AN ABSTRACT OF THE THESIS OF

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Title: COLOMBIA'S NATIONAL PARKS: AN ANALYSIS OF MANAGEMENT PROBLEMS AND PERCEIVED VALUES

Abstract Approved: Redacted for Privacy
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This analysis of Colombia's System of National Park Reservations accomplishes four objectives: 1) The historical development of national parks in Colombia was described; 2) The status, as of August, 1974, of the areas administered by the Colombian Renewable Natural Resources Development Institute (INDERENA) was summarized; 3) An analysis of major management problems facing Colombia's park personnel was completed; and 4) The values which park division employees place on Colombia's national parks were described.

Colombia's System of National Park Reservations includes nine national parks, one fauna territory, and one fauna sanctuary. In total, nearly 1.3 million hectares have been reserved by law and are being managed by INDERENA. This system amounts to 1.2 per cent of the total land surface area and territorial waters of the country.

A Fulbright-Hays scholarship facilitated seven months of field work to be undertaken in Colombia. Relevant literature on the history of Colombia's conservation efforts and resource management policies was reviewed in Colombian archives and resource agency files in the

U. S. The major methodology used in the study was the interview with open-ended questions and a structured format. The selection of informants was restricted to employees of INDERENA's Division of National Parks and Wildlife. In total, 44 interviews were conducted. Four groups of park employees were identified and their responses, concerning management problems and park values, analyzed and compared: Park and wildlife administrators from the national office in Bogota, regional office managers having park responsibilities, national park superintendents, and park inspectors or rangers. The major conclusions of this study were:

1. Twenty-eight distinct management problems were identified in Colombia's park system. The most important single management concern was that of the presence of inholdings and the associated problems. These include: roads, power lines, poaching, agriculture, burning, grazing, and mining.
2. The next four most important problems were a lack of: adequately trained park personnel, public interest for the park program, financial resources, and support from the national office to the field offices and employees.
3. National and regional administrators, and park directors generally agreed as to the system's management issues, while park inspectors tended to identify personal concerns rather than park management problems.
4. Thirteen values thought to be derived from national parks were identified. The most frequently mentioned values were:

The preservation of endangered species and their habitat, providing outdoor education study areas, national pride, watershed protection, and open space aesthetics.

5. Colombia has the potential, and a sound legislative basis to develop an outstanding park system. The task remains one of implementation of existing laws.

Twenty recommendations were forwarded to INDERENA for consideration. It is believed that with their implementation, Colombia's park management system will be strengthened, and more data will be available for resource planners to analyze future problems.

Included in the appendices are a list of South American national parks recognized by the International Union for the Conservation of Nature and Natural Resources, and a brief description of the administrative organization of each South American national park system.

Colombia's National Parks:
An Analysis of Management Problems and Perceived Values

by

Richard Albert Meganck

A THESIS

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Typed by Joan Westfall for Richard Albert Meganck

DEDICATION:

To my parents--

Albert and Margaret (Verschaeve) Meganck

and family--

for the love they have given me.

ACKNOWLEDGMENTS

When I behold the sacred liao wo* my thoughts return
to those who begot me, raised me, and now are tired.
I would repay the bounty they have given me,
but it is as the sky: it can never be approached.

Houston Smith,
The Religions of Man

*A grass symbolizing parenthood.

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director for the Division of National Parks and Wildlife, deserve special mention. These men spent much time when they did not have time to spare and helped refine and review my research.

Other professionals have contributed in sharing their knowledge about particular aspects of this thesis topic. Dr. Gary Wetterberg, a South American park expert; Dr. Myron Sutton and Mr. Fred Packard, of the Division of International Affairs, U. S. National Park Service, added immeasurably in providing technical resource management information concerning Colombia. Dr. Francisco Gnecco Calvo, executive director of the Fulbright-Hays Commission in Colombia provided an exceptional amount of guidance in overcoming the many tasks one encounters when undertaking a project of this scope in a foreign culture. Dr. Sidney Nolan freely spent many hours editing the final draft of this report. Mr. Dennis "Dusty" Golobitsh, a Peace Corps volunteer and professional wildlife photographer, took the photos which are contained in this document. Dr. Ernesto Barriga, Peace Corps-INDERENA coordinator, provided many historic references which would have otherwise been impossible to locate.

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COLOMBIA'S NATIONAL PARKS:
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I. INTRODUCTION

Colombia's official national parks management program has entered its tenth year. For the first three years, the Magdalena Valley Corporation (CVM - Corporacion Autonoma Regional de los Valles del Magdalena y del Sinu) pioneered the development and management of the country's national parks. In September, 1968, the Renewable Natural Resources Development Institute (INDERENA - Instituto de Desarrollo de los Recursos Naturales Renovables) was created by Special Government Decree No. 2420 and charged with the administration of Colombia's national parks. On January 1, 1969, INDERENA was activated and its Division of National Parks and Wildlife assumed the responsibilities of the CVM (Franky, 1970:1). Since this date, the national parks movement of Colombia has been progressing toward maturity.

Over 1.4 million hectares have been set aside for national parks and equivalent reserves, 1.3 million of which are managed by INDERENA. As of August, 1974, nine areas have been declared official national parks by action of INDERENA's board of directors. Six of these have been formally recognized by the International Commission on National Parks. One national park, Farallones de Cali remains under the jurisdiction of an independent government agency, the Autonomous Corporation of the Cauca Valley (CVC - Corporacion Autonoma de Valle de Cauca).

Wetterberg (1974) identified a dramatic rise in the establishment of new national parks in the previous 12 years in South America; Colombia has been in the forefront of this trend. For example, within designated national parks, equivalent reserves or projected areas, are representatives of each major biome association found in the country, from the lowland deserts and tropical seashores to the cool paramo and the permanently snow-capped nevados.[1] In fact, all permanently snow-capped peaks have been declared by law to be in the public domain. Also, part of the adjacent Caribbean Sea, including its coral reefs, has been designated as part of Tayrona National Park.

The importance of these decisions to Colombia, and to all South America, requires that the history and status of the Colombian National Park System be recorded. Therefore, the intent of this study is to provide an in-depth historical view of the development of the Colombian national park system, including its values and management problems to assist the country's park administrators, and teams of consulting specialists who may need to become familiar, in a relatively short time, with the Colombian system.[2] This study should be useful also to park administrators of other nations concerned with natural and cultural resources similar to those of Colombia.

1. Spanish terms are used in the text and defined in Appendix A.

2. Copies of this study have been provided to the national office of INDERENA, to the Division of International Affairs, U. S. National Park Service, and to selected international agencies.

Objectives of the Study

The objectives of this study are as follows:

1. To describe the historical development of national parks in Colombia.
2. To summarize the status as of August, 1974, of the areas administered by Colombia's Division of National Parks and Wildlife within INDERENA.
3. To analyze and describe major management problems facing Colombia's Division of National Parks and Wildlife, and to offer possible solutions to these problems.
4. To describe the values which employees of INDERENA, both professional and non-professional, place on Colombia's national parks.

These objectives are presented in separate chapters. Chapter one discusses the need for the study, lists definitions which are used throughout the report, and identifies the assumptions associated with this research. The second chapter examines the data collection and reporting methodology and evaluates the types of bias inherent in the research methodology.

The third chapter traces the history of the national parks movement in Colombia. To place this relatively recent development in perspective, a brief examination of some historical land use practices in South America and Colombia are described. The recent events leading up to the formal adoption of Decree No. 2420 in 1968, which formally instituted INDERENA and charged it with the management of

the country's national parks and other duties, are also traced.

Chapter four summarizes, as of August, 1974, the status of INDERENA's Division of National Parks and Wildlife. Each national park, its history and present status is described. Various aspects of the organization, budget, planning process, development and management philosophy for selected national parks are analyzed.

Management problems, as expressed by the respondents during personal interviews, and possible solutions are the focus of chapter five. Interviewees included employees from the national office of INDERENA in Bogota, several of the sectional or regional offices which have national park administration functions, the directors of each of Colombia's national parks, and selected park inspectors (ranger equivalent) stationed in the national parks. Open ended questions within a structured format were utilized to insure uniformity of interview content while permitting discussion of the management problems which confront park employees.

Chapter six describes and analyzes the values which Colombian park personnel place on national parks. The study's conclusions and recommendations are found in chapter seven.

Need for the Study

In 1969, the Latin American Committee on National Parks (CLAPN) adopted a recommendation that all Latin American countries "...prepare a book on the history and development of its national parks, including a description of its national park system" (IUCN, 1969b).

Again in October of 1971, the same body (CLAPN) at its meeting in Medellin, Colombia, asked that all member countries:

> Institute preparation courses for extension techniques in natural resources and teach...in a comprehensive manner personnel who are interested in this area.... Therefore it will be necessary to undertake comprehensive studies of the history and future trends of Latin American national parks (Colombia, INDERENA, 1971b:17).

According to Wetterberg (1974), these reports were to be prepared in anticipation of the impending 1972 World Conference on National Parks. Wetterberg further states that, "As of mid-1973 these histories had not been compiled" (1974:34). With the completion of this study, an important gap in the body of knowledge concerning Colombian national parks will be filled.

The conclusions of the Second World Conference on National Parks, held at Yellowstone and Grand Teton National Parks in September of 1972, also support the need for a study of this nature. In Recommendation Number 16, adopted at the final conference session, the delegates expressed the need for an exchange of information concerning national parks and cite the United Nations Conference on the Human Environment (1972 Stockholm Conference) as a precedent:

> RECALLING Recommendation 35 of the Action Plan of the United Nations Conference on the Human Environment (Stockholm, 1972) calling for an exchange of information between nations on all matters affecting national park planning and management:
>
> BEING AWARE of the action already taken by various agencies including FAO, Unesco, and IUCN to facilitate such exchanges (including the convening of the present Conference);
>
> THE SECOND WORLD CONFERENCE ON NATIONAL PARKS, meeting at Grand Teton National Park, USA, in September, 1972:

> URGES all governments and agencies concerned to implement Recommendation 35 of the Stockholm Conference Action Plan;
>
> COMMENDS the proposal that IUCN publish a loose-leaf National Park Handbook as a ready reference to those concerned with park operations, management, and interpretation;
>
> WELCOMES the suggestion that an international periodical be published as a medium for exchange of information on national parks operation and management, and stresses the need for its contents to appear, in different languages and be adapted to the varying conditions throughout the world;
>
> RECOMMENDS that all agencies concerned give special attention to the preparation and distribution, in appropriate form and languages, of material about national park research, operation, management, and interpretation, including manuals, model management plans, and information on national park systems (IUCN, 1972a:448).

This study of history and values adds to the body of knowledge concerned with natural resource management in Latin America and should benefit other countries which are currently establishing park programs. The material offers a basis for minimizing potential conflicts concerning the establishment of future areas. Myron Sutton, Assistant Chief of the Division of International Affairs, U. S. National Park Service, commenting on a study of this nature adds:

> ...an analysis of Colombian methodology would have a direct bearing on the improvement of other park systems around the world - including that of the U. S. A. Your report would be indexed, disseminated and studied in the National Park Service for possible benefits to be derived from knowledge of Colombian...park management. I believe this would add to your project another element of practical usefulness to society (personal communication, November 20, 1973).

By examining management problems identified by Colombian park employees, this study reveals some of the difficulties of reconciling

the demands for tourism and development with other appropriate uses of natural resources, including preservation. Hopefully, this study will lead to new approaches to the protection and proper management of natural ecosystems that fit within the cultural patterns of local inhabitants.

Kenton Miller, FAO's (United Nations Food and Agriculture Organization) Regional Advisor and Team Leader in Wildland Management and Environmental Conservation Program for Latin America, commented on the need for a historical study of Colombia's national park movement:

> Certainly Colombia is a country worthy of study, since much can be learned from its brief history of park management. Uniquely, Colombia is a country in which since the first national parks were managed by CVM, they were planned and placed into programme budgeting or at least treated as specific projects...Colombia's history also shows some of the outstanding conflicts such as the case of Tayrona (national park), and of great interest to us, it is a country where following several years of assistance at the international level, they have now practically developed their parks institution to where it is self-sustaining (personal communication, January 10, 1974). (Parenthetical information supplied.)

Finally, Colombia's national park system is important as an example to all of South America. Enough interest has been demonstrated recently to merit further study of a comprehensive nature; for example the activities of teams of experts from the U. S. National Park Service, financial aid to natural resource management agencies from World Wildlife Fund, Unesco, and others, and a very successful Peace Corps-INDERENA operation.

Definitions Used in the Study

Several terms used in this study are defined below. They are: National Park, Equivalent Reserves, INDERENA, Present Status, Management Problems, and Values of National Parks.

National Park

A substantial amount of literature has addressed the problem of defining the term national park. The use and meaning of this term varies widely throughout the world reflecting the broad spectrum of preservation philosophies, ownership patterns, methods of establishment and maintenance, size, and judgement of the suitability of areas for national park classification.

For purposes of this study, a national park will be defined in terms of the official Colombian definition. Provided by Accord No. 42 prepared in 1971, a national park is:

> An area, ecologically self-regulated that is reserved, delineated, and declared by INDERENA for its natural values representative of the fauna, flora, and natural scenic beauty of a region, with the purpose of conserving them in perpetuity, subjecting them to special rules of management so that in being used by the public for recreation they do not suffer significant alterations (Colombia, INDERENA, 1971a:2).

Additional concepts will be explored in this study from the definitions provided by Harroy (1971) and accepted by the International Commission on National Parks, and Wetterberg (1974).

The 1971 International Commission on National Parks publication United Nations List of National Parks and Equivalent Reserves (Harroy, 1971) and its three revisions (Harroy, 1972a and IUCN, 1973b; IUCN,

1974) provide the most widely accepted current cirteria for the establishment of a national park. Because the original listing of national parks was based on replies from only 81 countries to a United Nations questionnaire, it is incomplete. However, the important factor is that an attempt was made to add stability to a near chaotic situation as to the definition of a national park.

The definition of a national park adopted at the 10th General Assembly of the IUCN held in New Delhi in November of 1969 is as follows:

> A National Park is a relatively large area
> 1) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educative and recreative interest or which contains a natural landscape of great beauty and
>
> 2) where the highest competent authority of the country has taken steps to prevent or to eliminate as soon as possible exploitation or occupation in the whole area and to enforce effectively the respect of ecological, geomorphological or aesthetic features which have led to its establishment and
>
> 3) where visitors are allowed to enter, under special conditions, for inspirational, educative, cultural and recreative purposes (IUCN, 1969a:32).

The criteria for inclusion of an area in the United Nations List of National Parks and Equivalent Reserves were somewhat complicated and therefore not utilized by all nations possessing de facto national park areas. The criteria in 1971 were:

> National Park
> An area or part of the national territory which
> 1) the central governmental authority
> 2) has so ordered that the following three basic conditions of the classification are fulfilled:

a) status of general protection,
b) size in excess of a certain minimum.
(SIZE) If less than 50 inhabitants/km^2 . . .
. . . 2,000 hectares (has.)
If more than 50 inhabitants/km^2 . . .
. . . 500 has.
c) protected status adequately maintained and,
(STAFF) If less than 50 inhabitants/km^2 . . .
. . . One person/10,000 has. working full time on management and supervision.
If more than 50 inhabitants/km^2 . . .
. . . One person/500 has.
(BUDGET) If less than 50 inhabitants/km^2 . . .
. . . US $50/1000 has. annual expenditure on management and supervision.
If more than 50 inhabitants/km^2 . . .
. . . US $100/has.
3) in which that authority permits or actually organizes tourism (Harroy 1971 and 1972a).

The 1974 U. N. listing (IUCN, 1974) revised and expanded the criteria to be reviewed before an area could be classified as a national park or equivalent reserve. While the IUCN Secretariat felt that the legal status and size must be strictly adhered to, the proposed staff and budget requirements were, for the first time, presented as guidelines rather than as a part of the definition. In qualifying this new approach, which allowed each country to interpret the staff and budget requirements necessary for the proper protection of an area, the Secretariat stated:

> No strict rules can be laid down on either the amount of the budget nor (sic) the number of staff since these needs vary between remote and little frequented national parks and those heavily visited areas near densely populated centres (IUCN, 1974:15).

A National Park Must:

1) Enjoy adequate legal protection under statute;
   a) The protected area must be established as a permanently protected area.
   b) For the U. N. List of National Parks and Equivalent Reserves and the U. N. List of National Nature Reserves such statutory protection must stem from the 'highest competent authority' (IUCN, 1972b) having jurisdiction over the region in which the protected area is situated.
2) Enjoy adequate de facto protection;

(SIZE) At least 1,000 hectares . . .
. . . Exceptions are made for islands or areas of unusual biotic interest.

It is suggested that a National Park:

(STAFF) If less than 50 inhabitants/km^2 . . .
. . . One person/10,000 has. working full time on management and supervision.

If more than 50 inhabitants/km^2 . . .
. . . One person/4,000 has.

(BUDGET) If less than 50 inhabitants/km^2 . . .
. . . U. S. $50/1,000 has. annual expenditure on management and supervision.

If more than 50 inhabitants/km^2 . . .
. . . U. S. $100/500 has.
(IUCN, 1974).

Wetterberg (1974) traced the history of the term national park and arrived at a definition which encompasses the key points of the IUCN definition and points to the most important criteria.

> National Park: A portion of a nation's territory which, because of its natural and/or cultural characteristics, has been considered of such national significance that the national government of that country has legally set it apart for public benefit (Wetterberg, 1974:27).

In summary, this study investigates all of the national parks

as defined by the Colombian definition. Because three areas classified by INDERENA as national parks are not recorded in the IUCN listings (Harroy, 1971, 1972a; IUCN, 1973b, 1974), the IUCN's definition cannot be applied exclusively in this study.

Equivalent Reserves

Certain countries have chosen other names for de facto national parks. Harroy (1971) therefore has, with the approval of the IUCN, defined and listed equivalent reserves as follows:

> Other areas where the three basic criteria of classification are also fulfilled and which may be either
> 1) Strict Natural Reserves, where tourism is not permitted or
> 2) When their status is not derived from the central governmental authority, State Parks, Provincial, Cantonal, or other Local Authority Reserves, or Private Reserves belonging to non-governmental associations (Harroy, 1971:33).

In the 1974 IUCN list, equivalent reserves were enumerated for the first time. Only the size stipulation of 1,000 hectares is strictly adhered to in these areas. The following categories were distinguished:

1) Protected Natural Zones:
   a) Strict natural zone
   b) Managed natural zone
   c) Wilderness zone

2) Protected Anthropological Zones:
   a) Natural biotic zone
   b) Cultivated landscape
   c) Sites of special interest

3) Protected Historical or Archaeological Zones:
   a) Archaeological sites
   b) Historical sites (IUCN, 1974:23).

Colombia's Division of National Parks and Wildlife has several additional national land classifications which, for purposes of this study, will be accepted as equivalent reserves. These areas are defined in chapter three in the detailed examination of the Division's organization and functions.

INDERENA

INDERENA (Instituto de Desarrollo de los Recursos Naturales Renovables) is translated as the Colombian Renewable Natural Resources Development Institute. It is a federal-level government agency charged with the management of Colombia's forests, fisheries, watersheds, parks and wildlife.

Present Status

Information on the Colombian National Park System was considered through August, 1974. Data made available after this time were included only if judged to have a significant bearing on the study.

Management Problems

Management problems are defined as those national park problems identified by INDERENA employees to be significant because they affect the attainment of the desired administrative goals of a park or the park system.

Values of National Parks

Values are defined as the various rationales or purposes identified by the interviewees (such as preservation, recreation or tourism) for management of an area as a national park.

