

Establishment, Planning and Implementation of a National Wildlands System in Costa Rica

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ABSTRACT. *In 1969 five legally established protected areas in three management categories existed in the Costa Rica. None were receiving any protection or management. Between 1970 and 1982, with the creation of the Costa Rican Park Service (CRNPS), General Forest Directorate (DGF) and National Commission for Indian Affairs (CONAI), the situation changed markedly. By 1982, there were 79 legally established wildlands units in nine categories, covering almost 27% of the national territory. Of these, 32 units are receiving "adequate and continuous management," 21 "inadequate and intermittent" management and 26 no management.*

1. INTRODUCTION

From 1950 to 1970, in terms of renewable natural resources allocation and use, Costa Rica was rapidly approaching the condition of a runaway train on a steep and curvy downhill grade, with no brakes and no engineer at the controls. The country had begun to irreversibly damage and destroy the very base for long-term sustained development, and was on the brink of even far worse future change.

As a response to these trends, Costa Rica has accomplished a very significant feat over the past 12 years: establishment and partial implementation of a national system of wildlands which is probably the most complex in all of Latin America. By 1982, a total of 79 wildland units had been legally established, covering approximately 27% of the country's total land area. These units are distributed among 9 management categories as follows: 14 National Parks; 10 Biological Reserves; 4 National Recreation Areas; 1 National Archaeological Monument; 1 Biosphere Reserve; 12 Forest Reserves (=

National Forests); 8 Forest Protection Zones (= Watershed Protectorates); 3 Wildlife Refuges; and 26 Indigenous Reserves. Three public institutions are responsible for managing different one of these categories.

The process of reaching this state has been complex and the management intensity and implementation success with the different management categories and their subsystems by the different institutions has been notably variable; the Costa Rica National Park Service (CRNPS) stands out for its success and dynamism in the establishment, planning, administration and on-the-ground implementation of management, whereas the other institutions have lagged notably behind.

How were the system and/or subsystems designed and planned? What were the strategies and tactics? Did designs, plans, strategies and tactics even exist? What were the key differences in those and other aspects between and among the CRNPS and the other institutions? What key principles and guidelines can be derived from this case study to aid in the solution of such problems in the other countries of Mesoamerica? Can this experience be applied even more broadly to other developing countries in the tropics in South America and even the rest of the world? This paper will attempt to answer all of these questions, except the last one, which is left to the reader to answer.

2. PROBLEM STATEMENT

In 1950, 65% of Costa Rica's national territory was owned by the State, the vast majority of it under forest cover. The other 35% was privately owned, of which one-third was covered by natural forest. By 1970 the land owned by the State and in forests had been reduced to 40%,

and the remaining 60%, largely deforested, was privately held. However, this massive reduction in the country's forest cover did not result in any notable increase in cultivated area nor in agricultural production of basic foodstuffs. Instead, *almost all* of that massive change corresponded to an expansion of pastures for very low-density beef cattle grazing, for export, an industry which employs few and enriches even fewer.

By 1970, Costa Rica's total area covered by natural primary forests was only 35%. Almost all of those forests were located in life zones (*sensu* Holdridge) that are marginal or submarginal for agriculture and cattle. Those areas are almost all characterized by having very broken to steep topography and poorly drained, infertile soils very susceptible to erosion.

Given the situation the following major socioeconomic problems and impacts were visualized for the country in the coming few decades, if there were no change in established trends:

- An increasing shortage of timber and related raw materials, leading ultimately to the collapse of the national forest industry;
- increasing unemployment of the forestry industry's labour force;
- increasing deficiencies in the production of electricity and water, due to the damage to most major watersheds, along with seasonal floods and droughts with extremely negative impacts on agriculture and industry;
- irreversible losses of fauna, flora and recreational opportunities; and
- loss of natural scenic landscapes and other resources which are the base for national and international tourism.

This list obviously could be greatly expanded; the negative socioeconomic, political and cultural ramifications and impacts of such trends are intricate and almost endless.

In marked contrast to this situation, as of 1970 Costa Rica did not have even one protected and managed wildland.

The problem therefore was how to begin from essentially zero and gradually select, establish, plan and implement a protected area system which could counteract the negative environmental trends and thus form part of the solution to the major problems being confronted.

