evaluated; and a brief description of the planning process is advanced. It is concluded that in order to achieve an effective protection of La Amistad natural and cultural values, as well as its genetic resources, is necessary to reconcile principles having to do with cultural evolution, economic development and natural resources conservation.

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# LA AMISTAD BIOSPHERE RESERVE: TOWARDS SUSTAINABLE DEVELOPMENT.

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## INTRODUCTION

Costa Rica- as many other tropical countries- is suffering from massive deforestation of its broadleaf forest. An estimated 40-60.000 hectares are deforested every year. If this trend continues, by the year 2000 what remains of these valuable tropical forests will have disappeared.

The need to protect threatened tropical forests reserves is vital but at the same time development of appropriate technologies for their sustainable utilization is a socio-cultural and environmental necessity.

Considering this fact, the National Park Service of Costa Rica decided to initiate the La Amistad Biosphere Reserve Project. Although in its initial phase, the project is already demonstrating that conservation and development can be integrated in a sustainable manner. The reserve not only protect invaluable genetic and other natural resources, but also supports the self determination of indigenous communities with their traditional land use patterns.

## THE LA AMISTAD BIOSPHERE RESERVE

The Biosphere Reserve extends for over 500,000 ha, including

the La Amistad International Park-Costa Rican sector, Chirripo National Park, Hitoy-Cerere and Barbilla Biological Reserves, all controlled by the Costa Rican National Park Service; five Indian Reserves (Tayni, Telire, Talamanca, Chirripo and Ujarras-Salitre-Cabagra); Las Tablas Forest Protection Zone managed by the Costa Rican Forest Directorate and the Las Cruces Botanical Garden managed by the Organization for Tropical Studies. The Botanical Garden, located less than 25 Km. from Las Tablas Forest Protection Zone provides classroom, dormitory and laboratory facilities, for biosphere reserve training and research activities.

Due to the area's marked climatic, altitudinal and edaphic variability and its position on the "land bridge" connecting the biogeographically distinct regions of North and South America, plant and animal species and community diversity is remarkable. Endemics and endangered species are of tremendous importance. These include six felines, the resplendent quetzal (Pharomachrus mocinno), giant anteater (Myrmecophaga tridactyla), and Baird's tapir (Tapirus bairdii). Migrant birds from North and South America winter in the area, and seasonal altitudinal migrations among resident birds, insects and other wildlife groups are thought to be of great importance (Tosi, 1981). The biosphere reserve provide the best hope for protecting genetically viable populations of endangered animal species high on the food chain and with very large territories, such as the jaguar (Felis onca) and harpy eagle (Harpia harpyja) (Vaughan, 1983).

The wide range of altitudinal (100-3819 masl) and climatic (annual precipitation: 2000-7000 mm, T: 3-26°C) conditions give the biosphere reserve unique characteristic which make the most ecologically diverse natural area in Central America. The biosphere reserve contains 8 of the 12 biogeographical life zones (Sensu Holdridge) found in Costa Rica, and protects the last large continuous mass of high altitude natural vegetation found in Central America, including

vast pure oak (Quercus spp.) forests, high altitude bogs and paramos (Andean alpine scrub) (Tosi, 1981).

Slopes are very steep (over 40%). This feature and the low fertility soils greatly limit permanent agriculture. However, due to the high rainfall distributed throughout the year, the hidroelectrical generating potential of the area is enormous and represents the most important source of energy for the future of the country.

### SOCIOCULTURAL PROCESS: PAST AND PRESENT

Man has been present in Costa Rica since Late Pleistocene Times. For several millennia people's economy was based on hunting and gathering until about the year 1500 B.C. when agriculture was introduced. Before 1982 no archaeological research had been performed in the La Amistad Biosphere Reserve and even today, after several seasons of field reconnaissance only preliminary hints on the sociocultural processes in the area have been recovered. A major factor hindering research is the vastness of the Reserve and the extremely difficult access to most areas. However, now we know that two major archaeological regions are represented in the Reserve: The Gran Chiriqui of Western Panama and Southeastern Costa Rica, and the Central Atlantic Watershed of Costa Rica. Most of the Reserve's area, including the Estrella and Sixaola basins in the Atlantic side of the Talamanca cordillera, do correspond to Gran Chiriqui. Only the Northwestern end of the Reserve, having the Fila de Matama Range and Río Banano as its eastern boundaries, present evidence of cultural relationships with the Central Atlantic Watershed and the Central Valley, where San José, the capital city of Costa Rica is located.