Assumptions and Limitations of the Study

1. This study includes the use of social science research methodologies utilizing documents, laws, official correspondence, newspaper articles and in-depth interviews. While some quantitative and historical data were used, the major source of information was the interview responses which were collected and analyzed by the researcher.
2. The results of this study may be utilized by other countries. However, the results cannot be inferred as a statement about South American national parks in general or about any South American park system in particular.
3. The author makes no attempt to evaluate the validity of either the national park values identified by the interviewees or the importance of management problems so identified.
4. Although there are additional categories of lands managed by the Colombian Division of National Parks and Wildlife, only officially designated national parks are examined in detail in this study. "biological reserves," "unique national areas," "faunistic territories," "flora sanctuaries," and "fauna sanctuaries," may be referred to but are not the main emphasis of this analysis.

II. METHODOLOGY AND PROCEDURES

Introduction

Various approaches were used to collect the data for this study. These included: 1) The author's personal experiences and notes from prior work with INDERENA; 2) a personal visit to the archives of the Division of International Affairs, United States National Park Service in Washington, D. C.; 3) a personal visit to the libraries of Resources for the Future, the Nature Conservancy, the Colombian Embassy, and the U. S. Congress; 4) visits to the Colombian National Library, the National University School of Forestry Archives and the Congressional Library of Colombia in Bogota, Colombia; and 5) in-depth interviews with employees of the Colombian Division of National Parks and Wildlife.

Historical methodology was used in the gathering of primary and pertinent secondary materials related to the administration of national parks in Colombia. Material was sought which would surface important developments, transitions, values, and management problems in order to form a sound historical base from which to make future assessments of Colombia's system of national parks.

Prior Work and Travel Experience in Latin America

During 1971 and 1972, the writer worked at the Division of National Parks and Wildlife within INDERENA as a Peace Corps volunteer. The position involved working directly with Amilcar Lopez Moreno, Chief

of the National Parks Division, and in an indirect manner with Simon Max Franky, Director of the Division of National Parks and Wildlife. The responsibilities of this job included assisting Mr. Lopez in writing a national park administrative manual and in working with a team of Colombian experts to draft various site master plans for areas selected to be national parks. As a Peace Corps volunteer, the writer participated in several working field tours of various national parks and visited others, including Isla de Salamanca, Tayrona, Sierra Nevada de Santa Marta, Purace, Los Nevados, and Las Orquideas. Two of the remaining three Colombian parks, La Macarena, and Cueva de los Guacharos, were visited during the field portion of this project. Only Los Katios was not personally visited.

The writer had the opportunity to become familiar with the workings of INDERENA, both at the national and regional levels. When the seventh meeting of the Latin American Committee on National Parks (CLAPN-VII Reunion del Comite Latinoamericano de Parques Nacionales) was convened in Medellin, Colombia, the researcher accompanied Mr. Lopez as the official representative of Peace Corps volunteers working for INDERENA.

Before leaving South America in 1972, several national parks and reserves in Ecuador and Peru were visited. A later visit to Guatemala in 1973 provided an opportunity to inspect selected Guatemalan national parks which focus on cultural and historic resources.

Visitation of Relevant Archives

The author was awarded a National Science Foundation grant to visit appropriate agencies that would have a direct interest in this study. During a ten-day period spent in Washington, D. C., the writer was able to spend a considerable amount of time with Myron Sutton, Assistant Chief of the Division of International Affairs, U. S. National Park Service, and Fred Packard of the same office. Dr. Sutton provided access to his personal files containing many historic documents and letters which would have otherwise been impossible to locate.

Visits were also possible to the offices of Resources for the Future (RfF), the Nature Conservancy, the Colombian Embassy, the Library of Natural History, and the Library of Congress in order to complete a comprehensive bibliographic search.

Field Research

Field research was conducted in Colombia during a seven month period beginning in July of 1974. A Fulbright-Hays Scholarship, granted by the Board of Foreign Scholarships under authorization of the Mutual Educational and Cultural Exchange Act of 1961, made this study possible.

The field research portion of the study plan provided the major input to the data examined in this dissertation. Employees of INDERENA's Division of National Parks and Wildlife were interviewed concerning park values and management problems. An in-field analysis

was also conducted in each national park with the exception of Los Katios. The author interviewed professional and non-professional personnel working in each of the national parks.

Methodological Considerations of Interviewing

The major methodology used in the field was that of the social scientist using an interview with open-ended questions and a structured format (see Figure 1). The selection of key informants was limited to employees of INDERENA working within the Division of National Parks and Wildlife.

Forty-four interviews were completed. Courtney and Wall (1973) in commenting about the advantages of the face-to-face interview state: "Reducing the number of participants is not as serious as some believe as sampling techniques enable the researcher to draw sound conclusions on relatively small numbers" (1973:26). The interview matrix is found in Table I.

After considerable research and consultation with experts in the art of interviewing who have had experience in cultures other than North America, the final interview schedule and method of interviewing were developed. All of the interviews were conducted in Spanish by the author and transcribed into English in the field notes immediately after the interview. All of the Spanish language materials and documents were translated by the author with technical assistance from INDERENA.

The validity of recording accounts from memory shortly after a

Figure 1. Interview format - Colombian national parks.

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INTERVIEW ON COLOMBIAN NATIONAL PARKS

INTRODUCTION

a. Name of interviewee:
b. Position within INDERENA:
c. Mailing address:
d. Date and time of interview:
e. Formal training or education:

QUESTION FORMAT

a. What major developments have occurred in the last two years in regard to INDERENA and its national parks?

b. In your opinion what is the most important problem that you have in your park (park system, region) as a park manager (inspector, national administrator, regional administrator)? Describe the reasons for your selection.

c. Please list and rank the next 4 most important problems which you face in your capacity with INDERENA.

d. What are some possible solutions to the problems you have identified?

e. Could you describe the average visitor to your national parks? (Specify by park.) What type of visitor would you like to see in the future?

f. What values do you feel exist in Colombian national parks? (What was the purpose of the establishments of "x" area as a national park?)

g. If you are familiar with other park systems in South America or other places in the world, how would you compare them to Colombia's system?

TABLE I. AGGREGATE INTERVIEW MATRIX.

Categories	Prof./Nat.	Prof./Reg.	Prof./Park	Field/Park
# of Interviewees N = 44	10	7	9	18

Where: Prof./Nat. = Professionals from INDERENA's National Office, Division of National Parks and Wildlife, Bogota, Colombia.

Prof./Reg. = Professionals from INDERENA's Regional or Sectional offices having national park responsibilities.

Prof./Park = The superintendent of each Colombian National Park under INDERENA's jurisdiction.

Field/Park = A non-professional ranger equivalent assigned to a national park.

direct field interview is substantiated by Whyte (1960:367). Selltiz, Jahoda, Deutsch and Cook (1959) also confirm that an open-ended but focused interview is a credible methodology for certain types of research.

> The focused interview is the more appropriate technique for revealing information about complex, emotionally laden subjects or for probing the sentiments that may underlie an expressed opinion (1959:242).

At various times throughout the text, quotations are used which are felt to represent to a high degree of accuracy what a particular interviewee or a group of interviewees said even though a direct quote is impossible. If professional ethics would be violated with the identification of the source of a particularly sensitive comment, quotations are used but the interviewee is not named.

As is the case in most field research utilizing an interview method, the problem of bias must be considered. In-depth interviewing involves the development of a relationship between two persons. Subjectivity undoubtedly enters into the conducting of the interviews and the subsequent recording of the conversations into the field notes. Courtney and Sedgwick (1972) indicate this to be a potential area of contamination identified as "experimenter bias." Although the interviewer may not be conscious of this bias, it may result in some type of preferential treatment being shown to one interviewee over another. Courtney and Sedgwick continue:

> Experimenter bias, because it fouls up the data which we collect after the treatments (for example in the recording of field notes) is a threat to internal validity....Internal validity relates to problems which are generated while we are doing the experiment and have to do with the

> procedures which we use in conducting the research (1972:3).

It should be the aim of every researcher to develop non-reactive means to collect data. However, a certain amount of contamination is unavoidable, and at times, in order to maintain the desired level of openness and frankness, should probably not be eliminated completely. This would seem to be a particular difficulty with an interview situation, but as Vidich and Bensman (1960) point out:

> ...the same difficulties which apply to the anthropologist using traditionally accepted field techniques also apply to other techniques. The social psychological apparatus which produces different levels of response in depth and free interviewing also operated in other types of field instruments. The same errors, deception, misinformation, inhibitions, and role-playing operate even in check list research, as is indicated by the difference in response by the same respondents interviewed by different techniques. This is equally true of attitude surveys, self administered itemaires, and fact finding census-type interviews (1960:201).

Goode and Hatt (1952); Best (1970); Courtney and Sedgwick (1972); and others discuss three other bias problems which the author considered in the present study. First, the "Hawthorne effect" is an experimental contamination which results when the subjects who are being tested or interviewed are aware of some special attention which they are receiving because of the conditions of the research. This special treatment alters their performance. Since this study assumed that the interviewees realized that they were part of a research project, there was little the researcher could do to reduce this source of bias.

Secondly, this study may suffer from results of the "Halo effect."

This results when the different interviewees are not using the same criteria to evaluate a particular problem or value. For example, park inspectors when questioned about the most important problems in the parks tended to talk about personal concerns rather than management issues. Special care was taken by the author to try and insure that each of the interviewees had a similar understanding of the definition of a management problem and national park value.

Lastly, Wechster (1940) reports that interviewees seem to avoid giving an "I don't know" reply and will often venture opinions on topics far beyond their understanding. Therefore, some interviewers may prompt their respondents in the direction which reflects his own opinion. This problem Wechster calls "Non-committal effect." For example, during extended pauses in the interview, it is easy for the researcher to interject comments which can lead the discussion to specific areas of concern other than the interviewee's interests. The best method to use according to Wechster, to avoid this problem is for the interviewer to maintain as open a mind as is possible during the interview and not pose leading questions or interject unsolicited comments. This the author tried to accomplish.

Other Sources

Supplementary sources of information used in the preparation of this study are primarily of an "unobtrusive" nature (Courtney and Wall, 1973) and include personal correspondence, library archives, private libraries, conference proceedings, and scientific publications

issued through private research and conservation foundations.

Maps are used to a limited extent throughout the text in order to illustrate various points. For example, location and detailed development and zoning plans supplement the text. Photos of natural scenes and management problems are utilized.

Data Analysis

The data retrieved from the various primary and secondary sources were analyzed as they pertain to the history, management philosophy and values involved in the establishment and continued administration of land as national parks in Colombia from the period October, 1965, to August, 1974. The researcher recorded the history of the national park movement in Colombia and described the major management problems and values of the areas managed by the country's Division of National Parks and Wildlife.

Finally, it should be noted that the researcher did not have to cope with the high degree of culture shock which may result when one lives in another culture for the first time. The Peace Corps field handbook indicates that "feeling at home in another culture comes only after living the culture - experiencing its smells, sounds, music, foods, and people. This may involve physical and mental discomforts, but it is a sure method to become culturally sensitive" (1971:16). Several visits to South America since early 1971 and two years of living in Colombia without day to day contact with North Americans aided immeasurably in preparing for this study.

III. THE MANAGEMENT OF NATURAL RESOURCES IN SOUTH AMERICA AND COLOMBIA

Pre-Columbian Civilizations

When the Europeans left their continent to explore the New World, they left behind many deforested and overgrazed areas where natural resources had been greatly exploited. These adventurers found a world that contrasted greatly with their own. William H. Prescott (1936) described the scene which the Spaniards faced:

> Stretching far away at their feet, were seen noble forests of oak, sycamore, and cedar, and beyond, yellow fields of maize and the towering maguey, intermingled with orchards and blooming gardens;....and, still further on, the dry belt of porphyry, girdling the valley around, like a rich setting (1936:286-287).

Although there is disagreement among historians and archaeologists about the impact of early technologies on the environment, many would concur with Dr. Maria Buchinger (1971:30) when she states that, "The natives of Latin America have generally coexisted harmoniously with nature." Pre-Columbian civilizations in South America were to some extent aware of the need for conservation and protection of animal and forest resources. These early civilizations were much more a part of nature than the Spaniards who in a more western philosophy viewed nature as their foe. Garcilaso de le Vega (1609) reported that the Peruvian Incas protected the guanay and other birds of the Pacific coast islands for their guano, which was collected and utilized as fertilizer. The seriousness of an infraction of this law is described:

> ...Under Inca rule, the birds were protected by very severe laws: it was forbidden to kill a single one of them, or even to approach their islands during the laying season, under penalty of death (1609:141).

Another early explorer, Antonio Vasquez de Espinosa (works translated by Clark, 1942) reported the great value the Incas placed on the guano fertilizer. His description helps to clarify the theory for the protection of the marine birds and the very strict laws surrounding the prudent use of the guano even as early as the 1400's:

> ...all the wheat and corn and other crops are guano'd, i.e., fertilized with guano, both before and after planting, in order to bear abundantly and profitably...they would rather go without eating than without their guano, for with its use, a fanega (1.6 bushels) of grain usually yields 300, 400, or 500 fanegas...some say that God put it there for that purpose, and others that it is the excrement of sea birds (1942:1418) (parenthetical information supplied).

Hunting was also prohibited, under penalty of death, throughout the Inca empire without the express permission of the emperor. But as with so many of these early restraints, conservation was not the primary reason for the laws. For example, both Garcilaso de la Vega (1609) and Antonio Vasquez de Espinosa (1942) report that certain undesirable species of animals were exploited to the point of extinction for hides and killed for no apparent reason.

A type of wildlife management utilizing selective killing was also practiced by the Inca civilization with the wool bearing vicuna and guanacos. As was the case with so many conservation practices, royalty were immune to the laws. Royal hunts took place, and although many commoners were required to assist in the round-up of thousands of the animals, none were allowed to actively participate in the

selective killing or to wear the silklike wool of these managed species. The methods used to insure preservation of a healthy herd are related by William L. Franklin:

> ...the vicunas were sorted into two groups: the finest males, the females, and the young were hand captured, shorn and set free; the balance of the males and the old or ungainly animals were killed....Because of an enlightened system of wildlife management, the annual hunt took place in the same province only once every four years (1973:3).

Spiritual beliefs in nature also played an important role in the lives of these early people. Grieder (1970) reported that Bernabe Cobo, an early Jesuit missionary to the Inca empire, believed that the Indians felt the "sun, water, earth and many other things to be divine because they understood that they had virtue to make or conserve the necessities of human life, which was always their principal intention" (1970:23). The survival of the belief that natural resources house spirits even in modern times is attested to by the account of Skinner (1972). While studying descendants of the early Caribbean tribes in the Sierra Nevada de Santa Marta mountains of Colombia, he reported that the mamas or priests of the Tayrona civilization received their power from the sierra and that inherent in these powers were "...vast secrets about the mysteries of the earth, about the heavens and stars and sun and all of the forces of nature" (1972:12).

The Colombian Chibchas, contemporaries of the Incas, also had sanctions against the exploitation of nature. High priests were charged with the task of controlling the exploitation of natural

resources, especially game animals. R. B. Cunninghame Graham (1967) noted that the protection of nature extended not only to the birds, forests and large animals but to diminutive species as well:

> ...Spiders were sacred to the Chibchas for a curious reason, that appears one of the most imaginative that has occurred to any people in connection with the soul. After death the Chibcha souls made their way by various dark and torturous passages to the center of the earth. Before arriving at their destination they had to pass a river and this they did on rafts of spiders' webs.... No one was known to have killed a spider, for to have done so would have been to kill a soul (1967:94).

It is also widely documented (Gill, 1951; Vega, 1609; Espinosa, 1942; Herring, 1961) that many Pre-Columbian civilizations throughout Latin America were, to varying degrees, aware of the need for forest protection, irrigation and erosion control. Segments of the Inca civilization, for example, are reported to have had seed and tree nurseries and to have practiced reforestation. Terraced farming was developed by early South American civilizations as a means of facilitating irrigation and controlling erosion.

However, all husbandry and agricultural processes were not conducted in total harmony with nature. Perhaps the most questionable agricultural process common to nearly all Pre-Columbian civilizations was the milpa system of slash-and-burn farming. This form of tropical agriculture is described by Helmuth O. Wagner (1948).

> ...Such a mode of agriculture means that forests must be cleared continually for new fields. This is done by cutting down the trees during the dry season and burning them in April when logs, limbs, and foliage are well dried (1948:591).

While this method of farming is extremely wasteful and non-conserving by today's standards, Leonard Hall (1974) explains how in Pre-Columbian times the impact of tribal societies on the land was not as noticeable, particularly in the tropical climates:

> Where populations are small and the total demand for food is limited, the milpa system can be made to work. The crop is planted in the clearing (which is the meaning of milpa) for perhaps two years. By that time the rains have begun to leach the fertility from the soil and so reduce the harvest. At this point the farmer simply moves a short distance away, clears another patch of ground, plants his corn and lets the original milpa go back to jungle again. Generally, under conditions of good rainfall, a dozen to twenty-five years suffice to rebuild the fertility so the area can be cleared once more (1974:53).

This discussion is not cited as a defense for the milpa system of agriculture but to indicate that with less pressure from fewer farmers, milpa farming can succeed without requiring the eradication of an entire continent's forests.

Spanish and Portugese Conquerors

The noble forests and untapped resources which greeted the Europeans upon their arrival to the New World did not remain untouched for very long. The Spanish did not live in harmony with nature, but chose to subjugate and use the natural resources to accomplish their desires for conquest. In their quest for the continent's wealth, little concern was given to respecting the natives' beliefs towards nature, or to endorsing the Indians' early conservation achievements.

The milpa system of agriculture was thrown out of balance with

a great increase in the demand for lumber. And with the introduction of large scale mining operations, the drain on the forests grew heavier. The Pre-Columbian enlightened methods of vicuna harvesting also suffered a setback, as Franklin (1973) noted:

> ...When the Spaniards brought their horses, firearms, and hunting dogs they initiated an era of large scale slaughter that was to continue for the next four hundred years. An early nineteenth century author calculated that as many as eighty-five thousand vicunas were being killed annually in Peru alone (1973:3).

When finally in 1825, Simon Bolivar declared vicuna hunting illegal, it was almost too late for this marvelous animal to survive. Bolivar's decree was not effective (Franklin, 1973) because Peru's great expanse of vicuna habitat and the remoteness of the altiplano made it impossible to police poachers seeking the animal's valuable skin. Fortunately, the same problems which made the policing effort impossible made it difficult for poachers to completely eradicate the species.

As early as 1533 a royal decree issued from Spain gave instructions to study and conserve the flora and fauna of the recently discovered continent (Costantino, 1964; Buchinger, 1965). Known as the Laws of the Indies, these instructions required reforestation, the establishment of tree nurseries and other related silvicultural practices. Unfortunately these laws were not enforced systematically. The literature indicates that it seemed to all concerned, as Buchinger (1965) indicates that "Latin America had an unlimited bounty of natural resources that could ensure a carefree future" (1965:27).

Simultaneously as the Spanish were colonizing most of the South

American continent, the Portuguese were campaigning throughout Brazil in search of the area's riches. Like their Spanish counterparts, the Portuguese had little respect for the land or its resources. Strang (1962) states the following in reference to the exploitation:

> The history of the country has been one of constant depletion of its natural resources. Arriving in the New World that seemed impossible of exhaustion, the colonizers of Brazil abandoned their traditional habits of exploiting economically the land and respecting a well-balanced biological cycle. The abundant natural resources available to that still-small population developed a feeling for getting rich in a short time and made them...destroy the resources that nature had accumulated in the country they had just conquered (1962:95).