3. CONSTRAINTS

At the end of the 1960's neither the government nor the general public in Costa Rica was conscious of the renewable natural resources problem. That lack of concern was based on widespread belief at both levels that the country still had more than enough resources and that no shortages would develop for a long time, and

that virtually the entire country was suitable for agriculture and livestock. Forested areas were looked upon basically as an impediment to development, a socioeconomic disturbance that should be eliminated. This attitude was backed strongly by a series of laws in which deforestation was considered as an "improvement" to the land.

The principal limitations which impeded the development of a programme to manage renewable natural resources, including establishment and management of wildlands, were the lack of governmental policy on conservation and the absence of institutional mechanisms, financial resources and a legal base of sufficient strength to guide public and private action.

4. ACTION

4.1. Policy and programme

The national programme of protected area establishment and management began with the 1969 Forestry Law, which delineates in general terms a policy designed to solve the problem of natural resource mis-allocation and mis-use by making the State responsible for ensuring the protection, appropriate use, conservation and development of the country's natural resources. The forest heritage is defined as the National Reserves (wildlands without an assigned management category), Forest Reserves, Protection Zones, National Parks, Biological Reserves, as well as any other lands, public or private, which will provide greater economic, social, protective and scenic utility by remaining or being restored to forest cover, than by exploiting them for agriculture, even with advanced technology.

The law established the General Forestry Directorate (DGF) in order to carry out that programme; the DGF started operations in early 1970, four months after the approval of the law, with two Departments: National Parks and Forest Protection.

To orient the first steps by the DGF and its Departments in the wildlands sector, the law established that the Executive Branch of Government, with the DGF's recommendation, would decree in the National Reserves and State, municipal or private lands, those Forest Reserve, Protection Zones, National Parks and Biological Reserves considered necessary to comply with the law. Also, those private lands affected would be obtained by purchase or expropriation. All legally declared wildlands would be inscribed in the Public Register as State-owned "haciendas." Moreover, once created, no part of the National Parks and Biological Reserves could be segregated for other objectives or uses without approval (i.e. a law) of the Legislative Assembly.

In order to advise the Executive Branch on implementing the programme, a National Forestry Council was established by the law, made up of the Minister of Agriculture and Livestock and one representative each

of the following institutions: Ministry of Commerce and Industries, ITCO, National Electricity Service (SNE), ICT, University of Costa Rica (UCR) and the National Association of Wood Industrialists.

To cover the costs of the programme, apart from the amounts to be assigned each year from the regular and special annual government budget, the law established the Forestry Fund, to be administered by the DGF directly. That fund is financed by voluntary contributions from many government institutions and any other institutions or persons wishing to donate to it. Also, the Fund can receive all types of goods, property or other donations as well as those from international or bilateral agencies and organizations.

