PLANNING AND MANAGING A MULTI-COMPONENT, MULTI-CATEGORY INTERNATIONAL BIOSPHERE RESERVE: THE CASE OF THE LA AMISTAD/TALAMANCA RANGE/BOCAS DE TORO WILDLANDS COMPLEX OF COSTA RICA AND PANAMA

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ABSTRACT. This paper describes ongoing efforts to establish and manage a lateral biosphere reserve containing a complex of natural and cultural reserves along the Costa Rica-Panama border. It is the largest, most diverse wildland area remaining in southern Central America, home to indigenous peoples maintaining subsistance lifestyles and containing most of the two countries' hydroelectricity generating potential. The history of conservation efforts in the region and the considerable problems encountered in its planning and integrated management are described. Management priorities are outlined, such as land ownership consolidation, boundary adjustment, completion of individual reserve management plans and overall reserve management guidelines, implementation of resource protection, environmental education/extension and applied research programmes, and improved inter-agency cooperation in reserve management. Long-term management goals for the biosphere reserve are reviewed, including: improving land utilization practices in and near the area; investigating and applying native peoples' knowledge of wild genetic resources; producing sustainable economic benefits for reserve inhabitants and national populations through integrated management of the reserve; and, assuring lasting protection of the region's outstanding natural and cultural resources. Threats to reserve integrity are described, including plans for pipelines, mining, and road construction, archaeological site looting, poaching and spontaneous colonization. International assistance in reserve planning and management, including biosphere reserve and World Heritage Site designation, is seen as stimulating local support for reserve protection and opposition to development projects which threaten the reserve.

1. INTRODUCTION

The adjoining wildlands of the Talamanca Range of southern Costa Rica and the Bocas de Toro region of western Panama represent the most altitudinally and ecologically diverse natural area remaining in Central America, exceeded in size only by the vast lowland forests, swamps and savannas of the Mosquitia region of eastern Nicaragua and Honduras. These border wildlands also contain important archaeological sites, the majority of the hydroelectricity generating potential of the two countries, and substantial populations of three Indian tribes practicing stable, subsistence lifestyles. This paper describes the ongoing efforts to plan, establish and manage a series of natural and cultural reserves in the border area, and incorporate them into the international biosphere reserve network. It is hoped that this discussion will prove useful for planners and managers working on similar multi-component and multinational biosphere reserves, especially those containing populations of indigenous peoples.

2. NATURAL AND CULTURAL SIGNIFICANCE OF THE COSTA RICA-PANAMA BORDER WILDLANDS

2.1. Natural significance

Covering a vast region of more than a million ha, the border wildlands of Costa Rica and Panama stretch from near sea level on the Atlantic-Caribbean slope and approximately 1000 m on the Pacific slope to over 3800 m on southern Central America's highest peaks. Because of this altitudinal diversity and annual precipitation ranging from 2000 to over 7000 mm, these wildlands represent the most ecologically diverse natural area in the Central American region. For example, the Costa Rican sector contains 8 of the 12 biogeographical life zones (sensu Holdridge) found in that country. The area contains the only large continuous mass of high altitude natural vegetation found in Central America, including sizeable, almost pure oak (Quercus spp.) forests, high altitude bogs, and 95% of the paramo (Andean alpine scrub) in Central America, a vegetation type which reaches its northern-most extension in Costa Rica (CATIE-SPN, 1982; Murillo, 1982; Ramirez, 1982; Tosi, 1981).

Geologically, the Talamanca Range is formed of highly folded and faulted metamorphic rocks derived from recent marine sediments and intercalated with intrusive igneous formations. The uplifting of the area commenced during the Tertiary about 60 million years ago. Pleistocene glaciations on the highest peaks have left moraines, cirque lakes and other geological features not found elsewhere in Central America (Weyl, 1955).

Slopes throughout the region are generally very steep (over 45%) and because of this factor and high rainfall, soils are for the most part extremely poor and unsuited for permanent agriculture (Villalobos, 1982). However, because of the high rainfall, distributed throughout the year, the hydroelectricity generating potential of the area is enormous, and represents the best hope for energy independence of the two countries, which lack known coal, oil or gas reserves and have serious balance of payments problems due mainly to their foreign oil bills (CATIE-SPN, 1982).