The eastern Brazilian forest belts stretched along the coast from the Rio Grande do Norte to Rio Grande do Sul and were some of the most productive forests on the continent because this location received a tremendous amount of rainfall.

Since colonization, this area has been exploited to the extent that, "It is there that we find today the farms that supply Rio de Janeiro with milk. It is also rather uncommon to find a few clusters of trees" (Strang, 1962:95)!

Through the centuries, the technology of exploitation continued to evolve while the methods of conservation found few supporters. For example, meadows and hillsides of grasses received no consideration in early conservation proposals. The Spanish transposed to the New World the common grazing rights laws which were practiced in Spain. Herds of cattle, sheep and horses multiplied rapidly. The impact of these animals and the Spanish policy of disregarding the natives' land boundaries led to serious overgrazing problems and the

conversion of much of the milpa land into permanent pasture (Prescott, 1936; Graham, 1967; Herring, 1961).

South American National Parks

It is generally agreed that Alexander Von Humboldt (1769-1859) was one of the individuals who initially recognized the importance of nature preservation in South America. He is said to have coined the term "natural monument," and to have set the foundation for ecological wildlands management and habitat preservation on the continent (Costantino, 1968:67; 1971:7).

Nearly twenty years elapsed before Von Humboldt's ideas were considered seriously by any South American country. In 1876, a Brazilian, Andre Reboucas, expressed the opinion that Brazil should follow the United States' example of the establishment of Yellowstone National Park and preserve parts of Brazil for future generations. Reboucas went so far as to identify two specific areas for national park designation. Strang (1962) comments:

> Andre Reboucas, an engineer who was fond of nature, pointed out the necessity of creating national parks in this country and even put forward two suggestions: the island of Bananal in Araguaya river and the 'Seven Falls' cataracts in the Panama River (1962:96).

Reboucas was ahead of his time in Brazil. The actual declaration of that country's first national park did not occur until some 60 years later when, in 1937, Parque Nacional Itatiaia (Harroy, 1971:11) was formally established and Reboucas's dream was realized.

Charles Darwin sailed some 210 kilometers up the Rio Santa Cruz

in Argentina while on his world-wide voyage in the H.M.S. Beagle in 1834. He recorded being within sight of "the summits of the Cordillera as they were seen peeping through their dusky envelope in the clouds" (Darwin, 1839). Darwin could not convince his men to sail any further but had they continued just 9 kilometers more up the Santa Cruz, they would have arrived at the present location of Argentina's Glaciers National Park (Boswell, 1973:243). Also his travels to the present Galapagos National Park are well known, providing the basis for much of his theory of evolution.

Historically, one of the most noteworthy episodes in the events which led to the formation of national parks in South America involved Francisco "Perito" Moreno of Argentina. A scientist-explorer, Moreno was the first Argentine to write about his travels across the sixty miles of Lago Argentina in 1877 and again in 1898. He also explored Lago Nahuel Huapi (Moreno, 1899:241) and, in 1903, donated 7,500 hectares of land for the purpose of establishing Argentina's first "national park" in the Andes Mountains (Costantino, 1972:81). This land was originally bequeathed to Moreno by the Argentine government as a reward for his support of and participation in early explorations of the Patagonian Cordillera.

On November 6, 1903, Moreno presented a letter to the Minister of Agriculture outlining in eloquent style his motivations for wanting to preserve this beautiful example of Argentina's national heritage:

> During the excursions which I made in those years throughout the southern region, I admired beautiful spots and more than once I proclaimed that it would be adequate for the nation

> to keep the ownership of some of them for the greater benefit of present and future generations, thus following the example of the U.S.A. and of other nations who own superb national parks. Each time I have visited that region I have told myself that if it became inalienable public property it would soon be a pivot of broad intellectual and social activities and therefore an excellent tool for human progress. One becomes aware there of natural substantial marvels which are already beginning to attract those investigators who will feel at ease in pursuing their fruitful researches. The marvelous setting of lakes and torrents, of gigantic forests, of steep mountains and of the eternal thaw located at a most outstanding site by the Atlantic Ocean, at the crossing point of the shortest route between Australia, New Zealand and Europe, forms one single range where the Tronador Mountain links on its peak two nations whose union is brought forth by nature and who will greet the forests...(Costantino, 1968:676).

That Moreno's aim in his donation was to preserve a portion of Argentina's national heritage is clarified in the close of his letter:

> I express my wish that the present perspective of its boundaries not be changed and that merely those constructions be made which grant every comfort for the sojourn of cultivated visitors whose presence at those sites will always prove advantageous to the regions thus definitely incorporated into our sovereignty (Costantino, 1972:676).

The national park movement in South America had found a true friend and leader. The Argentine government accepted the gift officially on February 1, 1904, although the land was not designated a national park at that time. In 1907, the area was enlarged by an addition of 43,000 hectares, and on April 8, 1922, for the first time the term national park was used officially in South America with the naming of Argentina's National Park of the South (Costantino, 1968: 676; Harroy, 1971:48; Buchinger and Mozo, 1973:34). At that time the park, which now is called Nahuel Huapi National Park, was enlarged to

its present size of 750,000 hectares.[3]

Encouraged by the growth of the park concept world-wide and by Argentina's example, the South American national park movement slowly expanded in the 1920's. Additions to the list of national parks on that continent were made by Chile in 1926, Uruguay in the following year, and in Guyana in 1929. These initial attempts in the preservation of South America's resources affected not only the country in which a particular area was established, but also the entire continent's relationship to the world's scientists and the burgeoning national park community.

Chile's Vincente Perez Rosales National Park, for example, encompassed 135,175 hectares (IUCN, 1974:49) and provided an area of suitable size for tourism and scientific investigations to coexist.

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3. There are apparent discrepancies in the literature as to the official establishment date of Argentina's National Park of the South. Brockman (1959:301) lists the park as being established in 1903. Nowhere else in the literature is this date suggested as the official establishment date. Wetterberg examined this issue in some detail and indicates that it deserves further study. He suggests that the first South American national park "was either Argentina's 'National Park of the South'...or Chile's Vincente Perez Rosales National Park" (Wetterberg, 1974:37). The question is one of the official establishment date. Wetterberg has identified conflicting evidence as to the establishment date of Argentina's National Park of the South. Various sources indicate that Argentina's first park was not established until October 9, 1934. If this is the case, three other countries established national parks before Argentina: Chile, Uruguay and Guyana. For the sake of consistency, this author used the IUCN data as the official record.

Santa Teresa National Park, located in the Rocha Province on Uruguay's Atlantic coast, preserved the first examples of South American coastal dunes, beaches and marine fauna. More importantly it expanded the concept of lands suitable for national park designation. In the same year, 1927, Uruguay set another example by designating an ancient fortress on the Brazilian border as San Miguel National Park. Guyana became the continent's fourth nation to protect by law a portion of its national heritage. The beautiful Kaieteur National Park includes a 225 meter falls of the same name and guarantees total protection by the original ordinance which makes it "...unlawful to hunt and disturb animal life, to gather flora, to disturb the soil by mining or construction..." (Harroy, 1972a:250).

The next decade witnessed a tremendous growth in the preservation movement. By 1939, eighteen national parks, which are still recognized by the International Union for the Conservation of Nature and Natural Resources, had been established in Argentina, Chile, Uruguay, Guyana, Ecuador, Brazil and Venezuela. These areas include, among others, one of the world's most delicate and unique resources: the Galapagos Islands (Ecuador, 1934:9; Bonifaz, 1971:4; Harroy, 1971:93). Argentina had already established six areas as parks, delimited their boundaries and begun the arduous process of writing its national park policy (Costantino, 1971:9).

Argentina in 1934 became the first South American nation to establish a formal National Park Service as a "self-ruling agency but dependent upon the Ministry of Agriculture and Livestock"

At this point, Bolivia, Colombia, Paraguay, Peru and Surinam had not formed national park systems. This is not to their discredit however, because established parks in many countries were not being adequately protected, did not have sufficient staff nor budgets and were under constant pressure from lumber, mining and hunting interests. Ann and Myron Sutton (1972b) comment on these and other forces which may have influenced the decision by some South American countries to postpone the establishment of national parks until total protection could be insured:

> The usual commercial opponents of wild land conservation--the petroleum interests, agriculture, heavy industry--succeeded in delaying as many park proposals as possible so that the resources could be exploited, and where they failed to delay the forces of conservation, they made those forces seem to be opposed to colonists, the poor, and 'progress.' These arguments had a grave effect....Almost universally, high government officials insisted that national parks produce prompt economic returns or be put to 'more productive' uses (Sutton, 1972b:176).

Numerous areas received protection during the golden age of South American national parks beginning in 1960. That recent years have indeed been a golden age for national parks in that continent is corroborated by Wetterberg (1974). He comments:

> By early 1973 a dramatic rise in the establishment of new South American national parks and similar reserves had taken place. This rise had generated unprecedented interest in parks and subsequent demands on governments for the management and development of these areas. Over 60 percent of the continents...parks and reserves had been created in the previous twelve years (Wetterberg, 1974:1).

In 1960, Colombia joined the list of countries which had established national parks with the formal designation of Cueva de los Guacharos (Harroy, 1972a:36; Colombia, INDERENA, 1973a:14; Buchinger

and Mozo, 1973:58). Peru and Surinam added their first national parks in 1961 leaving Paraguay and Bolivia[4] as the continent's only nations without national parks which met the IUCN requirements.[5]

In the same year, Brazil dedicated seven additional areas as national parks including the famous Monte Pascoal. Located in the State of Baia and containing 37,000 hectares, this evergreen rainforest is encircled by cut-over lands (Harroy, 1971:110). It contains one of the few remaining representative examples of the rose wood (Dulbergia nigra), and the Peroba trees (Paratecoma peroba), which once stretched over vast areas of the Atlantic coast. Also found in the park are several endangered animal species including the jaguar (Felis onca) and the tapir (Tapirus terrestris) (IUCN, 1972c).

When the 1962 First World Conference on National Parks was convened in Seattle, Washington, nine South American countries were represented. Only Guyana, Paraguay, and Surinam failed to send delegates to this landmark gathering. The Latin American representatives made every effort to implement the Conference recommendations and to this end, they formed the only regional committee of the International Commission on National Parks of the IUCN (Buchinger,

4. Wetterberg (1974) cites Noel Kempff Mercado, Director of Santa Cruz Botanical Garden from personal communication that Bolivia established three national parks in 1942. These areas are not recorded in any of the IUCN listings, which for the present study is the official record.

5. French Guiana remains a colony of France and although geographically a part of the South American continent, it is not an independent nation. French Guiana, as of August, 1974, had not designated any area as a national park or equivalent reserve.

1971). The first meeting of CLAPN, the Latin American Committee on National Parks, took place in 1964 in Quito, Ecuador.

Before this meeting occurred, however, the Food and Agriculture Organization of the United Nations (FAO) organized the Latin American National Parks and Wildlife Committee and called a meeting on November 3, 1964, in Curitiba, Brazil. All South American nations were represented and Italo N. Costantino was elected chairman. The committee met and approved the following functions which they were to undertake:

1. The Committee will periodically make a review regarding the importance of national parks and wildlife in Latin America, duly taking into account general land use politices, and present social and economic development.
2. The Committee shall, especially, make an estimate of the scientific, cultural and economic value of national parks and wildlife, and their role in relation to recreation, the tourist business, conservation and research, under specific conditions prevailing in the various Latin American countries.
3. The Committee shall examine and promote the extension and training programmes for professional personnel and workers for the national parks and wildlife and study the legal, institutional, administrative, social, economic and ecological aspects related to national parks and wildlife.
4. The Committee shall make recommendations to the Latin American Forestry Commission on the concerted planning and

development of national parks and wildlife, so that the Commission may recommend and promote a well balanced and defined national parks and wildlife development policy, integrated with overall development programmes.

5. The Committee will collaborate closely with national and international agencies concerned with national parks and wildlife, especially with the International Union for the Conservation of Nature and Natural Resources, the International Hunting Council and UNESCO (UNFAO, 1964:11).

With this meeting as a precedent, CLAPN met for the first time. According to Buchinger, each OAS member country was permitted to place two representatives on the Latin American Committee on National Parks, "...one a founding member...and the other the respective government's highest ranking official in the field of natural resources ..." (Buchinger, 1965:28). The world famous ornithologist-conservationist F. Carlos Lehmann of Colombia was elected the committee's first chairman.

Emphasis was placed upon the need for government interaction and public support for the national park and conservation education movements. The initial objectives also mentioned the need for valid scientific publications concerned with national parks and equivalent reserves and the research which they might support. Each year since its founding, CLAPN has held either a committee meeting or a general session, with the exception of 1972 because of the then impending Yellowstone World Conference on National Parks.

In March of 1968, the Latin-American Conference on the Conservation of Renewable Natural Resources was held near San Carlos de Bariloche in Argentina. The purpose of the conference was to provide:

> An opportunity for discussing how best to achieve successful cooperation at the local, national, regional and international levels, to support the growing interest in conservation in Latin American countries and organizations, and to help promote the wise use of the renewable natural resources of Latin America (IUCN, 1968b:49).

The mentioning of cooperation at the international level was significant and, in fact, Resolution No. 25 called for "A system of National Parks in the Western Hemisphere" (IUCN, 1968a). Among other things the resolution emphasized that a coordinated effort of planning and administration of a hemispherical system of national parks would concentrate many diverse efforts and allow for a sharing of nomenclature, zoning criteria and norms for park tourist services.

The trend in the establishment of national parks continued to grow throughout the 1960's and early 1970's. In January of 1972, the President of Bolivia established the Ulla Ulla National Reserve which became the country's first reserve to be recognized by the IUCN. Situated at an altitude of 4300 meters on the Peruvian border, the reserve was declared for the protection of the endangered vicuna. Recently, Bolivia has proposed that the boundaries of this park be extended and that an international park be created with Peru (Harroy, 1972a:23). In mid-1973, with the addition of Paraguay's Ybykui National Park to the IUCN list, every South American nation had taken steps to establish a national park or equivalent reserve.

The Second World Conference on National Parks met in Yellowstone

and Grand Teton National Parks in September of 1972 and thirty delegates from ten of the continent's twelve nations attended. These delegates presented papers, acted as rapporteurs and participated vigorously in the discussion which followed each major session.

Present Status of South American National Parks

Appendix B summarizes the present status of national parks and equivalent reserves recognized by the IUCN within each South American nation. Table II gives a yearly summary of the number of parks recognized by the IUCN in each country in South America for 1971 to 1974.

No attempt was made to update Wetterberg's (1974) listing of national parks, reserves, hunting preserves, or other areas, except for those recognized by the IUCN. The total number of reserved areas, regardless of the criteria used in designating them, is continually changing. Additional information about particular parks can be found in Harroy (1971, 1972a); IUCN (1973b, 1973c, 1974); Curry-Lindhal and Harroy (1972); and Sutton (1972b). In addition, Dr. Kenton Miller is preparing a book concerning national parks and environmental conservation in Latin America under the sponsorship of the University of Michigan, the Rockefeller Brothers Fund and in cooperation with the IUCN and FAO (personal communication, January 10, 1974). His work is scheduled to be completed before the end of 1976.

TABLE II. SUMMATION BY YEAR OF RECOGNITION BY THE IUCN OF SOUTH AMERICAN NATIONAL PARKS.

Country	Harroy 1971	Harroy 1972a	IUCN 1973	IUCN 1974	Total No. Parks
Argentina	11	2			13
Bolivia		1			1
Brazil	10	10			20
Chile	4	2		21	27
Colombia		6		2	8
Ecuador	1				1
Guyana	1				1
Paraguay				1	1
Peru		3	1		4
Surinam	6	2			8
Uruguay	3	5			8
Venezuela	7	1		1	9
Total No. Parks	43	32	1	25	101

Historical Aspects of National Parks and Reserves in Colombia

As was the case in several Latin American countries, the earliest attempts at preservation of Colombia's national heritage were aimed at particular historic resources of national significance located within areas which have since been declared national parks. G. Reichel Dolmatoff (1965) reported that as early as 1530, Santa Marta's governor, Dr. Garcia de Lerma tried to protect by decree the treasures of the ancient Tayrona civilization. Historically ancient burial sites could be explored only with his personal permission, in order to establish the rights of the Spanish Crown over any gold found. This early attempt to preserve a portion of the history of Colombia, regardless of the motive, was never widely publicized nor enforced because of the lack of manpower and knowledge of the excat location of all the burial grounds.

Colombia's flora and fauna also were to be protected by the Laws of the Indies discussed earlier (Costantino, 1964; Buchinger, 1965), but there is little indication that anything was ever done to enforce the ruling in Colombia.

Probably the first suggestion that pockets of Colombia's flora deserved special management came from the botanist Jose Celestino Mutis. His travels up the Magdalena River Valley and throughout its watershed during the years 1783-1817 are recognized in Colombia's natural history (Perez Albelaez, 1969). His work is still being analyzed and referred to by modern scientists when flora inventories are conducted in the regions he explored. Mutis claimed the

vegetation of the Magdalena River region to be so diverse and unique that "...the rest of the world should be able to study it or simply pleasure at its diversity" (Chardon, 1949).

Alexander Von Humboldt and Carlos Bertero also deserve mention. Their extensive botanical and geographical investigations during the last part of the 18th and the first part of the 19th centuries added greatly to the body of scientific knowledge concerned with the tropics and Colombia in particular (Perez Albelaez, 1969). Von Humboldt's unpublished diaries, from his Magdalena River Valley travels, for example, (Arias Greiff, 1968) are so detailed that they are still used today as a foundation for geographic investigations.

It is not until 1919, however that the literature once again mentions Colombia's conservation efforts. In that year, the Colombian Congress passed its first laws protecting its diverse flora and fauna (Colombia, 1919; Hunsaker, 1972). These laws are significant in that preservation of the national heritage from over-exploitation and subsequent extinction is what prompted the introduction and passage of the bill. Colombians have always been extremely patriotic and this modest beginning in the preservation movement gave the initial impetus for a growing conservation ethic.

The western slopes of the Sierra Nevada de Santa Marta were declared a State Forest Reserve by Decree No. 178 of 1933. The main objective in classifying this area in such a manner was to conserve the water source which supplied the vast banana plantations at the base of the mountain. All agricultural practices, including grazing,

were prohibited within the limits of the reserve with the exception of coffee plantations or where scientific studies proved that a particular practice would not affect the runoff either in volume or quality (Colombia, 1933).

The year 1935 witnessed the establishment of Colombia's first Archaeological Park at San Agustin, located in the Department of Huila. It is managed by the Ministry of Education. This park has become internationally famous for the Agustinian relics which are found there. A major step in historic interpretation and education was taken in 1938 when the Ministry of Education established the Archaeological Institute and charged it with the duties of arranging exhibits, conducting field research and organizing groups to protect the prehistoric monuments throughout the country (Reichel Dolmatoff, 1965:20).

Although Colombia's Congress has not ratified the Pan American Convention of 1940, the official delegate, Dr. Gabriel Turbay, supported its general recommendations according to the Ministry of Foreign Affairs (Colombia, Ministerio de Agricultura, 1940). This meeting served as a catalyst for the conservation movement in Colombia. In the following year, the government first enacted hunting regulations (Colombia, Ministerio de Agricultura, 1941). While this law was not perfect from a conservation viewpoint, it was nonetheless a beginning. An attempt was made to protect many species of birds with the establishment of hunting seasons and a moratorium on all bird hunting for a ten-year period. However, Article 11 was disastrous because it

encouraged the hunting of other animals--particularly large mammals. This article reads: "At any time (of the year) it is possible to hunt pumas, jaguars, fox, capybara, armadillo, caiman, and babilla" (Colombia, Ministerio de Agricultura, 1941:3). The law's only redeeming factors, at least where mammals were concerned, was that it introduced minimum size limits and fines for violations.