4.2. Special actions which contributed to the national wildlands system

- a) In 1969 the Tropical Science Center published the Ecological Map of Costa Rica, which identifies 12 life zones or bioclimates and has been invaluable in helping to select and evaluate potential wildlands.
- b) In 1970 the Wildlife Conservation Law was passed, for the first time recognizing wildlife conservation as being in the public interest.
- c) In 1970 the FAO Regional Wildlands Project expanded its activities and changed location to the Regional FAO office in Santiago, Chile, with K. Miller continuing as its leader. The Project covered technical assistance, training, research, pilot project development and the preparation and distribution of example methodology manuals and plans, for the selection, establishment, planning and implementation of wildlands and wildlands systems, particularly national parks. The scope of the project was all Latin America, but of necessity it concentrated most heavily in a few countries, including Costa Rica. In a third phase, 1975 to mid-1976, the project's focus was narrowed to Central America and Costa Rica continued to receive substantial technical assistance and training.
- d) In 1972 the National Parks Department was elevated to the status of General Subdirectorato and in 1977 it was made a Directorate.
- e) In 1972 the first conservation NGO, the Costa Rican Association for the Conservation of Nature (ASCONA) was established to act as a "watchdog" and aid both the public and private sectors in the conservation of natural resources.
- f) In 1973 the National Commission for Indian Affairs (CONAI) was created to help promote and guide the protection of the indigenous Reserves and their populations, as a response to increasing pressure for land acquisition by non-Indians.
- g) In 1974 the First Central American Regional Meeting on the Conservation of Natural and Cultural Resources was held in San Jos, organized by IUCN and sponsored by FAO, OAS, Unesco, UNEP, WWF and RBF. All countries of the isthmus were represented by official delegates competent in natural resources, tourism, planning and cultural resources. Based on recommendation 7 of the 1972 Second World Conference on National Parks, the meeting proposed a regional system of national parks in which Costa Rica would participate with two pilot national parks (Volcan Pos and Santa Rosa) two international parks (La Amistad, Costa Rica-Panama and Tortuguero, Nicaragua-Costa Rica), and two more proposed parks (Corcovado and Chirripo).
- h) In 1975, the FAO Regional Wildlands Project provided technical assistance for the preparation of an extremely important basic document for Costa Rica: *Policies for Wildlands Management*. The major contributions of the study were the recommendation of a set of 11 national objectives for natural resources conservation and a system of 15 wildlands management categories, each with detailed definition, objectives, characteristics and management guidelines.
- i) In 1975 the General Directorate of Fisheries Resources and Wildlife was established within the Ministry of Agriculture, but apart from the DGF, thus putting wildlife administration and management in a separate organization.
- j) In mid-1976, partially as a continuation of the FAO Regional Wildlands Project, the Regional Wildlands and Watershed Programme (PASC) was established at CATIE, as part of its Renewable Natural Resources Department. It was principally supported in its first few years by RBF, IUCN/WWF and CATIE, the latter having now taken over core funding. The principle objective is to promote ecodevelopment based on natural resource management, including the creation of a regional network of model, experimental-demonstration wildland units of all major management categories. The main elements in the PASC strategy, all carried out with national counterpart teams from the key natural and cultural resources management agencies, include: preparation of national conservation strategies and/or national wildlands systems strategic plans; training and education of national personnel; research on the development of planning and training methodologies and techniques; preparation and distribution of key methodology and training manuals and sample plans; improving communication, collaboration and sharing of human resources between the countries; and obtaining international and bilateral technical and financial aid. PASC's greatest impact, achieved

with the active participation of the CRNPS and DGF, has been to train most of the professionals and technicians in the central office staffs and at the level of superintendents of wildlands units.

- k) In 1977 the first broad Indian Law was promulgated, establishing that the Indigenous Reserves are inalienable and exclusively for the Indian communities which inhabit them. The law also establishes that the Reserves will be managed by the Indians according to their traditional methods, with advice and collaboration (but not control) from CONAI.
- l) In 1979 the CRNPS, with PASC's direct advice and collaboration, began an experimental programme of operational planning for all its management units and central office technical and administrative departments. In 1980, its results were evaluated and the CRNPS permanently adopted the programme. In 1981, via workshops and other training methods for the Forest Reserves Department professionals and the units' superintendents, the operational planning programme was initiated.
- m) In 1981 the government, through the CRNPS, contracted the Tropical Science Center to conduct an ecological study and evaluation of the existing system of national parks and equivalent reserves and to recommend new wildland units. The report was recently finished and recommends 47 new Protection Zones, Forest Reserves, Wildlife Refuges, Biological Reserves, National Recreation Areas and National Parks (mostly the first five, only two of the latter).
- n) The private National Parks Foundation was established in 1982 and has begun a very active national and international fund-raising programme. It is receiving notable technical assistance from The Nature Conservancy's (USA) International Programme. One of its main activities is to obtain funds for the purchase of private lands inside national parks and other wildlands, which the government can not possibly buy due to the existing economic crisis.

5. CASE STUDIES OF SEVERAL CRNPS AREAS

The following presents examples of the specific actions taken for the selection, establishment, planning and implementation of units managed by CRNPS.

5.1. Cahuita National Park

This small unit (1,100 ha) was the first established legally by CRNPS, in September 1970. A year and a half earlier the Wildlands Management Project at CATIE had prepared a study on the natural and cultural resources of the area, its socioeconomic characteristics and possibil-

ities for tourism. The study recommended protection of the area because it contains the only well-developed coastal coral reef in the country and high scenic beauty and recreational potential. The principal limitations identified were: difficult access (no road); the entire area was in private holdings; a sizeable part of the area was in cocoa and coconut cultivation.