Because of the areas' marked climatic, altitudinal and edaphic variability and its position on a "land bridge" connecting the biogeographically distinct regions of North and South America, plant and animal species and community diversity is remarkable. The number of endemics and endangered species is very high (including six felines, the resplendent quetzal (Pharomachrus mocinno, giant anteater Myrmecophaga tridactyla, and Baird's tapir Tapirus bairdii). Many species of migrant birds from North and South America winter in the area, and seasonal altitudinal migrations among resident birds, butterflies and other faunal groups are thought to be very important, a phenomenon which poses special problems for reserve planners (Tosi, 1981). The border wildlands cover more than a million ha, the largest pristine tract remaining in Costa Rica and Panama. As such, they provide the two countries' 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, 1982).

2.2. Cultural significance

Countless archaeological sites, including petroglyphs, burials and residential areas, have been found recently in the wildlands on both sides of the Costa Rican-Panamanian border. Investigations of these sites have begun to provide very important information on the pre-Colombian inhabitants of southern Central America, who were culturally very different from the Mayas, Toltecs and Aztecs to the north and the Incas to the south (Stone, 1977; Drolet and Markens, 1982; Corrales, 1982).

Indigenous reserves and homelands along the perimeter of the border wildlands contain most of the remaining Indian population of Costa Rica and a sizeable percentage of that of Panama. The three major tribes inhabiting the area are the Cabecars and Bribris in Costa Rica, and Guaymis and a small population of Bribris in Panama. The indigenous groups have developed migratory agricultural technologies and hunting, fishing, and gathering methods well adapted to the limitations imposed by their environment. These tribal peoples, although somewhat acculturated, still possess an incredible amount of knowledge about values of plant and animal genetic resources, of great potential importance in the fields of medicine, chemistry and agiculture (Borge, 1982; Corrales, 1982; Ocampo, 1981; Murillo and Garcia, 1982; Fernandez Guardia, 1975).

3. HISTORY OF CONSERVATION EFFORTS IN THE COSTA RICA-PANAMA BORDER REGION

Although establishment of the first indigenous reserves in the Talamanca Range of Costa Rica occurred in the late 1940s, effective field action to protect Indian cultures and conserve the area's natural resources is a recent phenomena. In December 1974, the First Central American Meeting on Conservation of Natural and Cultural Resources was held in San Jose, Costa Rica. At that meeting, sponsored by IUCN, FAO, OAS and Unesco, representatives of the six countries present signed a resolution promoting the development of international parks and reserves in areas within the region where wildlands cross international boundaries (IUCN, 1976). One of the sites specifically mentioned as a high priority for such a reserve, and the only one where the resolution is being implemented, is the Talamanca Range of southern Costa Rica and the Changuinola River basin of adjacent western Panama.

Following up on the 1974 resolution, between 1975 and 1982, the Costa Rican government created and began managing a complex of adjoining national parks, Indian reserves, forest protection zones and biological reserves which now cover almost the entirety of the Talamanca range -- over 500,000 ha or 10% of the country's area. This effort culminated in March 1982, with the inauguration of the 192,000 ha Costa Rican sector of La Amistad International Park.

The creation of the Costa Rican sector of La Amistad was a direct result of two resolutions, signed by the Presidents of Costa Rica and Panama in 1979 and early 1982. Citing the resolution of the 1974 San Jose meeting, the presidents directed their countries' resource management agencies to proceed with joint planning and development of wildlands along their border, especially an international park to be named La Amistad (Friendship), as part of overall cooperative efforts existing since the early 1970s to promote joint development of the border zone. The resolutions, and the decree creating La Amistad-Costa Rica, specifically mentioned the intention of the two countries to nominate their border wildlands for inclusion in the international network of biosphere reserves and on the World Heritage List. The resolutions also stated the intention of the two countries to seek cooperation from the Wildlands and Watershed Program of the Tropical Agricultural Research and Training Center (CATIE), of Turrialba, Costa Rica, in providing technical assistance in planning the border wildlands.