The first time the national park designation was ever used in Colombia occurred in 1943. The Minister of Economics issued Resolution No. 754 which established the area of Rio Muno as a "Hunting Preserve or a National Park" (Colombia, Ministerio de Economia Nacional, 1943). This designation however, never resulted in any formal development nor was the area ever mentioned in the national park literature after this date.

The cause of conservation was espoused when on November 28, 1948, President Mariano Ospina Perez issued National Decree No. 52 that established Colombia's first Biological Reserve and Field Station (Colombia, 1948; Molano, 1971). Named Sierra de La Macarena, the reserve is situated to the southeast of Bogota in the Department of Meta, and presently contains 600,000 hectares.

Six years passed before the next major conservation development in Colombia. Brigadier General Arturo Charry, who at the time was Minister of Agriculture, announced on February 3, 1954, that the Andean Condor would become the first fully protected species in the country (Colombia, Ministerio de Agricultura, 1954). General Charry took this step because of IUCN reports that the condor, Colombia's

national bird, was becoming rare, and because other South American countries had also taken steps to protect this valuable species. The resolution went so far as to prohibit collection even for scientific or museum purposes without express permission from the Minister of Agriculture (Colombia, Ministerio de Agricultura, 1954:1).

From this time on, the government has passed many laws regulating species exploitation and coordinating scientific research projects on endangered wildlife species. Unfortunately many of these laws are still not enforced. A complete listing of the regulations relating to wildlife management can be found in the INDERENA publication, Normas de Legislacion Vigentes Sobre Fauna Silvestre y Caza (Colombia, INDERENA, 1972c).

Official Recognition of National Parks

Under the provisions of Law 2, 1959, the Colombia Congress authorized the Minister of Agriculture to define areas which might be developed as national parks or equivalent reserves in the future. This law formed the foundation of the Colombian National Park System. Franky, in a paper presented to the Latin American Forestry Commission commented:

> ...this law stated the fundamental philosophy for parks, which would have as their objective the conservation of the flora and fauna, and the total environment, as well as cultural and historic relics. The law explicitly excluded from national parks all private property, further distribution of public domain lands, and agricultural and grazing activities (Franky, 1970:2).

One article of this law is of particular interest. The thirteenth article stated that "....The permanently snow covered mountains and their surrounding areas are declared national natural parks..." (Colombia, 1959:7). The law ordered the National Geographic Institute to survey all such areas within the country and determine the limits of the public domain. Nowhere in South America had this been done before. Colombia had taken a giant step by initiating the protection of these fabulous natural zones not only as parks, but as reservations for the head waters of the country's fresh water supply.[6]

In keeping with the preservation movement initiated more than a decade before in La Macarena, the Autonomous Region of the Magdalena and Sinu Valleys (CVM) was established in 1960 to "...promote the economic development of the region for which it has been entrusted, giving attention to the conservation, defense, administration and development of its natural resources..." (Colombia, 1960:2). Controlling an area in northern Colombia of some 17,000,000 hectares, this agency was the first body officially assigned the task of "...managing the National Natural Parks located within its jurisdiction..." and which could now be established as a result of the 1959

6. Theoretically, this Article established as a national park the area now included in Los Nevados National Park. It was not until 1973 however that INDERENA established the boundaries of the area within the park. To date the IUCN has not recognized Los Nevados because of problems including inholdings and boundary disputes.

law (Colombia, 1960:3; Franky, 1971a:4).

An administrative department of forestry including a national parks section was established in the CVM. This was a modest beginning, but nevertheless a beginning. It had been a pattern in nearly all of Latin America to place parks under the management of either the forestry or agriculture department, thus Colombia followed a well established precedent when determining the administrative structure of its first park department.

The CVM pioneered the management and development of national parks in Colombia. Specifically, it initiated the establishment of Colombia's three parks which are located near or on its Caribbean coast: The Isla de Salamanca; Santa Marta, which is now called Tayrona; and Tayrona, which has since been renamed Sierra Nevada. According to the present director of national parks, Simon Max Franky, the CVM:

> ...had management plans, marked the boundaries, and acquired portions of the lands for the Salamanca Island and Tayrona National Parks. They had begun to relocate colonists, to guard the parks' resources, and to construct basic facilities (Franky, 1970:2).

To assist this agency in its role of managing national parks, the CVM was encouraged to seek "...technical and monetary...cooperation" from such diverse organizations as 1) INCORA, the Colombian Agrarian Reform Institute which was to prepare official resolutions requesting national park status for a particular area, a power which the CVM did not possess; 2) the Colombian Geographic Institute Agustin Codazzi, which was to assist the CVM with aerial photography and mapping

assignments; 3) the Institute of Biological and Marine Research Colombo Aleman and 4) the National Tourist Corporation (Colombia, CVM, 1966:1).

The CVM requested and received assistance from a variety of sources for the development of its coastal parks. In September of 1966, Mr. Hernando Reyes Duarte, then Executive Director of the CVM, requested technical assistance from the U. S. National Park Service. In specifying the extent of his request, Reyes Duarte said:

> ...we would like to have master plans prepared in considerable detail for all three parks, including physical layouts, plans for roads and buildings, landscaping, conservation, tourist facilities, management plans and suggestions for handling the problems posed by squatters and private owners (Reyes Duarte, 1968:2).

Accordingly, Dr. Myron Sutton, Assistant Chief of the Division of International Affairs, consulted with the CVM in Colombia and filed a report entitled The National Parks of the Republic of Colombia (Sutton, 1967). In his recommendations, Dr. Sutton stated that the potentials for development were fivefold: tourism, recreation, conservation, inspiration and research.

In early 1967 Dr. Kenton Miller, an FAO field officer assigned to the Inter-American Institute of Agricultural Services (IICA) of the Organization of American States, completed his report entitled A General Strategy for Launching a Park Management Program in Northern Colombia (Miller, 1967). In his writings, Miller developed rather specific plans for the management of the individual parks treating each as a part of the total plan for regional development. Dr. I. R. Grimwood also traveled extensively in the same areas during the last

five months of 1967 and recorded his recommendations in 1968 (Grimwood, 1968). In his capacity as Technical Advisor on Wildlife and National Parks from the British Ministry of Overseas Development, Grimwood synthesized a great deal of information and subsequently published the first lists, although incomplete, of animal species observed within each of these parks.

Colombia's first permanent national park was established in the same year, not by the CVM, but by a direct decree from the President through the Minister of Agriculture (Colombia, Ministerio de Agricultura, 1960). Cueva de los Guacharos National Park located in the Department of Huila, with elevations up to 4,000 meters, was set aside primarily to protect the Guacharos oil bird (Steatornis caripensis). Although it includes only 700 hectares, the park was a significant first step towards the development of Colombia's system of national parks and reserves.

During the eight year period preceding the establishment of the Renewable National Resource Institute in 1969, twelve national parks were established throughout the country by various public entities, including ministries and autonomous corporations of national, regional and department governments. This list includes:[7]

1. Cueva de Los Guacharos - Established by Presidential Decree No. 2631, 1960, and originally administered by the Ministry

7. La Macarena was established as a National Biological Reserve by Law 52, 1948. This area did not receive national park status until 1971.

of Agriculture (Colombia, Ministerio de Agricultura, 1960).

2. Purace - Established originally by State Decree No. 199, 1961, from the Governor of Cauca (Colombia, Gobernador de Cauca, 1961). In 1968 INCORA, through Resolution No. 092 also declared the area a national park (Colombia, INCORA, 1968b). In the same year, through Executive Resolution No. 282, President Lleras Restrepo approved the INCORA document (Colombia, Ministerio de Agricultura, 1968).
3. Rio Leon - Established by INCORA Resolution No. 018, in 1963 (Cardona and Lopez, 1968). Annulled and changed to a national forest by INDERENA Accord No. 23, 1971.
4. Isla de Salamanca - Established originally by INCORA Resolution No. 191 upon the request of the CVM in 1964 (Colombia, INCORA, 1964), and approved by Executive Resolution No. 255 in 1964 by President Guillermo Leon Valencia (Colombia, 1964).
5. Tayronas - Established and approved by the same decrees as Isla de Salamanca.
6. Nevado de Santa Marta - Established and approved by the same decrees as Isla de Salamanca.
7. Paramo de Sumapaz - Established as a national park by INCORA Resolution No. 65, in 1968 (Cardona and Lopez, 1968). Annulled and changed to a forest protection zone by INDERENA Accord No. 22, 1971, which was approved by Executive Resolution No. 237 of the same year.
8. Laguna de la Cocha - Established as a national park by INCORA

Resolution No. 41, 1968 (Mozo, 1971). Annulled and changed to a forest protection zone by INDERENA Accord No. 5, 1971, which was approved by Executive Resolution No. 231 of the same year.

9. Cerro de Patascoy - Established, approved and annulled by the same decrees as Laguna de la Cocha.

10. Chingaza - Established as a national park by INCORA Resolution No. 65 in 1968 (Colombia, INCORA, 1968a). Annulled and changed to a forest protection zone by INDERENA Accord No. 24, 1971, and approved by Executive Resolution No. 236 of the same year.

11. Farallones de Cali - Established as a park by Departmental Decree No. 0162, 1962, and subsequently by INCORA Resolution No. 92, 1968 (Colombia, INCORA, 1968b), and approved by Executive Resolution No. 282 in the same year by President Lleras Restrepo (Colombia, Ministerio de Agricultura, 1968).

12. Guasca - Established by INCORA Resolution No. 116, 1968 (Mozo, 1971).

However it must be remembered that the majority of these early parks with perhaps the exception of those managed by the CVM, were parks in name only, and as is indicated were eliminated as national parks by subsequent laws. In general, the institution having jurisdiction over these areas had no park management philosophy nor budgets with which to carry out planning or development of a comprehensive nature.

Formation of INDERENA

Since January 1, 1969, the task of protecting and managing Colombia's national parks, wildlife and other natural resources has been vested in the Renewable Natural Resources Development Institute (INDERENA). On September 24, 1968, President Carlos Lleras Restrepo issued Extraordinary Decree No. 2420 which established INDERENA (Colombia, 1968:11). The new agency was vested with all of the responsibilities and areas of jurisdiction of the CVM and the Natural Resources Division of the Ministry of Agriculture. Because of the importance of this landmark legislation, the appropriate articles of the Lleras Restrepo Decree are cited here in full:[8]

> ARTICLE 22 - CREATION - Creating the Renewable National Resources Development Institute (INDERENA) as a public establishment, or as an entity endowed with an autonomous administration with the required means to exist. The Institute is charged with the regulation, administration, conservation and development of the country's natural resources in the aspects of marine and inland-water fisheries, surface and underground water, soils, forests, wildlife - fauna and flora, national parks, watersheds, natural reserves, communal grasslands and national prairies.
>
> ARTICLE 23 - FUNCTIONS - The Institute has an indefinite duration, resides in the city of Bogota and must fulfill the functions in the territories which were attributed to the Autonomous Corporation of the Magdalena and Sinu Valleys (CVM) and the Natural Resources Division of the Ministry of Agriculture. It has the following special functions:

8. The translation has been completed by the author with the assistance of Amilcar Lopez M., Chief of the National Parks Section, INDERENA. This is not an official translation.

a). To regulate the use, profit and commercialization of the country's renewable natural resources, for which it is charged the power of authorizing and supervising patents, concessions, licenses and respective permissions; to transport forest and fauna products and to register 'natural' and 'legal' persons that benefit from the water, the forest and the aquatic and wild fauna.

b). To delimit, reserve and administer the areas that it considers necessary for the adequate protection of the waters, the forests, the soils and the fauna, and to authorize the extraction of certain zones within these reserves.

c). To advance the activities and necessary works for the best conservation and development of the renewable natural resources.

d). To directly realize the benefits of the renewable natural resources and reserve and administer the areas having the special conditions of fauna, flora, overlooks or views, with scientific, educative, recreative or aesthetic purposes.

e). To advance the management of the watersheds, following an integrated development with the end being to obtain the benefits of the conservation and use of this renewable natural resource.

f). To realize and increase the activities of repopulating the forests, fisheries and wildlife and to facilitate the appropriate development and use of living marine and fresh water wildlife resources.

g). To regulate the occupation of the sea, rivers and lake beaches. The Institute is to coordinate these activities with the Minister of Public Works and whatever state agencies have responsibilities in this area.

h). To complete the norms relative to the country's renewable natural resources. To insure the Institute's effectiveness, they must also document the corresponding police faculties that are needed to carry out the functions identified in the present Decree.

i). Whatever else the board of directors considers necessary to complete these ends.

Paragraph - INDERENA can delegate to other official organisms, some of their functions, but to do so must first have a positive vote from the Minister of Agriculture and the Board of Directors (INDERENA).

ARTICLE 28 - PATRIMONY (Inheritance) - The patrimony of the Renewable Natural Resources Development Institute (INDERENA) is composed of:

a). The sum of the National Budget designated to INDERENA.

b). The patrimony of (responsibilities, land, etc.) the Autonomous Regional Corporation of the Magdalena and Sinu Valleys.

c). The products from the sales of public trees, when it is considered to be the best use of the system.

d). The value of national participation in the sale of forest products is authorized with predetermined prices by the INDERENA board of directors who will also determine the proportion of the participation that can be received by municipalities interested in actively defending their forests and collaborating in programs to insure their adequate utilization.

e). The value of the rights to establish concessions, licenses, and use permits of renewable natural resources including those relating to marine fish.

f). The amount collected for these uses of the renewable natural resources from the user.

g). The actual properties designated to the natural resources program of the Ministry of Agriculture are ordered transferred (to INDERENA) in total title.

h). The value (fees collected) of the technical services rendered.

i). The interest from external and internal loans

that are contracted for by the Institute.

j). The properties purchased (by the Institute).

The primary importance of the Lleras Restrepo's Decree lies in the fact that it established a central natural resources management agency for Colombia at the sub-ministry (cabinet) level and placed national parks administratively parallel to the forestry, fisheries and watershed divisions of INDERENA. This contrasts greatly with other national park organizational schemes found throughout Latin America which, in general, are located as a subsection or institute under the direct supervision of the agriculture or forestry department (Costantino, 1968:690; 1972:83; Wetterberg, 1974:68). It is also significant that INDERENA was authorized a budget in its first year of operation and had the mandate to determine what policing powers were needed to carry out the intent of the law and therefore manage the country's resources in the best possible manner.

Unfortunately there were two noticeable faults in this decree. First, three existing autonomous corporations with natural resource management responsibilities were excluded from INDERENA's jurisdiction. The Autonomous Corporation of the Bogota Savannah and the Ubate and Chiquinqura Valleys (CAR), the Autonomous Corporation of the Cauca Valley (CVC) and the National Corporation for the Development of the Choco remained independent and therefore prevented INDERENA from implementing a comprehensive resource management plan for the country. The author considers this to be a major flaw because these autonomous areas are not located in isolated watersheds

but overlap into watersheds managed by INDERENA. The result is that INDERENA cannot completely control the water quality, rate of erosion, and other problems in areas for which it is responsible but which happen to be located within a watershed partially managed by an autonomous corporation.

Secondly, a major fault, in this writer's opinion, is found in the Paragraph at the end of Article No. 23. This paragraph legally permits INDERENA's general manager, a political appointee, to agree with the Minister of Agriculture, also a political appointee, to allow other government agencies to exercise any of INDERENA's functions for an unlimited period of time. Since the Minister of Agriculture appoints the people who fill the seats of INDERENA's board of directors, the existence of national parks in Colombia is far from a politically independent issue. Theoretically, for example, INDERENA could delegate the management of Colombia's national parks to the development minded National Tourist Corporation (CNT). If this were to happen, all of INDERENA's conservation efforts could be completely destroyed as a result of a political accord.

Even with these weaknesses, INDERENA's creation was, to date, the most outstanding attempt in Colombia's history to coordinate and plan the use of its renewable natural resources.

Organizationally, INDERENA functions as an autonomous entity under the Minister of Agriculture. All budgets, investment plans and major land decisions are subject to his approval. A board of directors consisting of the following individuals was appointed by the

President:

1. Minister of Agriculture.
2. General Manager of Agriculture Livestock Marketing Institute, IDEMA.
3. Representative of the President of the Republic.
4. General Manager of the Colombian Agrarian Reform Institute, INCORA.
5. General Manager of the Colombian Agricultural Livestock Institute, ICA.
6. General Manager of the Colombian Agricultural Credit Bank, Industrial and Mines, CREDITARIO.
7. Representative of the National Association of Farmers, SAC.
8. General Manager of INDERENA (Colombia, 1968:14).

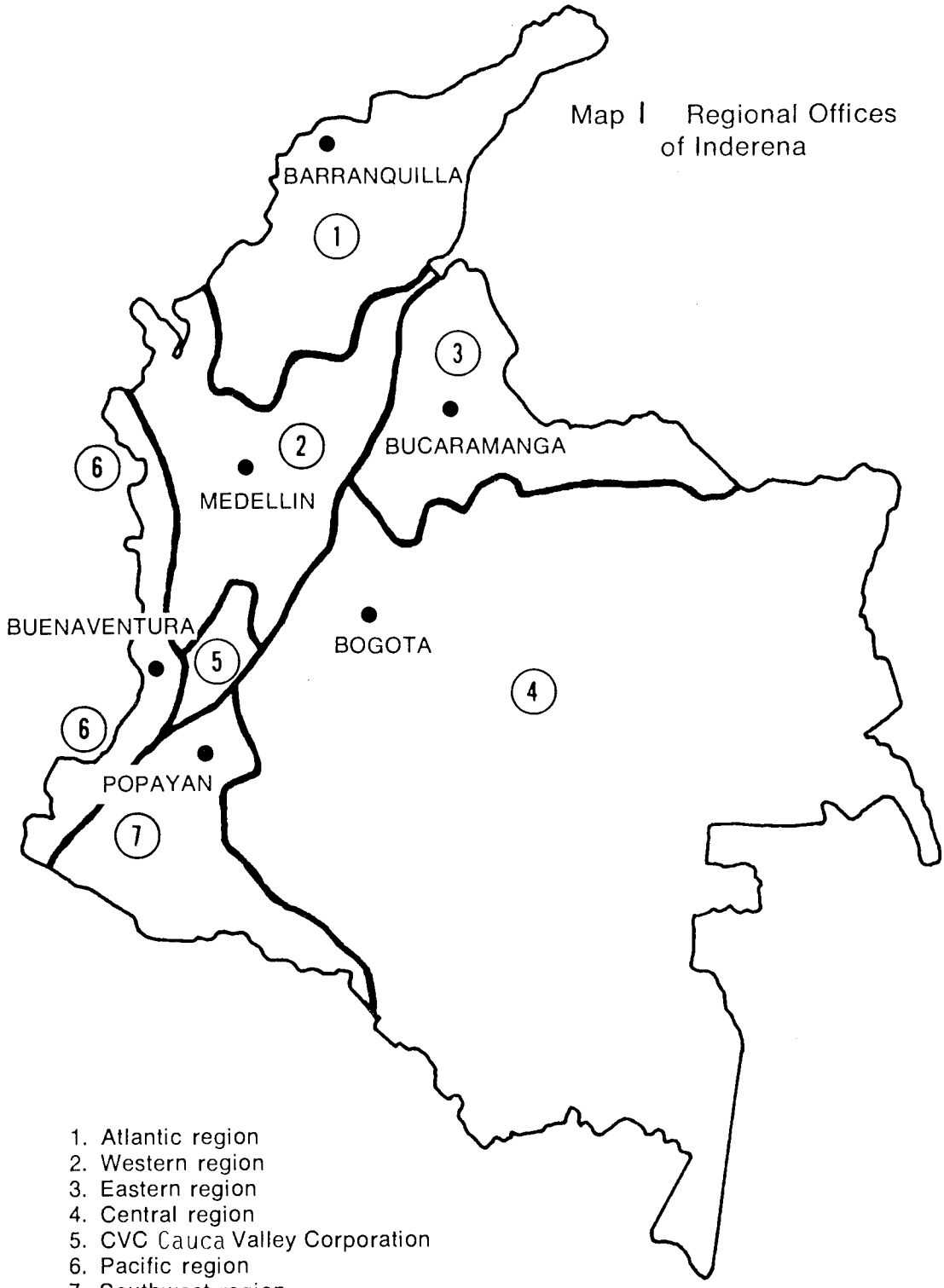
The national office was originally composed of three main branches: Planning, Technical Services, and Administrative Services. Planning functioned in an advisory capacity to the general manager and coordinated INDERENA's efforts with other Colombian Institutes and Ministries. Technical Services was divided into divisions of forests, fisheries (continental and maritime), water and soils, parks and wildlife, auxiliary services (engineering, design, water use and construction), social development (cooperatives, extension, information and education) and protection (law enforcement, inspection and rural conservation education). Administrative Services included divisions of law, finances, industrial relations and general services (Colombia, INDERENA, 1970a).