Just after the decree, land tenure and cadastral studies were done. Then the land owners were informed that in a relatively short period they would be compensated. The decree did not include the necessary financing and to date (1982) the owners have not been paid; this has caused serious conflicts with the park's neighbours. The local community has not really accepted the park and its personnel have had to try maintain a conciliatory and pacifist coexistence with the community, varying from very good to very bad in different periods, principally depending on changes of personnel in the park. The conciliatory attitude has included permitting, in sites chosen by the CRNPS, the harvesting of coconuts, artesanal fishing (beyond the reef), installation of a small food and drink concession for tourists in the park, hiring of several local people as permanent rangers, etc.

With the construction of the access road to the park, visitation went from a few hundred year to more 50,000 in 1981. The park has an administrative-living quarters centre for its personnel, which is also used for visiting scientists and occasional education-interpretive programmes.

Numerous studies on the park's natural and cultural resources, terrestrial and marine, have been done by national university scientists, a Peace Corps marine biologist and others. In 1980 the general Management and Development Plan was prepared as part of regional training workshop on wildlands planning and in 1982 a draft Interpretive-Environmental Education Plan was completed by the Wildlands Management course of PASC, as a practical exercise.

5.2. Tortuguero National Park

The principle objective of establishing this park, in September 1970, was the complete protection from egg extraction along the 20 km of prime nesting beach and from hunting of adults of the green sea turtle *Chelonia mydas*. The establishment was based on recommendations from Dr. Archie Carr, who since 1959 had been studying the species there. Given the Park's inaccessibility and the CRNP's precarious finances, until 1975 the protection of the park (the beach principally) was left to the CCC (Caribbean Conservation Corporation, Dr. Carr's group).

In 1975 by law the park was increased in size and given a budget and the CRNPS's full jurisdiction over the area was rectified. This new law set another positive precedent; because of personal economic interests of a high-placed government member, the President vetoed

the law, but the Legislative Assembly over-rode the veto.

5.3. Volcan Poas National Park

The third park established (December 1970), Volcan Poas is an active volcano of great scenic beauty, situated only 57 km (1 hour) from San José and accessible year round by bus or car on a good highway. The area was selected for those reasons, but also because it has great attractiveness for Costa Ricans, especially each March 19th (San José Day) when up to 8,000 persons from the cities of the Meseta Central traditionally visit the volcano. Before its creation, the general Management and Development Plan had been prepared, and it served well to "sell" the project.

In the first years the resident personnel, with assistance from Peace Corps specialists and National Youth Movement (NYM) volunteers, established basic minimum infrastructure and services for visitors and staff. Little by little this was improved until today the park has a complex of interpreted nature trails, a system of guard posts and patrol trails, a large visitor centre with first class educational exhibits, a paved highway into the park, and other infrastructure.

In 1974 at the Regional Central American Meeting on Management of Natural and Cultural Resources, it was selected as the model park for Costa Rica. That same year two FAO specialists and counterparts prepared a revised Management and Development Plan and later that year a preliminary Interpretive Plan, the first of its kind in Costa Rica.

Based on those plans, in 1976 the Central American Bank for Economic Integration (BCIE) approved a loan of \$1.8 million, with which the plans have been steadily implemented. This was the first loan by an international or regional bank for development of a national park in Latin America.

Most of the park's 4100 ha belong to the CRNPS, although a few small private lots remain to be purchased. This park has had a tranquil existence because of strong support for it by the local communities and government (tourism, watershed protection for dairy farms and rich vegetable croplands) as well as national ones such as ASCONA and the Biologists Guild.

5.4. Santa Rosa National Park

This park, established in 1971, protects the most important historic site in the country and more than 22,000 ha of tropical dry forest, a type which has almost been eliminated everywhere else in Costa Rica and Central America. In 1966 the historic Casona (main house) and 1000 ha was declared a National Monument and ICT were given the responsibility to manage it. ICT requested technical assistance from the Regional Wildlands Project of IICA (now CATIE) to prepare a man-

agement plan. The Preliminary Management Plan (1968) proposed extension of the area to 11,000 ha to be managed as an Historic National Park. In 1970 the new CRNPS accepted the area from ICT and began to manage it as a National Park. The area had squatters, furtive hunting, and cattle and the historic casona was in extremely bad condition. Thanks to the Minister of Agriculture, the CRNPS was able to obtain a small budget and contracted five rangers and a superintendent and purchase basic equipment, materials and a vehicle. That skeleton staff and volunteers (Peace Corps and National Youth Movement) initiated protection activities and successfully removed most of the squatters. When the Park was formally declared and inaugurated the CRNPS already had been managing it for over a year.