Progress in implementing the 1974, 1979 and 1982 resolutions on the Panamanian side of the border has been slower but nonetheless positive. In 1976 Volcan Baru National Park was created in the border area to protect the ecosystems surrounding Panama's highest peak and watersheds originating within the area. Resource inventories and a management plan for these areas have now been completed, with IUCN and CATIE assistance (LaBastille, 1976; MacFarland and Zadroga, 1981).

Costa Rican and Panamanian authorities originally hoped that joint nominations could be presented for consideration of the two countries' border wildlands as a single, bi-national biosphere reserve and World Heritage Site from the start. However, because of the delays in planning the Panamanian sector, the Costa Rican government decided to proceed unilaterally in 1982 and submitted nominations to Unesco for inclusion of their share of the wildlands in the international biosphere reserve network and on the World Heritage List. The area was accepted as a biosphere reserve in June 1982, and the nomination for inclusion of the Costa Rican sector on the World Heritage List will be formally considered in late 1983.

This biosphere reserve and proposed World Heritage Site comprises a reserve complex of just over 500,000 ha including the following areas: La Amistad International Park-Costa Rican sector, Chirripo National Park and Jitoy-Cerere Biological Reserve, all managed by the Costa Rican National Park Service (CRNPS); five Indian reserves (Tayni, Talamanca, Telire, Chirripo and Ujarras-Salitre-Cabegra); Las Tablas and Barbilla Forest Protection Zones managed jointly by the CRNPS and the Costa Rican Forest Directorate (CRFD); and the Las Cruces Botanical Garden, managed by the Organization for Tropical Studies (OTS), a university consortium (see Figure 1). All areas but Las Cruces are contiguous; the Botanical Garden is less than 25 km from Las tablas, and was included because of its excellent classroom, dormitory and research facilities, ideal as a base for biosphere reserve-related training and research activities.

4. PLANNING AND MANAGING THE COSTA RICAN SECTOR OF THE BINATIONAL WILDLANDS

The following section describes the planning and management of the Talamanca Range-La Amistad Biosphere Reserve as an example of the development process for a reserve cluster containing both natural and cultural protected areas, and whose management is entrusted to a series of different agencies.

4.1. The planning process

Starting in the late 1940s, but mainly in the 1970s, the Costa Rican government created a complex of natural protected areas and indigenous reserves covering most of the Talamanca Range. A common problem involved in almost all of these well-intentioned efforts was that resource inventories, especially of land tenure and location of human settlements, were not undertaken beforehand. As a result, later studies have shown that many of the Indian reserves contain sizeable non-Indian populations, are owned by non-Indians, or exclude some Indian settlements or hunting grounds. Similar problems affect the natural reserves of Talamanca. In addition, questions have arisen about the appropriateness of the management categories of the individual reserves or parts of them.

As a follow-up to the 1979 resolution in which the Costa Rican government declared its intent to create its sector of La Amistad Internaional Park, the government decided to contract CATIE to direct a detailed resource inventory and planning effort for the entire border wildlands area.

The planning effort, now well underway, is a good example of an interdisciplinary, interinstitutional approach to resolving resource management problems. The team consists of four levels of participants: the CATIE-contracted core planning team; full-time counterparts from the Costa Rican National Park Service Planning Department; representatives of other Costa Rican governmental institutions, assigned part-time to aid in the planning effort; and student and faculty volunteer collaborators from Costa Rican universities.

Since many of the team participants had no prior experience in similar efforts, the project began with a short intensive training course for them on the principles and procedures of wildlands planning according to the methodology proposed by Miller (1980). At the end of the exercise, each participant was assigned specific responsibilities in the initial search for all existing information on the natural and cultural features and socio-economic situation of the region.

Soon after, field inventories were initiated by the project's full-time staff and university collaborators in the Talamanca Range, to complement and update available information on the resources of the area and ground check the interpretation of available air photos covering about 50% of the region. Studies also began of land ownership and occupation, the results of which will be combined with data from ecological surveys to redefine the limits for La Amistad and adjacent protected areas.