Originally the country was divided into five regions with regional offices located in Bogota (central region), Popayan (southwestern region), Medellin (western region), Barranquilla (Atlantic region), and Bucaramanga (eastern region). In late 1971, the Popayan region was reorganized and a sixth region, the Pacific, was established with headquarters in Buenaventura (Colombia, INDERENA, 1972a; Sundheimer, 1971:2). Map No. 1 illustrates INDERENA's present regional organization.

Of the twelve areas that had received some level of official protection, if only nominal, INDERENA selected six which were felt to have the values necessary for national park status: Isla de Salamanca, Tayrona, Purace, Cueva de los Guacharos, La Macarena and the Sierra Nevada de Santa Marta. It was the consensus of the National Parks and Wildlife Division that the parks Chingaza, Sumapaz, La Cocha, Patascoy, Rio Leon and Guasca did not possess the minimum requirements necessary to be designated as national parks. Franky, in his paper "The Reserves of the Colombian National Park System" commented further on the exclusion of these areas:

> ...the colonization, the introduction of exotic species or the programs which had been completed by other state agencies, had profoundly modified the ecological and biological conditions to the point where the values which are inherent in national parks had disappeared... (Franky, 1971b:2).

During its first full year of operation, 1969, the Division of National Parks and Wildlife received approximately 5.7 per cent of INDERENA's total budget of 60 million pesos (approximately 2.7 million U. S. dollars) with which to conduct its program (Colombia, INDERENA,



Map I Regional Offices of Inderena

1. Atlantic region
2. Western region
3. Eastern region
4. Central region
5. CVC Cauca Valley Corporation
6. Pacific region
7. Southwest region

adapted from INDERENA, Division of National Parks and Wildlife

1970b). The Division undertook and accomplished several major programs with this meager budget even though "the activities of this program were possibly considered the most controversial of the Institute" (Colombia, INDERENA, 1969a:27). Among the accomplishments are the following:

1. The status of both the Isla de Salamanca and Tayrona (renamed from Santa Marta National Park) National Parks was confirmed by Accord No. 04 of INDERENA's board of directors and by Executive Resolution No. 292 of the President. The boundaries of these parks were also altered upon recommendation of the National Parks Division.
2. Specific development plans were begun for three of Colombia's parks: Isla de Salamanca, Tayrona, and Purace.
3. Basic information was collected about a wide variety of wildlife species found in Colombian national parks.
4. Colonization censuses were undertaken in La Macarena Biological Reserve and in the Caribbean parks.
5. Intensive habitat, migration and reproduction field studies were conducted for some 80 species of animals found within the national parks and equivalent reserves.
6. Plans were initiated, although never carried forward, for an inspectors' school to include formal classroom instruction and field training.

It is significant that Colombia chose to concentrate initial development efforts in three parks and simply preserve the remaining

areas until such time as development was feasible. The ideal of course, would have been to develop all of the areas and establish new parks in the life zones which were not yet represented. This is often not possible and, according to some authorities not desirable. Mario Andres Boza, Director of Costa Rica's Department of National Parks was faced with a similar problem in 1970. He commented on the selection of initial national parks by a developing country:

> If the funds and staff available are largely invested in and allocated to only one or two parks, there is a good chance of having well-managed areas which will serve as excellent models. The worst mistake that can be made is to try and develop several different parks at the same time, since it can result, after a year or two of effort, in having nothing to show for it, either to your superiors or the public (Boza, 1972:3).

Like Costa Rica, Colombia chose three areas of particular natural significance to begin intensive park development efforts: the Isla de Salamanca, an area whose delicate, Everglades-like, ecosystem affords protection for many migratory species of birds; Tayrona National Park which includes some of the most magnificent caves, coral reefs and beaches found anywhere in the world; and Purace which possesses spectacular volcanic scenery and contains habitat for at least two endangered species: the Mountain tapir (Tapirus pinchaque), and the South American Spectacled bear (Tremarctos ornatus) (Hunsaker, 1972).

In 1970, Colombia established its first faunistic territory, El Tuparro, and in 1971 two additional areas were added to its list of national parks. By Accords No. 6 and No. 26 respectively, La Sierra Nevada de Santa Marta and La Macarena were named national parks. The

Sierra Nevada de Santa Marta had been renamed from the CVM's Tayronas National Park and its boundaries were redefined with its acceptance by INDERENA's board of directors. La Macarena became the first area in the country to have its classification changed from biological reserve to national park.

Prompted by the obvious flaws in Decree 2420 which were discussed earlier, and by the mandate given to INDERENA as a result of the same Decree, Amilcar A. Lopez M. drafted The Statute of the System of National Park Reservations in 1971 (Colombia, INDERENA, 1971a). This document which was eventually approved by the board of directors of INDERENA, is perhaps the most important work in Colombia's national park history. In general terms, this statute defined specific limits for development and use of Colombia's national parks, and elaborated a zoning scheme for each particular type of reservation.

Colombia's System of National Parks was defined in this document as follows:

> A group of reservations that have been defined and declared in different categories, for the defense, investigation, propagation and conservation of the fauna, of the flora, or the scenic views and of other national values that correspond to the administration and management of the country.
>
> A National Natural Park:
>
> An area ecologically auto-regulated that is reserved, delineated and declared by INDERENA for its natural values representative of the fauna, flora, and national scenic beauties of a region, with the purpose of conserving them in perpetuity, subjecting them to special rules of management so that in being used by the public for recreation they do not suffer significant alterations.

Colombia designated several national land classifications which

are, in effect, equivalent reserves as defined in Chapter I of this study. They are also established by INDERENA and receive the same protection as national parks. However, as the following definitions illustrate, the administrative philosophy varies for these areas.

Biological Reserve:

An area in which pristine conditions of flora, fauna and geomorphology exist, with the absence of motor roads, designated to research and the study of the natural riches which it contains. The biological reserves are delimited, reserved and declared as such by the Renewable Natural Resources Development Institute.

National Flora Reserve:

An area that is reserved, delineated and declared by INDERENA for its protected plants, representative or endemic vegetation to which the registered public has access and where the Institute conducts research, conservation propagation, management and successional studies of national wild flora, to avoid the extinction of valuable species with diverse characteristics.

Unique Natural Area:

An area delineated, reserved and declared as such by INDERENA for possessing special conditions of flora and earth formations which make up a natural scenery of rare frequency.

Flora Sanctuary:

An area reserved and delineated by INDERENA for the preservation of a flora species or community; where all other interest and activities are subordinated to this end.

Fauna Sanctuary:

An area reserved and delineated by INDERENA for the preservation of an animal species or community; where all other interests and activities are subordinated to this end.

Faunistic Territory:

An area reserved, delineated and declared as such by INDERENA for the investigation, study, conservation, propagation, management and utilization of the wildlife, with demonstrative purposes.

Within the same document, a zoning plan for Colombia's national parks was outlined including the following management areas:

Intangible Primitive Area:

An area in which the natural environment is maintained with minimum alterations, in its pristine state for perpetuity. It includes the landscape, the fauna, the flora and the ecology. One may also refer to this area as a Primitive Area, Intangible Area or Protected Area.

Natural Recuperation Area:

An area that has suffered alterations to its soils, flora, fauna, or natural environment but which is included within the limits of a Natural National Park and where the total area is being allowed to recuperate to its pre-existing natural state.

Historical-Cultural Area:

An area where one encounters relics of past cultures, archaeological vestiges or sites which are part of the national heritage.

General Exterior Recreation Area:

An area which, because of its natural conditions, has possibilities to offer facilities to the visitor for open-air recreation.

High Density Use Area:

An area in which, because of its natural conditions or location, is constructed official personnel buildings, visitors centers, camping and open-air dining areas, and small restaurants and cafeterias.

Buffer Zone:

An area which acts as a filter for disturbances to the zones included within the system of National Park

> Reservations, with the goal to impede that which causes disturbances or alterations in the ecology or wildlife of the same (Colombia, INDERENA, 1971a).

This document also enumerated the long overdue prohibited uses within areas managed by INDERENA. Foremost among these regulations was the prohibition of any hunting or trapping within any of the areas managed by INDERENA unless of a scientific nature and previously approved by the Division of National Parks and Wildlife.[9] Colombia had long been criticized for permitting hunting and trapping for recreation, the live animal trade, or the international hide market. For example, as recently as 1969 INDERENA issued 75 hunting licenses, oversaw the exportation of 144,500 live animals, the majority of which were primates and parrots, and more than three million animal hides. All of these were collected from territory under the jurisdiction of the Institute with exception of the areas within the system of National Park Reservations. In addition, to further illustrate the immensity of this activity in Colombia, more than 45,000 unauthorized live animals and 83,000 hides were confiscated by INDERENA in the same year (Colombia, INDERENA, 1969a:31). The drain on Colombia's wildlife population was beginning to have serious effects on endangered as well as non-endangered species when INDERENA finally banned all hunting and trapping activities in its territories.

Also prohibited, among many other activities, are the collection

9. Hunting had been previously banned in national parks as a result of Law 2, 1959.

of flora specimens unless a special permit is authorized, the introduction of exotic animals or plants, the feeding of any of the wildlife, the use of any pesticide in any area, and the construction of fires in unauthorized sites of any area managed by INDERENA and included in the System of National Park Reservations. Sport fishing is permitted in authorized areas such as Purace National Park during regulated seasons. Minimum size, and bag limits are enforced by the park inspectors.

Anyone guilty of an infraction of this statute is liable to be punished with a fine of 200 pesos to 500 pesos (approximately 8 to 20 U. S. dollars) and may be subject to arrest. Any flora or fauna products collected from or introduced into a park, and the equipment or arms used in the process, are subject to be confiscated (Colombia, INDERENA, 1971a).

With the adoption of this document, Colombia's efforts on preservation and conservation of her national reserves, and the animals and plants which they contain, had come of age. The world park community had gained an ardent supporter and a professional "colleague" in Colombia.

Los Pharomacrus was added to the System of National Park Reservations when it was designated the country's first fauna sanctuary in 1972 (Colombia, INDERENA, 1972e). The following year witnessed the confirmation of Los Nevados National Park (originally reserved by Law 2, 1959) with the adoption of Accord No. 15 by the board of directors of INDERENA. Also in 1973, two new national parks were added to

Colombia's system bringing the total number of national parks under the administration of INDERENA to nine. Las Orquideas, one of the world's most famous orchid habitats, insured the preservation of approximately 32,000 hectares of land in the Department of Antioquia. The last park to be established to date was Los Katios which is located on the Panamanian border adjacent to a reservation in that country. It is unique in that it is located in the Darian Gap region, the major north-south land migration route for animal populations between Central and North America with South America. Also significantly, an international agreement has been signed with the United States Department of Agriculture to help manage and finance this area.

Budgetary Considerations of INDERENA and the Division of National Parks and Wildlife

INDERENA's National Budget is derived from two main sources: flowing revenues and capital revenues. Flowing revenues are monies which in general are realized directly by INDERENA for services rendered (field technical assistance, licenses issued) or from the purchase of resource products (lumber sales, grazing rents, water rights, and animal harvesting). The intake of these monies is justified by INDERENA in the following manner: "One of the principal activities of the Institute is to offer services to communities at minimal charge, while still adhering to the grand objective of protecting the renewable natural resources" (Colombia, INDERENA, 1972a:12).

However, the majority of the Institute's budget is not derived

from the flowing revenues, but from capital revenues received from the National government through the Minister of Agriculture. Annually, INDERENA submits a proposed budget for approval to the Minister of Agriculture and he determines what per cent of the proposed budget will actually be funded. Table III contains the figures for INDERENA's budgets since its creation.

Column one contains the budget request totals forwarded by the board of directors of INDERENA to the Minister of Agriculture, and the second column contains the amount finally approved for distribution among INDERENA's programs. In 1972, all government programs were reduced because of the country's growing economic problems. Therefore, even though INDERENA's total budget allocation increased, the percentage of the requested budget approved was substantially less than in the previous years. Very few new programs were initiated during that fiscal year. For example, most of the initial work on Los Nevados and Las Orquideas National Parks had been completed by mid-1972, but approval of the financial resources needed to begin a vigilance program was postponed until the following year. In 1973 this downward trend reversed, and INDERENA received 89.31 per cent of the funds requested.

As Table IV indicates, the Division of National Parks and Wildlife has received a small percentage of INDERENA's total budget with which to operate and expand their programs. The Division has never received more than 12.6 per cent of the total budget, and in 1972 was forced to operate with 3.6 per cent or 3 million pesos less than in

TABLE III. BUDGET REQUESTS AND APPROVED FUNDS FOR INDERENA, 1969-1973.*

Year	Budget Proposed to Min. of Agric.	Budget Approved from Min. of Agric.	% of Budget Approved
1969	$ 69,302,860	$ 64,700,000	93.4
1970	120,690,000	100,874,000,	83.2
1971	136,500,000	128,221,000	94.1
1972	185,501,000	145,701,000	78.5
1973	275,000,000	245,690,000	89.3
1974 (proposed)	302,501,000		

*The tables contained in this section have been compiled by the author with information received from the Office of Planning, INDERENA, the Budget Office, INDERENA, and the following sources: Colombia, Minister of Agriculture, 1973; Colombia, INDERENA, 1970b. All figures are in Colombian pesos. The approximate exchange rate as of August 1974 was $1.00 U. S. to 25.56 Colombian pesos.

TABLE IV. BUDGET REQUESTS AND APPROVED FUNDS FOR THE DIVISION OF NATIONAL PARKS AND WILDLIFE, 1969-1974.

Year	Budget Approved Total INDERENA	Budget Proposed Div. of Nat. Parks & Wildlife	Budget Approved Div. of Nat. Parks & Wildlife	% of Total Budget Received by Parks & Wildlife
1969	$ 64,700,000	$ 4,108,625	$ 2,871,000	4.4
1970	100,874,000	11,300,000	8,699,000	8.6
1971	128,221,000	18,625,000	16,229,000	12.6
1972	145,701,000	27,300,000	13,116,000	9.0
1973	245,690,000	28,007,120	21,006,000	8.5
1974		13,225,000		

the previous year. This reduction would seem to be understandable since INDERENA received only 78.5 per cent (Table III) of the total funds which they requested. Additionally 951 new employees were hired during the 1972 fiscal year and the Pacific regional office was opened. However such Division budget reductions did not occur in other programs. For example, in 1972 the Divisions of Fisheries and Forestry received increases of 3 and 6 million pesos respectively accounting for 11.3 per cent and 24.2 per cent of the Institute's total budget. Generally however, with the exception of 1972, total peso investments for national park and wildlife projects have been increasing annually.

Each of INDERENA's offices, having national parks or wildlife management or research responsibilities receives a portion of the total Division budget. Regional office budgets are administered in coordination with national management plans. The national office does not monitor exact program expenditures, although financial guidelines are provided. Therefore, the author was not able to verify national park expenses on the regional level. National park and wildlife budgets, whether administered through the central or regional office are divided into four categories: direction, wildlife research, national parks and wildlife management, and control and vigilance. Table V illustrates the proportions allotted to each of these areas since INDERENA's formation.

The management of national parks and equivalent reserves has always received the greatest percentage of the Division's budget.

TABLE V. TOTAL PESO DISTRIBUTION FOR THE DIVISION OF NATIONAL PARKS AND WILDLIFE CATEGORIES.

Year	Direction	Wildlife Research	Management Nat. Parks & Wildlife	Control and Vigilance	Totals
1969	$ 200,165	$ 176,000	$ 2,494,835	General Serv. Div. Budget	$ 2,871,000
1970	1,732,000	1,862,000	5,105,000	"	8,699,000
1971	610,990	4,030,765	11,597,245	"	16,239,000
1972	1,113,000	2,642,000	9,361,000	"	13,116,000
1973	349,370	2,859,930	10,729,700	$7,067,120	21,006,120
1974 (proposed)	1,463,760	944,890	7,391,350	3,425,000	13,225,000

This is to be expected, however, because funds for facility construction, even those to be used by biologists conducting field research, for example, are taken out of the management category.

It should also be noted in Table V that the 21 million pesos received in 1973 for the Division's programs did not actually indicate that parks had been designated a higher priority within INDERENA. In that year, for the first time, money which had been allocated for control and vigilance was administered directly by the Division of National Parks and Wildlife instead of by the General Services Division. Therefore, parks received an increase of only 0.8 million pesos if the control and vigilance allocation is discounted.

The proposed budget for 1974 deserves mention. A detailed breakdown is found in Table VI.

The 1974 budget is drastically reduced from what one would expect, given the Division's increasing responsibilities with the addition of three national parks during the previous year. But INDERENA's restructuring in June, 1974, required a drastic reduction in the funds awarded the Division.

On March 18, 1974, the board of directors of INDERENA submitted Accord No. 8 to the President. This Accord provided for a reorganization of the administrative structure of the Institute (Colombia, INDERENA, 1974a). On June 7, 1974, the Accord was approved and made law by Presidential Decree No. 1102. As a result, Directions were created, headed by sub-managers in the following areas: Judicial Direction, Administrative Direction, Forest Direction, Fisheries

TABLE VI. PROPOSED 1974 BUDGET FOR THE DIVISION OF NATIONAL PARKS AND WILDLIFE.*

Site	Management & Development	Control & Vigilance		Total
Central	$3,413,180			$3,413,180
Central-Regional	2,722,380	Macarena Tuparro Guacharos	$1,193,090 516,480 126,430	4,558,380
Southwest	466,150	Purace	430,710	896,860
Atlantic	2,423,690	Salamanca Tayrona	331,030 535,100	3,289,820
West	774,600	Nevados Orquideas	146,080 146,080	1,066,760
Totals	$9,800,000		$3,425,000	$13,225,000

*Only eight of the ten national parks managed by INDERENA have received money from the Division's budget. Los Katios has a separate budget, and no budget has been programmed for La Sierra Nevada de Santa Marta.