The Gran Chiriqui related areas of the Reserve were not uniformly inhabited in prehispanic times. Most lands on the Pacific watershed were widely populated during the Aguas Buenas cultural phase (A.D. 200-800) occupying diverse ecological zones over a significant altitudinal range reaching up to about 1800 m above sea level. In contrast to this pattern, during the Chiriqui cultural

phase (A.D. 1000-1500), the population was more concentrated in low land valleys, limiting use of the uplands to funerary purposes very few of the archaeological sites found above some 800-1000m produced traces of domestic activities, but many included tombs.

On the Atlantic slope, the Aguas Buenas phase is scarcely represented. In the Sixaola river drainage system it is totally absent, suggesting a very sparse population during these times. However, it also could be that the area was populated, but largely isolated from cultural core areas in the Southeast. During Chiriqui times, either population or cultural links augmented, as shown by compared with patterns observed in Southeastern Costa Rica and Western Panama, the Atlantic side was remarkably less populated during Chiriqui.

On the Pacific slope, evidence shows that people lived on the banks of the Térraba river since about 1500 B.C., but no clues of occupations earlier than (A.D. 200) have been obtained in the Gran Chiriqui areas of the La Amistad Biosphere Reserve. Conversely, the areas related to the Central Atlantic Watershed, do present evidence of occupation since 1000-1500 B.C.

All these peoples were agricultural, but different regions achieved different levels of sociopolitical organization at different times. Tribes were the most common form of organization but chiefdoms developed in the North-west from A.D. 300-500; while these appeared in the Southeast only around A.D. 1000-1200.

Early European explorers found a major chiefdom in the General Valley, with stone-faced mounds and palisaded villages, but comparable monumental sites were abandoned around the 14th century in the Central Atlantic Watershed where the population was sparsely distributed over wide areas. For centuries, the Talamanca tribes were spared colonization, but the Southeast did support settlements: catholic missions, Indian "reducciones" towns and active trade routes. Several military and religious expeditions to Talamanca were

initiated in the General Valley and followed Indian trails over the Cordillera. Repeated failures to find gold and good agricultural lands in Talamanca did not preclude colonial authorities from periodically raiding the land to capture Indians to replenish meager labor forces in Cartago and Nicoya.

After the advent of the Republic (1821), several decades passed, before the whole of the Atlantic lowlands were firmly controlled by the Costa Rican government, and only at the end of the 19th Century did colonization succeed. Major factors included widespread development of banana plantations and the improvement of the maritime port of Limon. Meanwhile, an slowly increasing Black, English-speaking, population had settled in active communities along the Caribbean coast, providing the land with a unique way of life that still is widely manifest in the province.

The original Indigenous population belonged to several ethnic groups, but since colonial times some were decimated, others were slowly pushed to the east. Nowadays, only two ethnic groups, the Bribri and the Cabecar, are found in five Indian reservations within the La Amistad Biosphere Reserve. They are organized in nine communities on both sides of the Talamanca Range. Their sparse, ever dynamic, settlement patterns make quite difficult determine the actual population size and most estimates range between 8 to 12 thousand people.

Even though their traditional way of life has changed with the introduction of traits and technologies from the wider national culture, many of their basic attitudes toward the natural environment are intact. Thus, even though many cashcrops, these have been developed in ways designed to ensure sustained, limited, exploitation of the river valley lower slopes. The forests are still perceived as an important source of vital resources and, consequently, they are protected. Field observations have repeatedly indicated, that parks and biological reserves located in the core zone, are best protected where they border on active, well organized Indian communities.