The planning team is now working on general management guidelines for all Talamanca reserves, recommendations on revising their limits, zoning and management categories, and an overall biosphere reserve zoning scheme. In addition, the long-term management plan for La Amistad and adjacent Chirripo National Park, the two areas initially considered the "core" zone of the biosphere reserve, will be completed by 1985.

4.2. Current reserve management

Until long-term general management and development plans can be prepared for all CRFD and CRNPS managed areas in the biosphere reserve, management is being carried out by a combined force of approximately 30 rangers, under the terms of short-term (2 years), annually revised and updated operational plans, prepared by their staff and the planning team according to the methodology proposed by Barborak et al., (1982). The plans are designed to provide park and reserve managers with a simple, practical guiding document which permits them to maximize the impact of reserve management programmes and make the best use possible of limited financial resources and personnel. Management emphasis is placed on resource protection, environmental education/extension programmes directed at neighbours of the reserve, construction of basic infrastructure (trails, signs, ranger posts, etc.) and assistance in resource inventories as part of the overall biosphere reserve planning effort.

Management of the indigenous reserves is somewhat different. The Costan Rican National Indian Affairs Council (CONAI), Agrarian Development Institute (IDA) and agencies such as the Health and Education Ministries, advise Indian community leaders and assist in obtaining national and interntional support for priority programmes in the reserves, such as basic health care and bilingual education. They also pay salaries for health promoters, teachers, and the approximately 10 reserve wardens dedicated primarily to preventing invasions of reserve lands by non-Indian colonists. Actual decisions regarding internal affairs are made by community development councils in each reserve. Land ownership is communal, not individual, and the indigenous people live in widely scattered houses and not in organized villages. This makes delivery of services such as health care and education very difficult, but this arrangement is probably well adapted to the migratory agriculture practiced by most of them and in response to centuries of often-hostile encounters with outside civilization.

No formal inter-agency council or advisory board has yet been formed between the major management agencies and Indian reserves' community councils, but continual informal meetings help to assure coordination in management. As an initial example of the type of cooperative activity which the management

agencies hope to jointly carry out, in February 1983 a one-month ranger course, funded through the World Heritage Convention, was held at Las Cruces and in the Costa Rican sector of La Amistad National Park. Participants invited instructors from CATIE and all the involved management agencies, and invited participants from biosphere reserves in four neighbouring countries.

4.3. Dealing with major management problems

A series of existing and potential problems and threats affect efforts to plan and manage the biosphere reserve. The major problem along the lower slopes is the presence and continual expansion of colonization fronts created by migratory agriculturalists and land speculators, resulting in forest destruction, habitat elimination, and watershed degradation. Many of these squatters have legalized their claims by staying over ten years on "barren" government land; if forcibly removed all must be paid damages and relocated according to Costa Rican agrarian law. Buying out all these areas would be beyond the financial capability of the Costa Rican government. To attack this problem, constant ranger patrols are carried out, to monitor activities of existing colonists, who are prohibited from expanding their farms, and to discourge new invasions. Complete inventories of land occupation, ownership and values of private land and squatters' "improvements" are being completed in cadastral and tax offices in San Jose and by surveys carried out by rangers in the field. Interpreted, ground-checked air photos and tax and title information are being used to map precisely the affected areas. The eventual goal is to redefine park and reserve limits to eliminate those areas whose acquisition would be most costly and politically difficult, and whose ecological importance is minimal.

A major social problem is the distrust and suspicion with which reserve residents and neighbours, Indian and colonist alike, view the reserves and their rangers. To counter this problem, comprehensive environmental education and extension campaigns have recently been initiated with the aim of reaching every household, school, and community group in and adjacent to the reserves by 1985. Also, wherever possible, natives and colonists are hired as guides, porters and field assistants during field inventories.