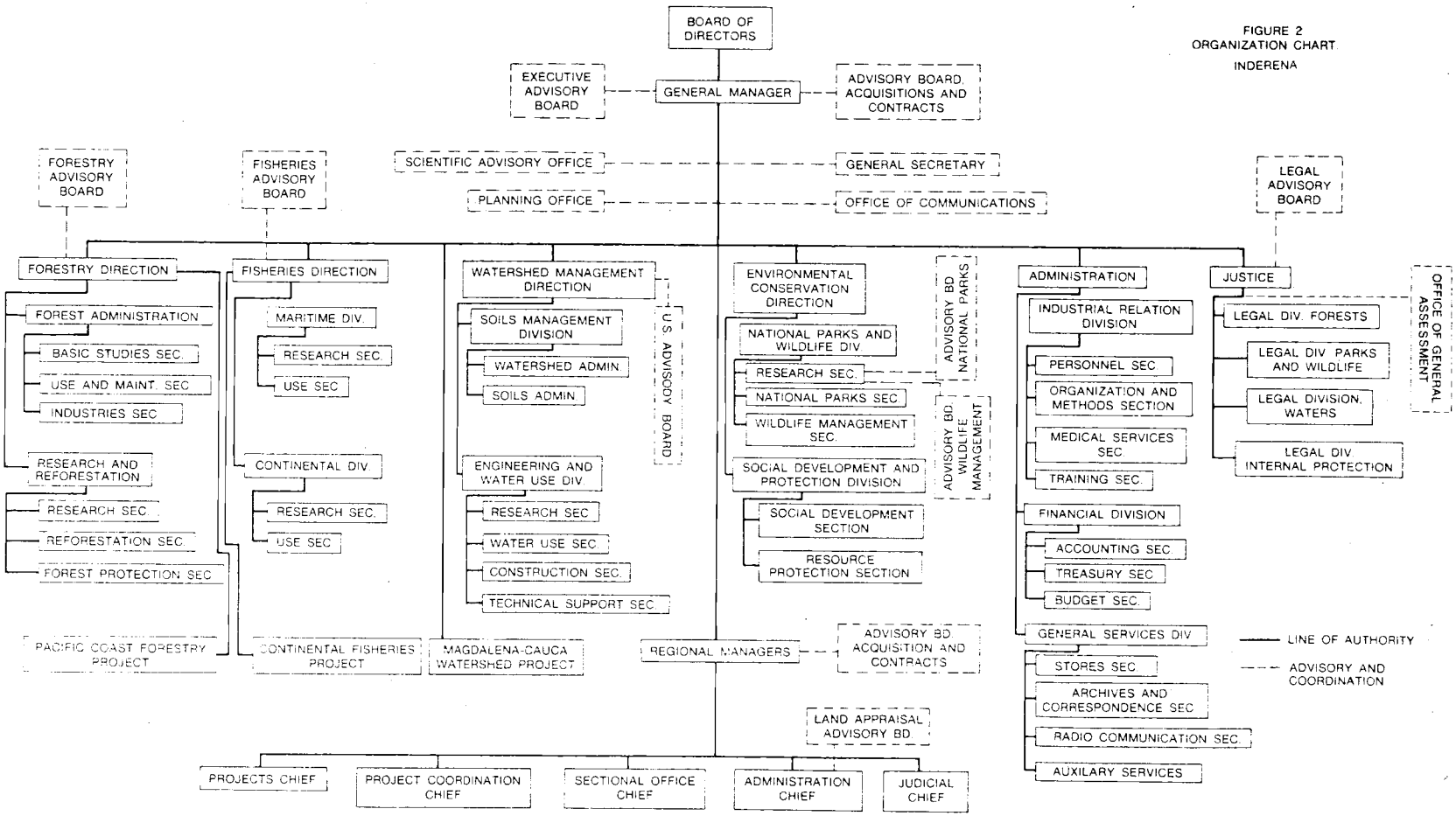
Direction, Watershed Direction and Environmental Conservation Direction. Figure 2 is an updated organizational chart of INDERENA.

The management of national parks and wildlife remained, in name, at the division level, but administratively under the Environmental Conservation Direction. Therefore, an additional level of bureaucracy was interjected between the general manager and the Division. In the author's opinion the National Parks and Wildlife Division lost a substantial amount of political strength with this restructuring. This may help explain the reduction in the Division's 1974 proposed budget. Forestry, Watersheds and Fisheries each received Direction status while Parks and Wildlife did not. Park programs now compete for funds with the Division of Social Development and Vigilance which is also housed under the Environmental Conservation Direction.

Land acquisition funds, both for park additions and for the purchase of private land within park boundaries, are allocated from INDERENA's general fund which is administered by the Direction of Administration. The Division of National Parks and Wildlife was not granted expropriation powers when the national park system was formed, even though the statute stated that no private citizen could hold claim to lands which were located within the boundaries of a national park or equivalent reserve. To date, additional park lands are acquired only when a land owner decides to sell his property. Therefore, land acquisition funds are allocated on an individual case basis and simply totaled at the end of a given fiscal year.

The Division on National Parks and Wildlife asked for powers of

FIGURE 2
ORGANIZATION CHART
INDERENA



eminent domain in May of 1974. To date, the President has not responded to this request although the author had been advised that a positive response was likely before the end of the year. Without this power, it will be impossible for the Division to properly manage the land declared to be within park or reserve boundaries.

Long range financial planning was instituted in the Division of National Parks and Wildlife in 1974. Formerly, a proposed budget was drafted in March of the year prior to it being administered. However, largely through the efforts of Amilcar Lopez, M., the process of evaluating the future financial needs of each area under the Division's direction has been completed for the five year period from 1975 to 1979. Table VII summarizes these projections. It is interesting to note that, anticipating the expansion of the system, money has been requested for areas which have not yet been approved but which have been officially proposed as projects by INDERENA. However, Los Estoraques Unique National Area and the Fauna Sanctuaries of Iguaque and Los Flamencos are expected to be included in the System of National Park Reservations before January, 1975.

The Sierra Nevada de Santa Marta is programmed to receive management and development funds for the first time in 1976 even though the area has been declared a park since 1971. To date, there has been very little demand from the public to use these permanently snow covered peaks located on Colombia's north coast.

TABLE VII. LONG RANGE BUDGET PLANNING FOR EXISTING AND PROJECTED AREAS WITHIN THE SYSTEM OF NATIONAL PARK RESERVATIONS.+

	1975	1976	1977	1978	1979
Tayrona	$3,160,000	$3,650,000	$4,020,000	$4,400,000	$5,060,000
Isla de Salamanca	1,820,000	2,100,000	2,415,000	2,780,000	3,200,000
Purace	1,000,000	1,150,000	1,270,000	1,400,000	1,540,000
La Macarena	2,850,000	3,500,000	4,200,000	4,830,000	5,000,000
Guacharos	1,100,000	1,600,000	1,850,000	2,100,000	2,420,000
Orquideas	1,320,000	2,000,000	2,300,000	2,650,000	3,050,000
Nevados	1,230,000	2,000,000	2,300,000	2,650,000	3,050,000
Sierra Nevada	-	1,320,000	2,000,000	2,300,000	2,650,000
Tuparro	1,100,000	2,000,000	2,300,000	2,650,000	3,050,000
Pharomacrus	150,000	300,000	300,000	150,000	150,000
Estoraques*	200,000	800,000	800,000	200,000	200,000
Iguaque*	800,000	2,000,000	2,000,000	800,000	800,000
Volcan del Huila*	-	1,320,000	2,000,000	2,300,000	2,650,000
Los Flamencos*	-	400,000	460,000	500,000	500,000
Turpiales*	-	400,000	460,000	500,000	500,000
Sierra de Tibu*	-	1,100,000	2,000,000	2,300,000	2,650,000

*Future projected areas.

+Los Katios has a separate budget and is therefore not included in this list.

Human Resources

The programs which INDERENA initiated in 1968 were staffed with personnel from the CVM and the Natural Resources Division of the Ministry of Agriculture. Since that time, the expansion of INDERENA's responsibilities and the initiation of new projects has necessitated a commensurate expansion in the numbers of persons employed by the Institute. This development is summarized in Table VIII.

The total number of employees has increased at a rather predictable rate with the possible exception of 1972. In that year, 951 new permanent personnel were added to the staff of the Institute. Since its creation, the total number of employees has more than quadrupled.

The staff of the Division of National Parks and Wildlife has also grown commensurate with its responsibilities, although at a much slower rate than the Institute's other programs. Table IX categorizes the Division's employees into four groups: direction, administration, technicians and service. Only the Division director and the chiefs of the national park management, wildlife research and wildlife management sections, are included in the direction category. Regional managers, project directors, field chiefs are included in the administrative section. The technician classification is composed of all biologists, forest engineers, and skilled craftsmen. The service or support category is by far the largest and includes secretaries, park inspectors, field assistants, boat operators, watchmen and laborers.

Figure 3 contains the present organizational chart of the national office of the Division of National Parks and Wildlife. The Division

TABLE VIII. NUMBER OF EMPLOYEES OF INDERENA AND THE DIVISION OF NATIONAL PARKS AND WILDLIFE, 1969-1974.

Year	INDERENA	Parks & Wildlife
1969	560	30
1970	943	56
1971	1140	91
1972	2091	140
1973	2163	146
1974	2302	152

TABLE IX. EMPLOYEES BY NUMBER AND CLASSIFICATION OF THE DIVISION OF NATIONAL PARKS AND WILDLIFE.

Year	Direction	Administration	Technician	Service	Total
1969	1	5	10	14	30
1970	1	9	12	34	56
1971	3	16	15	57	91
1972	3	29	27	81	140
1973	4	28	29	85	146
1974	4	28	32	88	152

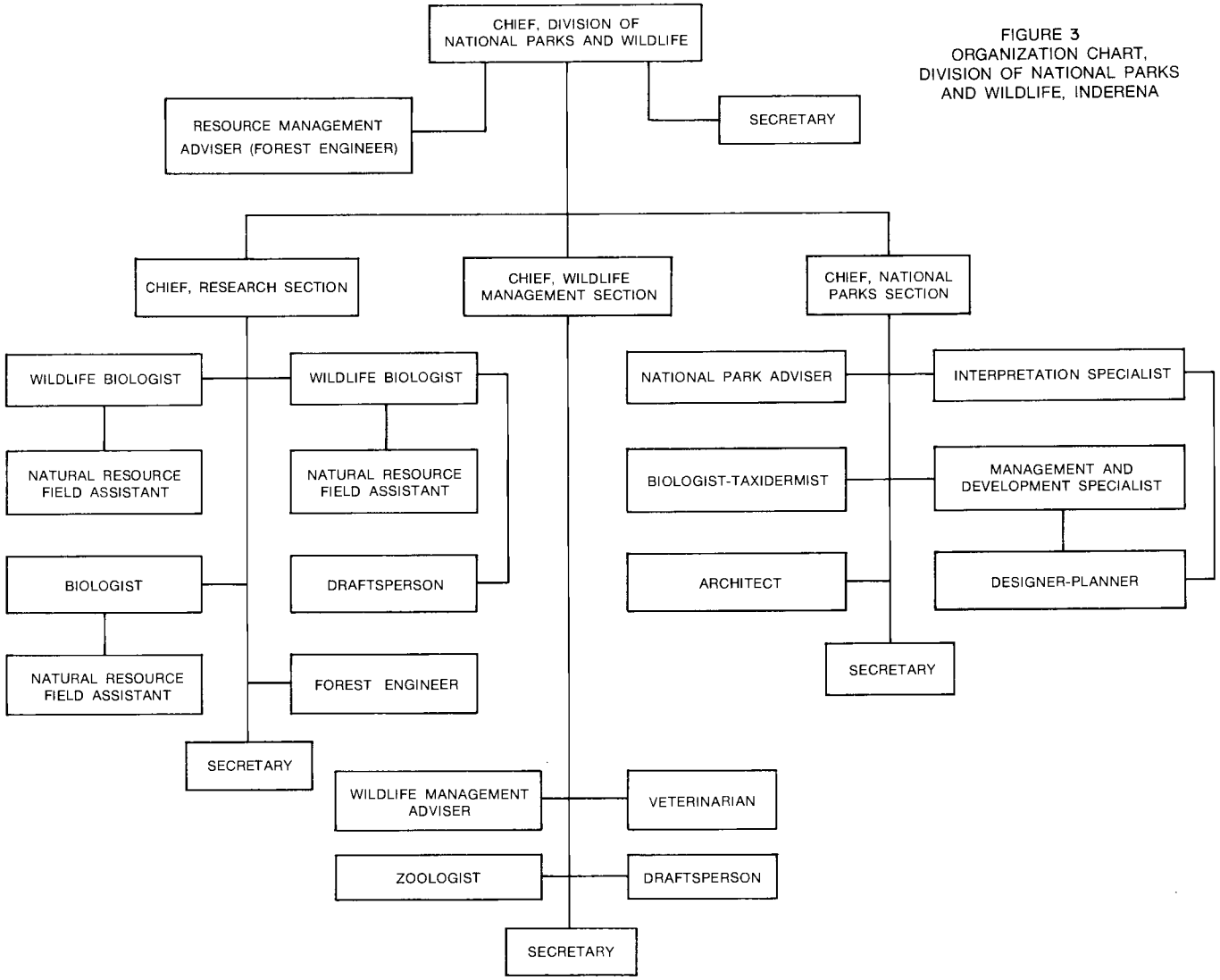


FIGURE 3
ORGANIZATION CHART,
DIVISION OF NATIONAL PARKS
AND WILDLIFE, INDERENA

is divided into three sections: Wildlife Research, Wildlife Management and National Parks Management.

Summary

The author supports the thesis that, in general, Pre-Columbian South American inhabitants co-existed with nature in a more harmonious manner than did the conquerors. Early civilizations initiated soil and water conservation practices, managed tree nurseries and had strict hunting laws, all of which were disregarded by the Europeans. The toll of damage to forests and game was immense during the long colonial period. Four hundred years were to elapse before the first land was officially reserved as a national park. In 1922, Argentina established the National Park of the South, and by mid-1973 every nation on the continent had preserved a portion of its national heritage in a national park or equivalent reserve.

Colombia's conservation efforts are noted in its early history, but it was not until 1919 that a coordinated attempt was initiated to protect part of that country's natural resources. In that year Colombia passed its first laws protecting its flora and fauna. In 1933 the western slopes of the Sierra Nevada de Santa Marta were nominally protected and two years later, in 1935, the first archaeological park was established at San Agustin.

Colombia participated in the 1940 Pan American Convention on Nature and Wildlife Preservation. As a result of that meeting's recommendations, La Macarena Biological Reserve was designated by

President Mariano Ospina Perez in 1948.

In 1959, Law 2 was passed and as a result the basis for national park establishment became law. In 1960 Cueva de Los Guacharos became the first permanent national park in Colombia. Various government agencies used the powers identified in the 1959 law to establish national parks and by 1968, twelve such areas had been designated.

In late 1968, Law 2420 was enacted, creating the Institute of Renewable Natural Resources Development. Activated on January 1 of the following year, INDERENA, among other functions, assumed responsibility for the management and development of the country's national parks. To date, INDERENA has recognized and is administering nine of the ten national parks which exist in Colombia. Only Farallones de Cali National Park, which is managed by the Autonomous Corporation of the Cauca Valley (CVC), is outside INDERENA's jurisdiction.

The National Parks and Wildlife Division functioned parallel to the Divisions of Forestry, Fish and Watershed Management until mid-1974, when INDERENA was administratively reorganized. Presently parks and wildlife are located under the Direction of Environmental Conservation.

Colombia's maturation process as a contributing member to the world national park movement has not been without faults or problems. Today however, the Division of National Parks and Wildlife while not free of administrative problems ranks as a developed system for the management of natural resources.

IV. THE PRESENT STATUS OF COLOMBIA'S NATIONAL PARKS

Introduction

The history of the conservation movement in Colombia has led to the development and administration of Colombia's System of National Park Reservations under the direction of the Renewable Natural Resources Development Institute, INDERENA. This Institute is presently managing nine national parks as Map 2 indicates. Two additional areas have also been declared equivalent reserves: El Tuparro Faunistic Territory and Los Pharomacrus Fauna Sanctuary.

In total some 1,297,168 hectares or 1.2 per cent of the total surface area of the country are included in the System of National Park Reservations (Atlas de Colombia, 1967). Of this total more than two-thirds, 914,168 hectares, are national park lands. Table X traces the legislative history of each national park and equivalent reserve within the Colombian system.

In this chapter, each of Colombia's national parks managed by INDERENA is examined. Aspects of planning, staff, budget and zoning are discussed as appropriate to each park for the level of development which exists. The chapter concludes with a brief description of future development projects which have been identified by the Division of National Parks and Wildlife.

Map 2 Colombia's Political Divisions and System of National Park Reservations

TABLE X. LEGISLATIVE HISTORY OF COLOMBIA'S NATIONAL PARKS.*

Park or Reserve	First Declared	Approved Executive Res.	Declared Other Entity	Declared INDERENA	Approved Executive Res.
Isla de Salamanca N.P.	INCORA, Resolution No. 191, 1964	Executive Resolution No. 255, 1964		Accord No. 04, 1969	Executive Resolution No. 292, 1969
Tayrona (Santa Marta) N.P.	INCORA, Resolution No. 191, 1964	Executive Resolution No. 255, 1964		Accord No. 04, 1969	Executive Resolution No. 292, 1969
Sierra Nevada de Santa Marta N.P. (Tayronas)	INCORA, Resolution No. 191, 1964	Executive Resolution No. 255, 1964		Accord No. 06, 1971	Executive Resolution No. 230, 1971
Cueva de los Guacharos N.P.	Presidential Decree No. 2631, 1960	(not necessary)		(not necessary)	(not necessary)
Purace N.P.	Governor of Cauca Decree No. 199, 1961	(not necessary)	INCORA, Resolution No. 092, 1968		Executive Resolution No. 282, 1968

*N.P. equals a National Park.
T.F. equals a Faunistic Territory.
S.F. equals a Faunistic Sanctuary.

TABLE X (continued).

Park or Reserve	First Declared	Approved Executive Res.	Declared Other Entity	Declared INDERENA	Approved Executive Res.
La Macarena N.P.	Declared Biological Reserve, Law 52, 1948	(not necessary)	Law No. 163, 1959, National Monument	Declared Park, Accord No. 26, 1971	Executive Resolution No. 440, 1971
Las Orquideas N.P.				Accord No. 14, 1973	Executive Resolution No. 071, 1974
Los Nevados N.P.	Law 2, 1959, Article No. 13	(not necessary)		Accord No. 15, 1973	Executive Resolution No. 148, 1974
Los Katios N.P.				Accord No. 37, 1973	Executive Resolution No. 372, 1974
El Tuparro T.F.				Accord No. 19, 1970	Executive Resolution No. 307, 1970
Los Pharamacrus S.F.				Accord No. 17, 1972	Not approved as of August, 1974

Isla de Salamanca National Park

Introduction

The Isla de Salamanca National Park, containing some 20,912 hectares, is a triangular shaped island located between the cities of Barranquilla and Cienaga on Colombia's north coast (see Map 2). This park is an excellent example of a mangrove-saltwater estuary ecosystem. The western portion has numerous swamps and mangrove lined canals which provide habitat for at least 156 species of birds, both resident and migratory (Toro Garcia, 1971). One also encounters a wide variety of tropical seashore habitats some lined with small micro-habitats of desert flora. On the Caribbean side, are extended stretches of beaches with sands grading in color from black to light caramel. The eastern portion is covered with xerophytic forests.