The date of inauguration and legal establishment were carefully chosen to exactly coincide with the 115th anniversary of the Battle of Santa Rosa (20 March), the most important historical date in Costa Rica. The highest government authorities, including the President and First Lady, attended.

Slowly but surely facilities and services were developed for visitors and staff, neighbours and local and regional communities and governments became involved in management and support. The last squatters were removed and the free-running cattle eliminated under agreements with their owners. The Ministry of Culture funded and carried out restoration of the Casona and exhibits were installed. In 1977, 796 more ha of coastal area and in 1979, 11,600 ha of a neighbouring hacienda were expropriated (owned at the time by Nicaraguan dictator Anastasio Somoza).

This has been one of the protected areas with the heaviest concentration of foreign and national scientists and much research has been carried out, aiding and supporting appropriate management.

5.5. Manuel Antonio National Park

This small area of only a few hundred hectares contains some of the finest beaches in Costa Rica, areas which had been used for decades by the inhabitants of the nearby (10 km) town of Quepos and the surrounding area as well as many visitors from the Meseta Central, as a recreation area. In 1968 the area was owned by a foreigner who decided to close off both access routes. He installed iron gates which the people of Quepos promptly tore down. He sold the property to another foreigner of like mind: more gates, more conflict. Based on a request by the local community and a journalist, the CRNPS submitted to the local representative to the Legislative Assembly a bill declaring the area a national recreation park. It was immediately presented to the Legislative Assembly and at the same time the Municipality of Quepos held an open public meeting to solicit local opinion on the project. The entire town, including the Association of Small Agriculturists, the Youth Movement and many others at local and national level joined

in support of the park's creation. The law passed in 1972. It established a basic budget for the park, required the Executive Branch to expropriate the private holdings, and established an entrance fee of one colon (= \$0.12 at that time), one fourth of which would go to the Municipality of Quepos for improvement and maintenance of the road to the park. One more try was made by certain interested parties to have the law rescinded. However, the Local Committee for Development of the Park, set up just after the law was approved, and the CRNPS succeeded in fighting off the move and obtained an emission of government bonds in 1975 to allow the purchase.

At its creation the CRNPS immediately staffed the park and gradually developed minimum recreational and interpretive facilities. In 1981 it received 31,000 visitors.

5.6. Corcovado National Park

Since 1972, the Tropical Science Center (TSC), the Organization for Tropical Studies (OTS), the UCR and many other national, European and U.S. universities and scientists had been fairly intensively studying the ecology, fauna and flora of the Osa Peninsula. Since 1971 a wave of interest arose to establish a large protected area there. The CRNPS was very interested but already had four parks to manage, which absorbed all its scarce human and financial resources. However, in 1975 a series of events developed which put the proposed park in grave danger: a sudden increase in invasion by squatters (most of whom were land speculators) with the associated deforestation; a large mixed national-foreign capital logging firm developed very concrete plans to start a gigantic operation with a consortium of Japanese companies; and hunters began to enter the area in large numbers as word of its spectacular fauna spread. Given the situation, a national and international campaign in coordination with the CRNPS was begun to both build support for its legal declaration and to obtain funds for its establishment and management. The principal movers in this campaign were the TSC, WWF-USA, RARE, the U.S. Nature Conservancy, the Biologists Guild of Costa Rica and IUCN.

As soon as it was declared in October 1975, a National Committee Pro Corcovado National Park was established to coordinate national actions for the immediate taking of possession of the area with proper institutional, legal and financial support. A few weeks later \$40,000 was received from The Nature Conservancy and RARE via WWF-USA. To avoid bureaucratic slowdown TSC agreed with CRNPS to handle the administration of that and future donations. With the agreement of the National Committee and the CRNPS, the TSC also assigned one of its staff (a Costa Rican naturalist) as director and the CRNPS assigned all auxiliary personnel.