Aside from budget and personnel limitations and localized resource use, problems such as colonization, poaching, and looting archaeological sites, a number of potentially devastating development projects have recently been proposed for areas in or near the biosphere reserve, as supposed "quick-fix" solutions to the Costa Rican financial crisis. These include construction of a cross-Talamanca highway, copper mining, and construction of a trans-continental oil pipeline. The latter two projects, of course, would also include road construction, and all would have a series of secondary impacts, such as massive uncontrollable colonization along the road routes, logging, and watershed destruction. All of these projects are the subject of serious national debate.

International financial and technical assistance and moral support is of utmost importance in protecting the biosphere reserve from both chronic problems such as poaching and major threats such as oil pipelines. Funding received or requested through a number of agencies, such as Unesco (World Heritage and MAB Programmes), IUCN/WWF (Tropical Forest Campaign), and the New York Zoological Society has been and will continue to be of critical importance in training personnel, expropriating private lands, buying equipment, building infrastructure, and supporting resource inventory and planning efforts. CATIE technical assistance has been of critical help in organizing and directing the planning and initial management effort.

The importance of biosphere reserve and World Heritage Site status in obtaining public and official support within both Costa Rica and Panama cannot be understated. The possible loss of international prestige by a government, involved in approving projects which threaten the integrity of "one of the world's few biosphere reserves" or "an area declared by the UN to be part of the World Heritage" or "one of the world's greatest natural areas" is important in convincing decision-makers to not approve such projects and in gathering enough strong local support to successfully block even officially sponsored schemes.

4.4. Long-term development philosophy

The overall, long-term management and development concept for both the existing Costa Rican sector of the biosphere reserve and its planned counterpart in Panama differ markedly from that applied in many developed countries. In the Northern Hemisphere, emphasis has been placed in biosphere reserves on basic research and monitoring, visitor services for public enjoyment and education and resource protection. Most developed-world biosphere reserves have been created on top of long-established national parks, ecological reserves and similar protected areas and the new designation has often not resulted in any change in management focus.

In the Costa Rican-Panaman border biosphere reserve, as in other biosphere reserves in Central America, management will concentrate on making tangible contributions to improving human welfare: applied research of potential values and uses of wild genetic resources; protection and management of watersheds for maximum downstream hydroelectricity generation, irrigation, domestic water supply and flood control benefits; environmental education and extension programmes; promotion of appropriately scaled and designed resource-based tourism; and design and implementation of improved land use practices in cultural reserves and in degraded areas adjoining natural reserves.

5. DISCUSSION

It should be clear that to initiate the planning and development of a truly functioning biosphere reserve, a complex task anywhere, is especially difficult when the reserve is a multicomponent or on an inhabited bi-national area, in the developing world, and not simply a new veneer and label superimposed on an existing strictly protected area in regions where phrases such as "ecodevelopment" and "sustained production of goods and services" do not form part of reserve managers' vocabularies.

Problems such as spontaneous colonization, poaching and archaeological site looting, complicate enormously the management of the Talamanca Range-La Amistad Biosphere Reserve in Costa Rica and will also be troublesome in the Panamanian sector of the reserve once it is established. But it is because of these problems, not in spite of them, that the biosphere reserve concept is so important and appropriate in the Talamanca Range and in many ecologically diverse areas with similar socio-economic problems throughout the developing world. The squatter, poacher, or grave robber is not a criminal, but rather an individual looking for a way to keep food in his family's stomachs. The management problems described in this paper are really not problems, but rather symptoms of problems typical in developing 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 if developing countries really hope to "develop" in any sort of sustainable fashion, bringing benefits to all sectors of society. Since human problems and those involving protection of the earth's natural heritage and genetic resources in the developing world are intertwined, an integrated approach to resolving them, both within and among nations, is necessary. The Man and the Biosphere Programme provides a valuable framework for attempting this. The case of the Costa Rican-Panamanian border wildlands is a tangible example of both the opportunities and difficulties posed in development of a multi-component, bi-national biosphere reserve in the developing world, as a means of reconciling socio-economic development and resource protection and in order to achieve long-term protection of outstanding natural and cultural values and genetic resources, while simultaneously contributing to sustainable socio-economic development at local and national levels.