The length of the island is 62 kilometers and it varies in width from 500 meters on the eastern side to 18 kilometers on the western border (Miller, 1968c). Its highest point rises only 8 meters above sea level (Colombia, INDERENA, 1973a).[10]

The island is rich in every form of wildlife but the number of bird species exceed the mammals or reptiles. The most logical explanation for the variety of birdlife is the number of distinct habitats on the island and the fact that it is located on a major North-South American migration route. The seashore, the saltwater-mangrove on

10. One meter is equivalent to 3.28 feet.
One hectare is equivalent to 2.47 acres.
One mile is equivalent to 1,608 meters.

the northern side of the island, the land opened by agricultural practices, the fresh water swamps of the southern portions and the remains of a desert thorn forest are all specialized habitats found within the park's limits. Some of the most ecologically important birds inhabiting the island are the only known breeding population of the Bronze-brown cowbird (Molothrus armenti) along with the endemic Sapphire-bellied hummingbird (Lepidopyga lilliae), the endangered Brown pelican (Pelecanus occidentalis), the Magnificent frigate bird (Fregata magnificens), the Savannah hawk (Heterospizias meridionalis), and the Yellow oriole (Icterus nigrogularis). Only one species of bird is known to have become rare on the Isla de Salamanca and that is the Flamingo (Phoenicopterus ruber) (personal interview, Jorge Hernandez, INDERENA, February 6, 1975). This may not have been the direct result of man's interference, but possibly because of the birds' irregular movement patterns and specialized diet.

The Division of National Parks and Wildlife has identified several larger species of animals which are still found on the island today. Among others, the world's largest rodent, the Capybara (Hydrochaeris hydrochaeris isthmius) is very common. The Paca (Agouti paca), Manatee (Trichecus manatus manatus), Savannah dog (Cerdocyon thous aquilus), Spectacled caiman (Caiman crocodilus fuscus), otter (Lutra longicaridis annectens), iguana (Iguana iguana), and the Howler monkey (Alouatta seniculus) can be seen with some frequency. Several species are in danger of extinction however, and these include the Colombian white tailed deer (Odocoileus virginianus)

and the American crocodile (Crocodylus acutus).

The exact number of species of fish within or near the park's boundaries is not known. Jorge I. Hernandez Camacho, a biologist and Chief of the Research Section, Division of National Parks and Wildlife, estimates their number at sixty. The Cienaga Grande provides economic support and food for a great number of people living outside of the park's eastern boundary. Although it does not seem probable that this activity has eliminated any particular species of fish, it is widely documented, as Miller (1968c) indicates, that it has limited reproduction potential. This is primarily because local fishermen have netted the narrow channels during migration. INDERENA presently does not permit fishing within the park boundaries.

Historical Outline and Present Status

In 1964, the Colombian Agrarian Reform Institute, INCORA, issued Resolution No. 191 which established Isla de Salamanca as a national park. This act was approved in the same year by Presidential Decree No. 255. INCORA's assistance in proposing the Resolution had been requested by the Autonomous Corporation of the Magdalena and Sinu Valleys (CVM) which had jurisdiction and national park management responsibilities in the area.

Initially, the project was presented by the CVM to the Colombian Academy of Exact, Physical and Natural Sciences for comment, because until that time no single government agency had sufficient park management experience to advise the CVM on their plans. The Academy

reviewed the island's biological characteristics, evaluated them in relation to its location, and subsequently spelled out four justifications favoring establishment of the park. First, considering the island's proximity to Santa Marta and Barranquilla, the Academy recognized that there were not sufficient areas where "the public can find relative tranquility and experience and intimate contact with nature." Second, they reiterated what several scientific studies had concluded; that the unique ecological balance once found on the island "had nearly disappeared and now it must be re-established." Third, this group of distinguished scientists noted the esthetic potential of the island when restored to its natural condition. Lastly, the potential for permanent national and international tourist clientele was mentioned as a "supporting justification for the preservation of this area as a national park" (Colombia, CVM, 1966:4-5).

The CVM responded to the Academy's report and outlined specific objectives which the Section of National Parks would work toward, should national park status be granted. They were threefold:

> 1) ...the conservation and re-establishment of the flora and fauna of the area which have nearly been destroyed because of colonization by man in an irrational form.
>
> 2) ...to provide for the benefit of the people and their recreation and spiritual growth in a setting which allows the peaceful thought so necessary for modern man.
>
> 3) The park management plan should include the mimimum amount of construction and alteration but which will at the same time permit a great number of visitors to use the area (Colombia, CVM, 1967:3-4).

The CVM immediately conducted an existing land survey and categorized the findings as shown in Table XI.

Opinions from both visiting scientists and consultants were favorable. After the Isla de Salamanca was declared a national park in 1964, Myron Sutton, Assistant Chief of the Division of International Affairs, U. S. National Park Service, commented:

> By any standard, it fulfills with distinction the internationally established precepts of a national park. Its characteristics resemble those of Everglades National Park and Cape Hatteras National Seashore in the United States. The difference--and urgency--is that it is much closer to large centers of population (Sutton, 1967:5).

It did not seem to Sutton that evidence of man's impact within the proposed limits should be grounds to deny national park status. The important thing was that the ecological system was being protected. Others like I. R. Grimwood disagreed with this opinion. Said Grimwood:

> ...the Isla Salamanca (sic) is a most unpromising area to be made into a national park. The usual purpose in creating a national park is to preserve a particularly interesting or beautiful part of still unspoilt (sic) country in its natural state and to safeguard its flora and fauna from destruction or modification by man. On the Isla Salamanca scarcely a hectare of land remains...in which the vegetation has not been altered almost beyond recognition....Mammalian life and the larger reptiles have also almost disappeared....The Isla Salamanca will not attain true national park status until its vegetation and the fauna dependent on it, have been coaxed back into something like their original state; which is a process which may take several decades (Grimwood, 1968:1).

Nevertheless, for almost the exact reasons that Grimwood might not have granted national park status to the island, the CVM and the Colombian Academy of Sciences recommended that INCORA declare the

TABLE XI. PRINCIPAL LAND CLASSIFICATIONS IN ISLA DE SALAMANCA NATIONAL PARK.*

Land Classification	Hectares	% of Surface Area
Sandy ground	1,813 has.	8.7%
Degraded forests	535	2.5
Hawthorn forests	605	2.9
Lagoons	5,623	26.9
Dunes	649	3.1
Mangrove	6,048	29.2
Shrub	40	0.2
Pasture-stubble	4,235	20.2
Beaches	319	1.5
Seashore	63	0.3
Swamp-bogs	981	4.5
Totals	20,912 has.	100.0%

*Source: CVM, 1967. Programa Preliminar para el Estudio y Desarrollo del Parque Isla de Salamanca Durante el Ano 1967. Bogota, Colombia.

area a national park.

It is true, however, that the island has felt man's impact. Its resources had been altered by squatters, private land holders, the grazing of livestock and timber cutting for fuel, fences and charcoal manufacturing. As a result, nearly 50 per cent of the mangrove forests have been eliminated and over 4,000 hectares of pasture created. In addition, a major two-lane blacktop highway traverses the length of the island.

The highway was constructed in 1953 by the Department of Public Works in order to connect Barranquilla and Santa Marta which are only 88 kilometers apart. It will eventually join the Venezuelan coast-highway development. Biologist Alejandro R. Ciardelli, assessing the road's environmental impact, claimed that it effectively divided the island, biologically isolating the Caribbean side, which would become much more salty, from the southern portion, which would become permanently fresh water (Ciardelli, 1968). Subsequent studies have supported this conclusion and will be discussed further in Chapter V.

The road, however, was only one of the problems that the CVM inherited with the declaration of the Isla de Salamanca National Park. Of the total land area, it was estimated that 40 per cent was uncultivated, unclaimed land largely in swampy or sandy area, and that 42 per cent was privately owned. The remaining 18 per cent was either claimed by colonos or indirectly held by private persons (Colombia, CVM, 1967:8). Therefore the CVM did not own 60 per cent of the park it was managing.

As Table XII indicates, the problem has been eased, but it is far from eliminated. The present director estimates that 4,200 hectares, or 20 per cent of the park, are still not controlled by INDERENA even though the land is "officially declared to be property of the State" (Colombia, INDERENA, 1973a:3). In 1966 the existing squatters' dwellings were razed and these families were asked to locate outside of the park limits. At that time no government program existed to assist with relocating these families. Thus it is impossible to say that no colonos live within the park today, because several areas are isolated and difficult to patrol on a regular basis.

In the period from early 1966 to mid-1970, 108 private land holdings were purchased with either INCORA or INDERENA funds, and the buildings and fences of these farms destroyed. In late 1970, therefore, the land still excluded from the direct jurisdiction of the government had been reduced from 12,600 hectares to 6,000 hectares. In 1971, when the last official census was conducted, six additional inholdings had been purchased reducing the total amount of private land to 5,000 hectares or 23.8 per cent of the total park area. If INDERENA receives eminent domain powers from the President the remaining inholdings will undoubtedly be acquired.

In 1966, the CVM staffed the Los Cocos ranger station with six inspectors to guard against further destruction of the fauna and flora. During the same fiscal year, a mosquito fumigation program was initiated, several canals were cleared in order to facilitate vigilance patrols and a dune stabilization program was begun in the

TABLE XII. LAND HOLDINGS IN ISLA DE SALAMANCA NATIONAL PARK, 1965-1973.*

Year	No. of Private Prop. Owners	No. of Squatters	Hectares Held	% of Total Park Area Claimed
1965	134	62	12,600 has.	60%
1970	26	?	6,000	28.7
1971	20	?	5,000	23.8
1973	18	?	4,200	20

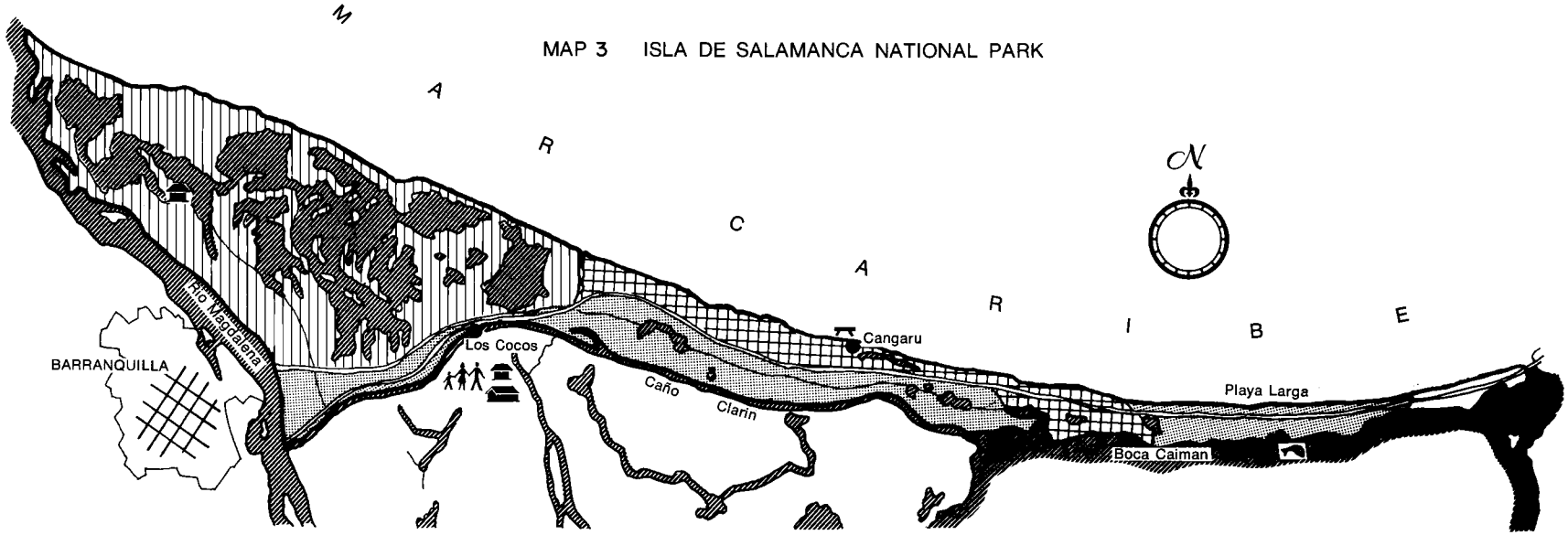
*This table was compiled with figures from: CVM, 1967; Franky, 1970; Mozo, 1971; and Dalfelt, 1973.

Cangaru area.

In the following year the CVM with the consultant services of the Inter-American Institute of Agricultural Services (IICA) of the Organization of American States (OAS), developed a management outline for the island. As a result of this preliminary plan (Miller, 1967) and a subsequent study undertaken in 1968 (Miller, 1968a), the island was divided into four zones to "explicitly recognize those natural values which require special management techniques, and to both guide and limit the development of the park for recreational, educational and research purposes" (Franky, 1970:3). Map 3 identifies the zoning scheme for the park.

1) Primitive Wilderness Zone - The richest biological part of the park is dedicated to the integral protection of the flora, the fauna and the total environment. All exotic plants and animals which remain from former land uses, are destroyed, and no developments, except for those associated with the protection and study of the area are permitted.
2) Natural Recovery Zone - The area which was most altered by former land uses is managed to promote natural plant succession and recovery of the habitat. No immediate developments are allowed except for research projects.
3) General Recreation Zone - Basic facilities are provided for public enjoyment and education, but in a manner which alters the natural environment as little as possible.
4) Intensive Use Zone - Activity centers with basic facilities

MAP 3 ISLA DE SALAMANCA NATIONAL PARK



adapted from INDERENA, Division of National Parks and Wildlife

- Visitors Center
- Biological Field Station
- Park Limit
- Highway
- Administration Building
- Ranger Station
- Picnic Area
- Lakes and Bays
- Primitive Wilderness
- General Recreation
- Natural Recovery
- Intensive Use

are created where a relatively high number of visitors per hectare can enjoy the natural environment without damaging the resources (Franky, 1970).

The CVM initiated a construction program within the park during 1968 and INDERENA continued with these plans in the following year. In 1969 by Accord No. 4, Isla de Salamanca became the first national park to be established by INDERENA. The President confirmed the national park status of the island and therefore officially recognized the transfer of the management responsibilities from the CVM to INDERENA.

A five person study commission was immediately designated to thoroughly review the recommendations of Kenton Miller's two reports: A General Strategy for Launching a Park Management Program in Northern Colombia (1967) and Estudio de Preinversion para el Desarrollo Forestal en los Valles del Magdalena y del Sinu (1968a), and to determine the development potential for each of the management zones within the park.

During the 1969 fiscal year, the construction program at Los Cocos was completed. Located within the Intensive Use Zone, this area is the main visitor center in the park. Its theme focuses the visitor's attention upon the wildlife of the park through various interpretive facilities. To this end, the development contains a museum with dioramas and models representative of the island's ecology. Also located at this site are a slide projection room,

micro-habitats,[11] a restaurant, and a boat facility for taking visitors into mangrove-lined canals to view wildlife. An administration building, inspector's quarters, sanitary facilities, and parking lot are also located at Los Cocos as Photo 1 indicates.

Also in 1969, an active recreation area was developed within the Intensive Use Zone at Cangaru. Palm-roofed picnic shelters, including fireplaces, were constructed at some 20 sites near the Caribbean beach. Fresh water, sanitary facilities and parking were also provided.

With the completion of this development program the number of inspectors assigned to the park was raised to ten. The island received its first full-time director in late 1969, and he initiated regular vigilance patrols at both the Los Cocos and Cangaru developments. The museum displays were completed and the micro-habitats stocked. During the island's first full year of operation as a park, 7,000 visitors registered at Los Cocos according to Mr. Gilberto Toro Garcia, former director of the park.

The development of these facilities required substantial investments from the Division of National Parks and Wildlife. Of the Division's total budget for 1969, $1.2 million pesos were diverted to Isla de Salamanca (Colombia, INDERENA, 1969b:47). During the following year $3.2 million pesos were needed to finish the proposed visitor facilities and equip and patrol the park (Colombia, INDERENA, 1970a:

11. Micro-habitats are areas in which wildlife are displayed in confined quarters resembling their natural habitat, for public education and enjoyment.

Photo 1. Development at the Los Cocos visitors center, Isla de Salamanca National Park.

Photographed by: D. L. Golobitsh

51). By concentrating staff, funds and interest in the development of the island, INDERENA had managed, within less than two years, to provide Colombians with the facilities necessary to study and enjoy nature "...in a setting that allows the peaceful thought so necessary for modern man" (Colombia, CVM, 1967:4).

Since this time, a boardwalk has been constructed at Los Cocos largely through the efforts of Gregory Kroll, the first Peace Corps volunteer assigned to the island. This boardwalk, illustrated in Photo 2, has the potential to become an important interpretive device by facilitating visitation and understanding of the various habitats associated with the mangrove-saltwater estuary ecosystem which it traverses.

Visitation to Loc Cocos has increased regularly from the time records have been maintained. Interestingly, however, it has been estimated by the former director that a small percentage of the total visitation is from Colombians. Gilberto Toro Garcia indicated to the author that "It would be generous to estimate that presently more than 20 per cent of the total park visitation is from Colombians" (personal interview, September 20, 1974). However, Toro Garcia and others agree that this trend will reverse itself over a period of time as Colombia intensifies its conservation and environmental education programs. Presently, the vast majority of foreign visitors are from Venezuela.

Another major problem was introduced to the island in late 1971. Approximately 180 electrical towers of more than 20 meters in height

Photo 3. Main entrance at Arrecifes-Canaveral intensive recreation development, Tayrona National Park.

Photographed by: D. L. Golobitsh

Photo 4. Camping zone, Arrecifes-Canaveral intensive recreation development, Tayrona National Park.

Photographed by: D. L. Golobitsh

TABLE XIII. VISITATION TO ISLA DE SALAMANCA NATIONAL PARK.*

Year	Number of Visitors to Los Cocos	% of Total Visits by Colombians	% of Total Visits by Foreigners
1970	7,000	5%	95%
1971	10,000	10	90
1972	15,000	15-20	80-85
1973	18,000	15-20	80-85

*Compiled with the assistance of Gilberto Toro Garcia, Biologist, INDERENA, September, 1974.

were erected and span the island adjacent to the highway. This presented the staff not only with a major ecological problem, but established an esthetic precedent which is seen by many to pose a serious threat to national park management priorities in the future. This and other management problems will be discussed in the following chapter.

The inspector staff was increased to 14 in 1974 when a bridge connecting Barranquilla and the island was completed. This increased the volume of traffic to the island tremendously since previously the only means to cross the Magdalena River was by ferryboat.

Because of the area's biological frailty and its relation to major population centers, the national park was the first to be developed by the Colombian government and is presently one of the system's most advanced. Not only are conservation ends being served, but the objective of providing facilities for the recreational needs of the Colombians is also notably being served.

Tayrona National Park

Introduction

Composed of a land area of 12,000 hectares plus approximately 3,000 hectares of Caribbean Sea and its bottomlands, Tayrona National Park is located in the Department of Magdalena on the north coast of Colombia (see Map 2). The park includes representative ecosystems from the seacoast, to tropical thorn forest, to rich upland humid forests. The coastline is broken with many pristine bays and coves,

the majority of which are lined with white sand beaches and separated by truncated headlands. This park is particularly important to Colombia's System of National Park Reservations in that it bridges the gap between the flora and fauna found in the Isla de Salamanca and Sierra Nevada de Santa Marta National Parks. The marine fauna of the park, according to Grimwood, is complementary to that of Isla de Salamanca "...since it represents that of the deep-water rocky coast...as opposed to a shallow sandy coast..." (Grimwood, 1968:1).