## NATURAL RESOURCE ISSUES

A number of natural resource issues have to be addressed and resolved if the La Amistad Biosphere Reserve is to achieve its potential as the integrator of conservation and development. Most if not all of these issues are strongly affected by or directly effect sociocultural processes that function in the region, and any proposed development plan must take these inter-relations into account. The following brief descriptions of the major issues will follow a less holistic approach, however and will focus on the biotic and physical aspects.

The most obvious problem to be resolved is the conflict between land use capacity and actual land use practices. During the last several decades, rapid expansion of agricultural and ranching activities has led to increased production, but has also caused significant deterioration of marginal lands. This has occurred mainly along the Pacific Slope of the Talamanca Range, and to a much lesser extent along the foothills of the Caribbean. Whereas these areas may have sustained shifting agriculture, current practices undermine the productive capacity of the soil as the cultivation of annual crops gives way to extensive cattle grazing. The subsequent soil compacting and the firing of pastures to eliminate woody vegetation leads to increased nutrient loss from accelerated erosion. For many small and medium size farmers/ranchers, the only viable option is continued deforestation to supplant the declining productivity of areas previously exploited.

A related issue is that of hunting and its effects upon the wildlife within the biosphere reserve. Subsistence hunting is practiced to varying extents by both Indian and non-Indian populations, and has been recognized as a legitimate activity under Costa Rican law. The impact of this type of hunting requires further study, but it is quite possible that in many cases it can be a sustainable utilization of the wildlife resource, providing important amounts of protein to rural families. More worrisome is the potential effect of unrestrained commercial and sport hunting. While



these activities become sustainable with proper management, both are currently carried out with little regard for seasonal limits, protected species status, or park boundaries.

A very different challenge comes from the actual or potential development of a number of major projects which if carried out would have strong social and environmental impacts. Petroleum and coal deposits have been discovered within the biosphere reserve, and their commercial production is a real possibility. The development of these reserves along with the hydropower previously mentioned will require special efforts to minimize the negative effects likely to be caused by their construction and operation. These impacts could include the relocation of human population, increased pressure on the natural resources by newcomers, and the loss of productive soils, plant and animal habitat, changes in the hydrologic regimes, and pollution of ground and surface waters.

The long term viability of the ecosystems that makeup the biosphere reserve, in face of the gradual disappearance of other forested areas in Costa Rica, and additional consideration. As the wildlands of Talamanca become more isolated, what impact will this have upon plant and animal communities? This question is particularly important for species such as the harpy eagle (Harpia harpya) or the jaguar, (Felis onca), which may require even more than La Amistad's +500,000 ha to support viable populations. While the loss of one or more large predator would represent reduced diversity and resilience, the loss of other species lower down on the food chain could be even more traumatic, depending on their importance as pollinators or seed dispersers. While the extensive forest cover and range of habitats provides a margin of security this issue deserves further study.

Lastly, an important issue with socio economic and environmental implications, and very difficult to evaluate, is the illicit production of Marijuana. As in the case of US National Forests, producers find the sparsely populated sectors of the biosphere

reserve quite attractive, even if that means a day walk or more from the plots to the nearest road. Environmentally, the indirect effects of hunting and the possibility that this type of activity occurring in protected areas will induce others to follow them are more important than the on site damage that is caused by land clearing and cropping.

The land contained within the biosphere reserve is quite limited in its usefulness for many purposes. But there are several potentially important areas of opportunity. The most tangible are those uses associated with the water resources. The production drinking water of good quality and in sufficient amounts becomes more important each day. Important projects to tap this resource are in progress or under consideration now. The hydropower potential of the region (20 potential sites, more than 50% of the hydroelectric potential of the country) highlights not only the importance of this resource, but also the need to consider the full range of costs and benefits when projects of this type are proposed. Given that a large proportion of the remaining primary forest of Costa Rica is located within the biosphere reserve, and that a considerable portion of the Pacific is made up of degraded marginal lands, investigation focused on natural forest management and plantation forestry should be encouraged; Finally, although the current difficult access limits the potential of nature and culture based tourism, this activity should be evaluated more closely. With very little infrastructure, and zero promotion, the Biosphere Reserve has begun to attract an incipient interest from organized tour groups, kayakers, and backpackers. The occasional arrival of investigators requiring local assistance (and assistants) and capable of paying for it has motivated some individuals towards tourism, and they could.