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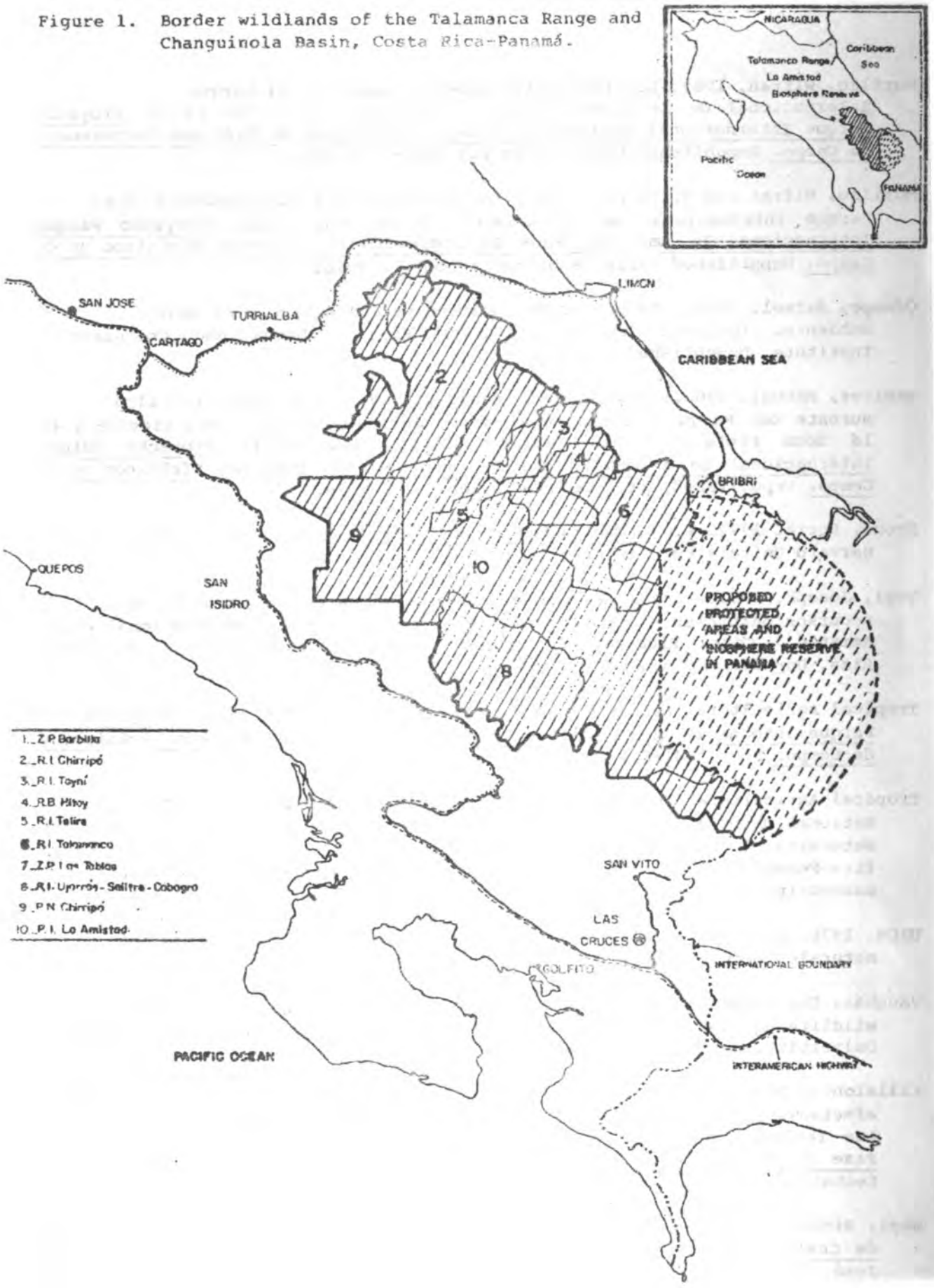
Figure 1. Border wildlands of the Talamanca Range and Changuinola Basin, Costa Rica-Panamá.



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