In sequence the CRNPS and the Park's director carried out the following key activities:

- Contacted the leaders of a small minority political party, but one which has great influence with agricultural workers in general and particularly the squatters in Corcovado (by that time 170 families, or 1500 persons scattered in various parts of the park). That assured that the party would not put obstacles in the way of CRNPS and would cooperate in the relocation of the squatters to new lands;
- various meetings with the President which resulted in: a high-level liaison coordinator with direct access to the President and his staff; direct orders to the chief of the Civil Guards air wing to lend all support necessary; direct access to the Executive President of ITCO, so that it would plan and take charge of the relocation and payment to the squatters; and direct access to the Rural Guard Commander to support all those actions and maintain order in the park;
- establishment of two fixed, manned guard posts in strategic positions in relation to the squatters' distribution;
- prohibition of any expansion of agricultural activities and strict control and confiscation of gasoline, chainsaws and arms;
- payment of a half-salary to heads of family during four months prior to the relocation, in order to decrease the pressure to clear more forest for crop planting;
- purchase by ITCO of a large farm on the Peninsula but outside the park, for the relocation;
- payment of the "improvements" and for livestock, and relocation of the squatters; and
- refurbishment of some squatters' houses as permanent guard posts, staff living quarters and basic facilities for researchers.

By 1977, the park had no squatters, 20 rangers (10 from the zone), 4 permanent guard stations with minimum facilities and radios, 30 horses, 15 km of critical boundaries well-marked and a reconditioned landing strip. It is one of the most important parks in the system, given its size (41,469 ha), extraordinary pristine nature and huge ecological and species diversity. It is rapidly becoming one of the most important research sites in tropical America.

5.7. Braulio Carrillo National Park

This area was declared in April 1978 based on heavy public pressure organized and directed by ASCONA and the CRNPS. The basis was the heavy deforestation that would follow the establishment of a new national highway cutting through the Cordillera Volcanica Central connecting San Jos with the Atlantic coast by a much shorter route. The extremely steep-sloped area included a complex of watersheds with primary forest cover of great importance for the Atlantic lowlands. The TSC in

1975 prepared an important study of the characteristics and potential environmental impact of the road and the colonization wave which would follow it. The park was declared just as road construction started and the CRNPS obtained control in time to prevent colonization.

In 1979 \$1.5 million was included within a major USAID loan to Costa Rica for natural resources management, to finance the preparation of the general Management and Development Plan, Interpretive and Environmental Education Plan and other specialized plans, implementation of a National Environmental Education Center and CRNPS Training Center in the park and basic infrastructure for its administration.

To 1982 the CRNPS is managing 27 areas: 14 National Parks, 8 Biological Reserves, 1 National Monument (Arqueological), the National Zoological Park, 3 National Recreation Areas and one Biosphere Reserve (Fig. 1). This accounts for 7.8% of the national territory. Of these, 10 have Management and Development Plans, 3 have Interpretive and Environmental Education Plans and all have an annual Operational Plan. The subsystem receives approximately 600,000 visitors/year (90% nationals, or almost 25% of the country's population). The CRNPS has 450 employees, with 90% in the field.

6. OTHER CATEGORIES OF PROTECTION

6.1. Forest reserves and protection zones

In 1975 the DGF's Forestry Research Department prepared guidelines for the establishment of Forest Reserves and Protection Zones, which in practice have been complied with only partially. These tactical guidelines leave much of the process of selecting potential reserves in local community hands, and management and development planning are not specifically treated.

As the Forest Reserves Department was only created in late 1980, establishment and management has been the responsibility of several different DGF departments, all of which had other priority objectives and functions.

As of 1982, the Department has within its responsibilities 12 Forest Reserves and 8 Protection Zones, totalling 650,959 ha or 12.7% of the national territory. Unfortunately, management of these in every case has been limited to some protection by a few forest guards and a forestry inspector (technical, not professional level) in charge of them. In the entire subsystem there is not one *in situ* administration and most of the inspectors have 2-3 or more units to manage. All decisions are made at central office level. For the vast majority of the units: the boundaries on the ground are neither well-known nor marked; the land tenure situation and actual land use are poorly known; and basic studies are lacking on most resources.

During 1981, the first biannual Operational Plans for all units were completed and their implementation

partially initiated; based on those, the first biannual Department Operational Plan was prepared. Two of the principal activities within the latter are:

- a) A pilot Management and Development Plan for the Rio Macho Forest Reserve is being prepared to develop, test and improve a planning methodology, which can later be applied to the rest of the Forest Reserves; and
- b) A Strategic Plan for the Management and Development of the National System of Forest Reserves and Related Categories is also being developed; it will include the existing subsystem plus potential ones. This will be finished by late 1983 and should give the Department a tool with which to strategically organize and manage the system.