#### THE PLANNING PROCESS

The recently finished planning process is a good example of an interdisciplinary, interinstitutional approach to solve management problems. The team consisted in four groups of participants: the

CATIE planning team, full-time counterparts from the National Park Service, representatives of other Costa Rican governmental institutions, assigned part time to aid in the planning effort, and experts from the spanish governmental technical mission (ICI).

A long term management plan for La Amistad International Park, which is the core area of the biosphere reserve, has been completed. (Torres, Hurtado, 1987). At the same time a document entitled "The La Amistad Biosphere Reserve: A strategy for its Conservation and Development" (Torres, H. y Hurtado, L. 1987) has been prepared to establish long term general guidelines on how to achieve a sustainable development for the indian and non-indian communities along with the conservation of valuable natural resources.

The major management problem along the Pacific uplands is the presence and continual expansion of colonization fronts created by squatters and land speculators. When settlers can present documentation proving occupancy for 10 years or more, their removal requires the payment for all the "improvements" they have made, if forcibly removed all must be paid damages and relocated according to Costa Rican agrarian law. Much of this colonization is illegal having occurred on Indian and Park lands causing destruction, habitat elimination, and watershed degradation. The eventual goal is to redefine park (core area) and biosphere reserve limits to eliminate those areas whose acquisition would be most costly and politically difficult, and whose ecological or cultural importance is minimal, and include other areas that have great ecological importance or those that could serve demonstration/rehabilitation purposes.

The recommendations to achieve the conservation and development of the La Amistad Biosphere Reserve involve every agency, public or private, acting in favor or against the objectives defined for the biosphere reserve:

-Preserving genetic diversity

-Maintaining the vital ecological process

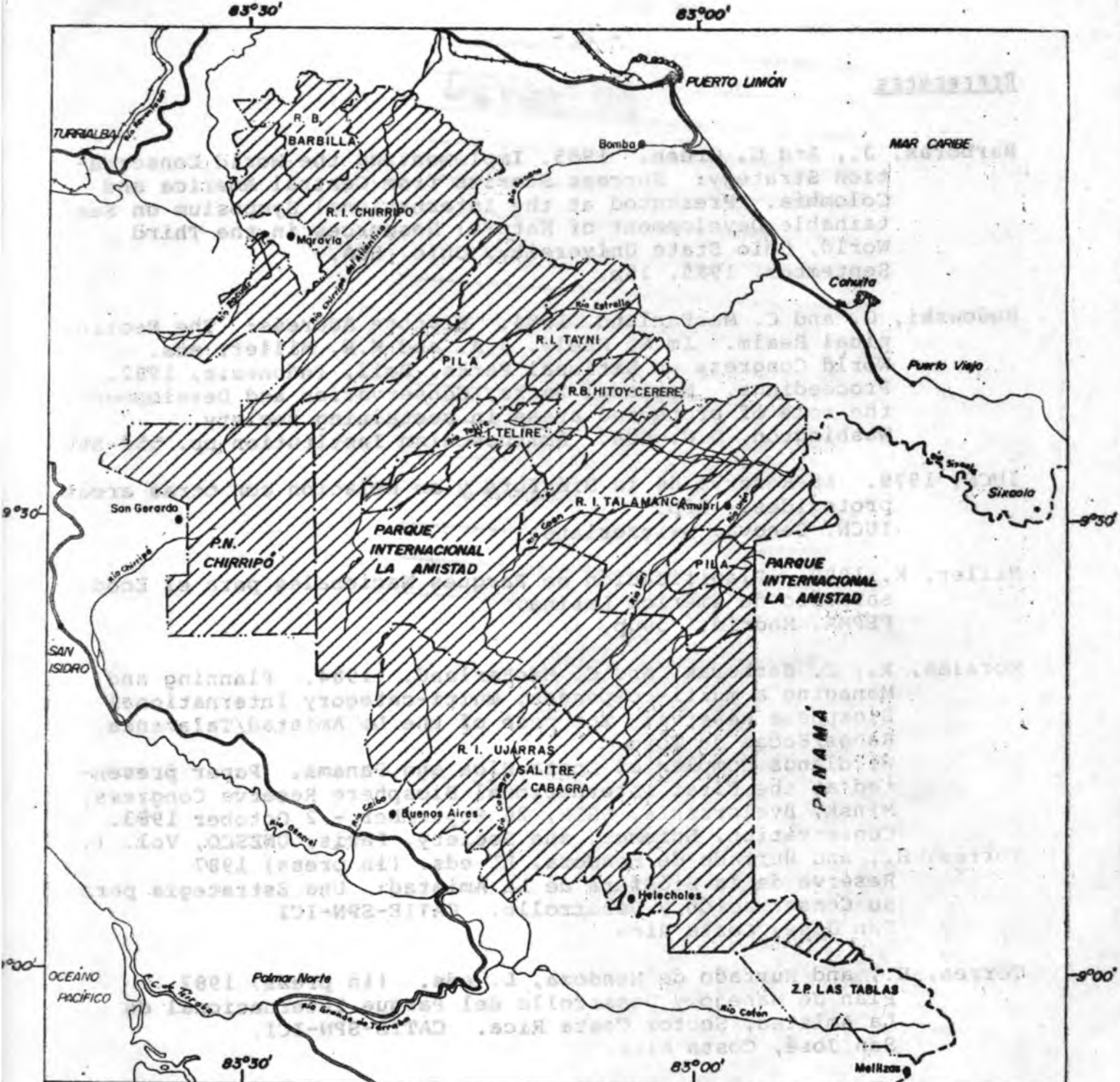
**-Promoting sustainable development**

**DISCUSSION**

Planning biosphere reserve is especially challenging when the reserve is a unit inhabited by indigenous communities which deserve a strict respect of their rights over the land and their ancient use practices. This is even more difficult when the sustained production of goods and services is not well understood by reserve managers or for governmental officials.

Squatterring, poaching and archaeological site looting, make difficult the management of La Amistad Biosphere Reserve. The management problems described in this paper are symptomatics of problems common in many tropical countries: land scarcity, population growth, soil impoverishment, acculturation of indigenous peoples, and poorly conceived development schemes.

The resolution of these problems is of critical importance for the La Amistad Biosphere Reserve. Since human problems and those involving protection of the earth's natural heritage and genetic resources are intimately connected, an integrated approach to resolving them is necessary. The case of the La Amistad Biosphere Reserve in Costa Rica, provides concrete examples of the opportunities and difficulties that exist in the development of large biosphere reserves. The reconciling of cultural, evolution, socio-economic development and resource conservation has to be considered in order to achieve long term protection of outstanding natural and cultural values and genetic resources.



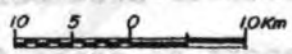
**RESERVA DE LA BIOSFERA DE LA AMISTAD**  
(SECTOR COSTARRICENSE)

DIAGRAMA DE LOCALIZACIÓN



**MAPA GENERAL**

ESCALA: 1:500.000



ELABORÓ:  
P. J. CORDERO

CARTOGRAFÍA Y ENTINTADO  
PEDRO CORDERO  
ALFREDO CALDERÓN G.

LEYENDA:  
Límites  
--- Internacional  
--- del PILA  
--- de R.B.  
● Poblados

R.I. : Reserva Indígena.  
R.B. : Reserva Biológica  
PN : Parque Nacional.  
Z.P. : Zona Protectora.

SUPERVISÓ:  
HERNAN TORRES

FUENTE:  
LEYES Y DECRETOS DE  
COSTA RICA

FECHA:  
DICIEMBRE 1986

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