6.2. Wildlife Refuges

The Wildlife Department of the DGF is in charge of managing Wildlife Refuges and conducting research leading to management and rational use of wildlife. Nevertheless, the low budget destined for those purposes, lack of methods and techniques for managing wildlife in the American tropics, lack of a national wildlife conservation plan, and the fact that this department has been moved from one Directorate to another several times in its short life, have been strong limiting factors. Also, the Department is just now for the first time experimenting with the preparation of a biannual Operational Plan.

The Department has three Wildlife Refuges under its responsibility:

Tapanti, actually part of the Rio Macho Forest Reserve; Bolanos Island, a 5 ha marine bird nesting site in the Pacific; and Rafael Lucas Rodriguez Wildlife Refuge, 75,00 ha of wetlands and dry tropical forest, which with Santa Rosa National Park, form most of the protected remaining dry forest in Central America. Only the latter has a Management and Development Plan and initial basic facilities and personnel and a few management activities; it is the first wildlife refuge in Central America with protection and such a plan. No Operational Plan has yet been done.

6.3. Indigenous Reserves

There are 26 Indigenous Reserves with a total of 269,000 ha or 5.2% of the national territory. The basic assumption of these areas is that the natural resources must be well-managed as a basis for sustaining the traditions, culture and life of those inhabitants and thus the nation as a whole. The Reserves are the property of the Indian communities which inhabit them and CONAI is obli-

gated by law to offer advice and technical assistance for their management.

None of those Reserves has a Management and Development Plan nor Operational Plan and they really receive no management except for that carried out by each family on its cultivated fields and fallow areas. Protection is conducted by indigenous guards but their effectiveness is very doubtful as there is no real control or administration.

7. RESULTS

7.1. Management on-the-ground

In 1969, five legally-established wildlands in three management categories existed in the country; none were receiving any protection or management. Between 1970 and 1982, with the creation of the Costa Rican Park Service, General Forest Directorate (DGF) and National Commission for Indian Affairs, the situation changed markedly. By 1982, there were 79 wildlands units (legally established) in nine different categories, covering almost 27% of the national territory. Of these, 32 units are receiving "adequate and continuous management," 21 "inadequate and intermittent" management and 26 no management. Those three intensities of management correspond in their descending order, roughly to the CRNPS, DGF, and, finally, the Indigenous Reserves of which CONAI is the co-responsible agency.

Adequate and continuous management of its areas by the CRNPS can be attributed principally to the following characteristics, in order of importance or priority:

- *In situ* administration (Director and personnel living in the area);
- at least minimum numbers of trained professional and technical personnel;
- minimum necessary infrastructure for staff;
- a mandatory Operational Plan and, in many cases,

a general Management and Development Plan; and

- minimum facilities for visitors or investigators (trails, interpretation, etc.)

The vast majority of the units under the DGF's responsibility qualify for inadequate and intermittent management because of:

- No *in situ* administration;
- no professional level personnel in the areas and the technical ones are inadequately trained;
- lacking the minimum infrastructure for personnel;
- very partial implementation of the Operational Plans which had been prepared for all the areas by 1982; and
- no minimum facilities for visitors or investigators.

For the Indigenous Reserves, all fall within the "no management" category; one could argue that *in situ* administration exists because the Indian leaders live within the reserves, but the only administration is restricted to specific communal matters and not for all the unit. The only administration (and that is not management) occurs long-distance from San Jos and that it by CONAI, with sporadic visits to the areas.

There is a fourth management intensity category which exists which could be termed "efficient management" and which exists in only one unit in the whole national system, Volcan Poas National Park, according to the authors' opinion. With professional and technical personnel in sufficient number (instead of minimum) to protect and maintain the integrity of the area and its resources; adequate (instead of minimum) infrastructure for the staff; excellent general Management and Development Plan, Interpretive and Environmental Educational Plan, and a biannual Operational Plan (revised annually); and adequate (instead of minimum) facilities for visitors or investigators, Volcan Poas provides an example of the level of management which all areas in Costa Rica's system of wildlands should attain if the nation is to earn the full benefits of ecodevelopment.