The park is situated northeast of Santa Marta, within 45 minutes driving time of that city. Its northern limit is formed by an imaginary line one kilometer offshore in the Caribbean Sea. On the west, the boundary is formed by the Bahia de Taganga and on the east by the Rio Piedras. The recently completed Colombia-Venezuela coast highway forms the park's southern boundary.

Over 10,000 hectares of the park are covered with forests, 90 per cent of which are virgin (Colombia, INDERENA, 1973a:6). Vegetatively, the area is extremely diversified because representative climax vegetation is found at every level from the seashore to the highest point at over 900 meters. This is not to say however that the park has not felt the effect of man in recent times, but from approximately 1600 to 1951 it was uninhabited. In an ecological study Hernandez and Rodriguez state that the 350 years after the indigenous tribes abandoned the area until the colons appeared in numbers in 1951, "... allowed ample time for the vegetation to recuperate to a climax state" (Hernandez y Rodriguez, 1971:4).

Espinal and Montenegro (1963) applying the Holdridge ecological classification system, place the majority of the park's vegetation in the Thorny Forest and Very Dry Tropical Forest classifications. However more detailed studies conducted by INDERENA (Hernandez and Rodriguez, 1971; Franky, 1971a) indicate that many additional vegetation formations are represented in micro-climates within a larger vegetative zone.

Sub-marine praderas (associations mainly of Thalassia testudinum) are found on most of the continental shelf which is included within the park limits. It is extremely vital to the world's ecological community that these grazing grounds are protected because they provide food for six species of marine turtles which use Tayrona's beaches to deposit their eggs. Included among these species is the endangered Green sea turtle (Chelonia mydas mydas) (Sarmiento Pena, 1971: 3). The Hawksbill (Eretmochelys imbricata), Loggerhead (Caretta caretta caretta), Olive (Lepidochelys olivacea), and Leathery turtles (Dermochelys coriacea) also nest on the park's shores. It is widely accepted, however, that all species of marine turtles are endangered due to their dependence on the same areas for food, nesting habitat, and the demand for their eggs, meat and shells. Therefore the protection of any breeding and nesting site, no matter how small, is a contribution to the worldwide attempt to save these species. The sixth turtle found in Tayrona is the Atlantic ridley turtle (Lepidochelys kempi) which has only been sighted once (Tufts, 1973).

Archie Carr, professor of graduate zoological research at the

University of Florida, stated the plight of marine turtles in a paper presented at the Latin American Conference on the Conservation of Renewable Natural Resources in 1968:

> There was a time when marine turtles held high rank among the resources of the sea. Today...the problem now is less how to manage an asset than how to save the species from extinction....Wherever well organized exporters are able to provide a steady outlet for frozen meat, calipee, skins and oil, turtling becomes feverish, and the drain becomes intolerable....The survival outlook for all the marine turtles is an unhappy one (Carr, 1968:162).

Also located in this relatively shallow continental shelf are vast banks of coral which offer optimum conditions for the reproduction of tropical fish. Of the total of about 72 coral species which live in the Caribbean Sea, more than 50 are found within the 3,000 hectares of sea bed area included in Tayrona National Park (Ciardelli, 1967; Colombia, INDERENA, 1971c). The majority of these formations are in the Concha, Cinto, Chengue, Gairaca, Neguange, and Arrecifes bays. Ruan and Franky (1972) estimate the importance of these Caribbean Sea meadow and coral reef areas by stating that together:

> They are the major producer of bio-mass in the tropical seas of the world...and constitute an important source of natural reproduction, indispensible in maintaining the fishing capacity of the Atlantic Coast (Ruan y Franky, 1972:17).

The north coast of Colombia, particularly the area within Tayrona National Park, is one of the richest areas in the world of birdlife. Over 300 species of birds are found within its boundaries (Franky, 1971:8). By comparison there are an estimated 520 species found in the entire United States. (*Cebus albifrons*) monkeys, Puma (*Felis concolor*), and Ocelot (*Felis pardalis*) are also reported by INDERENA

to be common.

Archaeological Relics

Within the park limits one also encounters Pueblito, a historic-cultural area which contains the ruins of the Tayrona civilization. The area was inhabited until 1600, when the Governor of Magdalena ended nearly 100 years of skirmishes by finally driving the remaining members of the tribe out of Pueblito and further into the Sierra Nevada de Santa Marta.

The Pueblito ruins were first excavated in 1922 by J. Alden Mason, a North American archaeologist and more recently by the famous Colombian anthropologist G. Reichel Dolmatoff. Although only the central portion of the village has been studied in any detail, scientists estimate the development to have included some 16 square kilometers, approximately 500 houses and some 3,500-5,000 inhabitants (Reichel Dolmatoff, 1965; Morales, 1972; Colombia, INDERENA, 1972b).

Both Dolmatoff and Mason reported that the economic base for this civilization was intensive agriculture based upon a communal system of labor. These contemporaries of the Incas also fished to obtain animal protein, had an extensive irrigation system of covered canals, and maintained a centralized area for disposing of wastes.

Scientific studies have revealed many ruins which present INDERENA with a wonderful opportunity for historic interpretation of the Tayrona civilization. The remains of several circular homes with stone foundations have been excavated. Structurally they are about

six meters in diameter and the walls were most likely woven vegetable matter. These dwellings were divided into male and female halves as is verified by the location of artifacts and tools within the ruins (Morales, 1972). The household tasks were performed by the women while the men tended their terraced fields and fished. Architectural relics, including bridges, stairways, ceremonial plazas, columns and roadbeds all fashioned from granite, indicate the level of sophistication to which these people had risen before the Spanish arrived in the early 1500's.

Historical Outline and Present Status

At the same time the CVM proposed the creation of Isla de Salamanca, national park status was also requested for Tayrona. This project was also presented to the Colombian Academy of Exact, Physical and Natural Sciences which recommended the declaration of this area as a park:

> It is necessary to take decisive and effection action to provide to the people of our Country the means to relax while at the same time conserving the fauna, flora and natural beauties that man is continuing to destroy in a systematic form...(Ruan y Franky, 1972:14).

Therefore by INCORA Resolution No. 191, of 1964, national park status was officially requested for Tayrona. The President concurred with Executive Resolution No. 255 in the same year.

Very little was accomplished in the two years immediately following the park's establishment. The CVM was concentrating development efforts in the Isla de Salamanca, and their meager park budget

did not allow more than preliminary resource inventories and a census to be conducted. At the inception of the program in early 1965, as Table XIV indicates, 211 persons either owned property within the park or simply claimed squatters' rights. This meant that 3,800 hectares of the park out of the total land area of 12,000 hectares were either legally claimed or simply settled.

By early 1971, all of the colonos, the majority of whom were collecting coconuts and fishing for an existence had been removed from the park limits. Additionally 85 private holdings had been purchased with INCORA funds giving the CVM control over 76 per cent of Tayrona National Park. By 1972, a total of 191 properties had been acquired, and adding these to those lands already in the public domain, 95 per cent of the park is now free from human occupation.

In 1967, while serving in a consultant capacity for the CVM, Dr. Kenton Miller recommended that Tayrona National Park (referred to as Santa Marta National Park in his report) be developed around two themes: First that the research potential presented by the marine and dry forest ecosystems be realized by the creation of a research center that "...would serve national and international scientists and students" (Miller, 1967:50). Secondly he advocated that an extensive recreation complex including campgrounds, nature trails, and compatible marine recreation activities be planned for selected areas. Miller was very specific however in the type of recreation facilities he considered to be in keeping with the theme of Tayrona and stated for example that the beaches:

TABLE XIV. LAND HOLDINGS IN TAYRONA NATIONAL PARK, 1965-1972.* +

Year	No. of Private Prop. Owners	No. of Colonos	Land Area Claimed or Owned	% of Total Park Claimed
1965	171	40	3,800 has.	31.6%
1967	86	32	2,900	24.1
1970	45	?	1,700	14.1
1972	20	?	600	5

*This table was compiled with figures from the following sources: Franky and Rodriguez, 1967b; Franky, 1970; Mozo, 1971; Ruan and Franky, 1972; and from personal interviews conducted with INCORA and INDERENA employees during September, 1974.

+The percentages presented in this table were computed on the basis of 12,000 hectares. In 1972, approximately 3,000 hectares of submerged lands and offshore waters were added to the park.

> ...should be developed so as to discourage congestion and large attendance at any one site. It is suggested that the campsites be scattered and up away from the actual beach area to reduce human impact on the beach side vegetation (Miller, 1967:51).

During the same year, the CVM initiated a serious research effort and also several visiting scientists studied various aspects of Tayrona National Park. Simon Max Franky and Pedro I. Rodriguez conducted two studies. The earlier report (Frnaky y Rodriguez, 1967a) was concerned with basic hydrographic and geological information, and determined the existing land uses of the area within the boundaries. The second investigation, anticipating a conflict between intensive tourist development and conservation interests, examined both sides of the issue and elaborated the CVM's position (Franky y Rodriguez, 1967b).

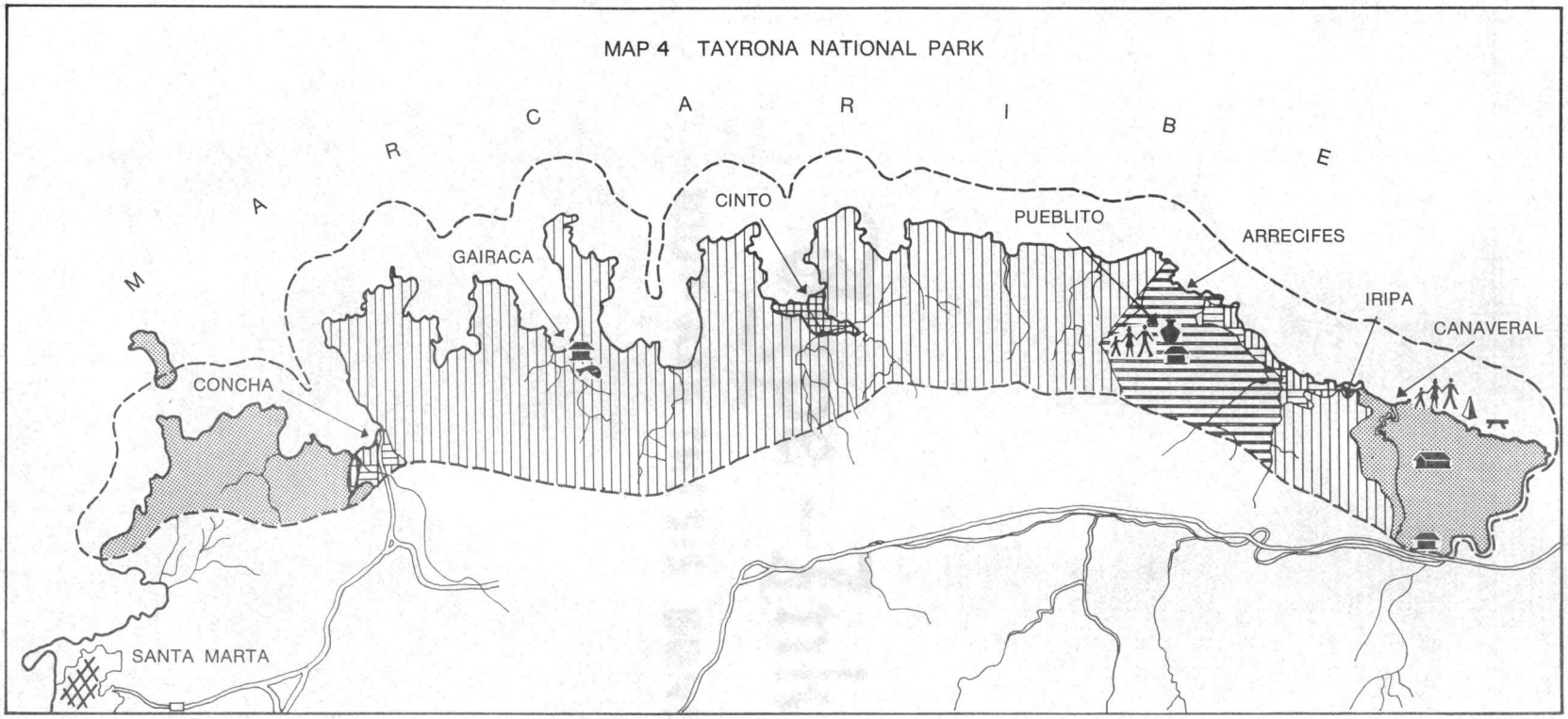
Alejandro Ciardelli (1967) coordinated a joint research effort with Harvard University concerned with marine life, including the coral reefs, and the animal and plant life of its many estuaries and bays. Dr. Myron Sutton (1967) visited the area and submitted a consultant report which recommended that the park could accommodate both research and recreational concerns. A pilot zoning scheme and management plan drafted by Ernesto Schrimpff (1967) and Major Ian Grimwood, (1968) recommended that measures be initiated to protect the area's fragile wildlife in the development of Tayrona National Park.

As a result of cooperative planning effort by the CVM and the United Nations Food and Agriculture Organization, a zoning plan was written in 1968 (Miller, 1968b). The planning team included a

wild-lands management specialist (Kenton Miller) two forest engineers (Simon M. Franky and Pedro I. Rodriguez), a marine biologist (Alejandro Ciardelli), a zoologist (Randall Gossen), an architect (Luis Aguirre P.), and a civil engineer (Rodrigo Reyes).

When the management responsibility for the park was transferred from the CVM, INDERENA identified five management zones: Primitive Wilderness, Natural Recovery, General Recreation, Intensive-Use, and Historic-Cultural. The park's pristine bays and beaches along with its virgin forests were placed in the Primitive Wilderness Zone. Subsequently in 1972, with the expansion of the park to include designated submerged lands and the water column above, the precious coral reefs and sand bars were added to this management classification. Map 4 indicates the zoning scheme for the park.

The two extreme ends of Tayrona which had been substantially altered by wood cutting and grazing activities by colonos were zoned as Natural Recovery areas. In addition to the removal of colonos from these locations, the plan called for the elimination of all exotic species and the resumption of natural plant succession. Basic facilities are permitted in this area in order to permit ". . . public enjoyment and education on the bays, coral reefs and in the dry forests, in a manner consistent with the natural environment" (Franky, 1970:4). The areas zones as having the ability to be used intensively by relatively large numbers of visitors are developed in areas which have already been somewhat altered and which can withstand human impact up to a predetermined carrying capacity if properly designed



adapted from INDERENA, Division of National Parks and Wildlife

and managed. Lastly, sites which have obvious historic value and require interpretation efforts to assist in public understanding are classified by INDERENA as Historic-Cultural Zones.

The only existing development within the Primitive Wilderness Zone is a biological research and marine study center which is not staffed or equipped. Located at Gairaca Bay, the center includes a residence for biologists, a laboratory and an inspector station.

The Arrecifes-Canaveral intensive recreation development, which was completed in 1973, is the major tourist zone within Tayrona National Park. Facilities include an access road, a park entrance area illustrated in Photo 3, registration and information station, 20 picnic kiosks, beach showers, and 50 developed camping sites complete with parking space, tent platform, barbecue, water and electricity. Photo 4 illustrates a typical camping site. A small restaurant offering lunches, soft drinks and firewood is also located in this recreation area.

Shortly after this high-use area was officially opened to the public, a use code was drafted by the Division of National Parks and Wildlife. Resolution No. 11 of January 4, 1974, spelled out administrative policy for the Arrecifes-Canaveral development and included regulations concerning camping duration and entrance fees. Campers may remain in the park for a maximum of six consecutive days per month. Entrance fees of $20 pesos per vehicle weighing less than one ton, $50 pesos for more than one ton, and $100 pesos per camping unit, are assessed (approximately ¢.80, $2.00 and $4.00 U. S. dollars).

Photo 3. Main entrance at Arrecifes-Canaveral intensive recreation development, Tayrona National Park.

Photographed by: D. L. Golobitsh

Photo 4. Camping zone, Arrecifes-Canaveral intensive recreation development, Tayrona National Park.

Photographed by: D. L. Golobitsh

A carrying capacity was also determined for the area and includes the following criteria:

1. A maximum of one thousand visitors are permitted within the Intensive Use Zone at one time.
2. A maximum of one hundred vehicles are permitted to be stationed between the entrance parking lot and the fifty camping sites.
3. No more than fifty camping units are allowed to be in the park at the same time.
4. No more than an average of five persons per camping unit (two hundred fifty in total) are permitted to stay overnight in the camping area (Colombia, INDERENA, 1974b:2).

Included within the Historic-Cultural Zone are an administration and guard residence at Pueblito. Future plans for this area include a visitors' center which will exhibit materials found in this area, and offer a wide range of interpretive programs ranging from film presentations to guided archaeological walks.

Also planned for the park are a general recreation area to be located at Bahia Cinto, including the construction of a large interpretive aquarium. An Intensive Use Zone, similar to the Arrecifes-Canaveral development is scheduled for the Bahia Concha vicinity. A coordinated effort for a park-wide interpretive program is planned to include the preparation of environmental education materials and the training of interpretive guides (Dankel, 1973).

As of August, 1974, 37 INDERENA personnel were assigned to

Tayrona National Park. Included among this group are the park director, a mechanic, 10 inspectors, 16 field workers and 9 watchmen (Colombia, INDERENA, 1973a:8). Visitation records have been kept for the first time this year. Some 60,000 visits were reported during the first 7 months of 1974 (El Tiempo, 1974c:8B).

Future Development Issues in Tayrona National Park

The ecological importance and recreational potential of Tayrona National Park have been amply documented both in scientific journals and popular writings. As Myron Sutton stated after a national park lecture-tour of the nation some three years ago, "There simply is no other Tayrona in the world" (Berdugo, 1971:8C). This area stands out in all of Latin America and the world with its magnificent natural scenery, ecological conditions, and historic-cultural values.

Unfortunately, the same features which mandated that national park status be granted to the area have resulted in the park being placed in a difficult situation, one which has resulted in spirited arguments by both sides and more press coverage and vocalized public concern than any other issue in the history of the System of National Park Reservations. Colombia has long desired an economic program which would contribute to the country's growth. The north coast has been in a particularly difficult economic situation (Boletin Semanal, 1973; World Bank, 1973) and the region's natural resources were logically examined in relation to possible solutions. It was believed by the National Tourist Corporation that the development of Tayrona's

beaches was one of the most promising means to provide rapid regional economic growth and at the same time insure an input into the long term stability desired by the national government.

Therefore, in 1970, the National Tourist Corporation announced its plans to begin conducting the necessary economic studies to determine if these ideas merited further consideration by the national government and international finance corporations. By mid-1971 they had resolved that the best use of Tayrona's beaches would be an intensive tourist complex developed around the theme of "sun, sea and sand as a major attraction for foreign tourists...providing the highest economic return for the country" (Colombia, CORTURISMO, 1971a:8).

Specifically CORTURISMO proposed that the north coast of Colombia be intensively developed as a major international tourist attraction and that the center of this regional complex be located in Tayrona National Park. They concluded that the majority of the financing would be from private national and international entreprises but that it was necessary for the government to invest in the initial infrastructure in the following projects to insure their seriousness in pursuing this development (Dalfelt, 1973:9).

1.	Extension of the Santa Marta Airport to accommodate 747 jets	U.S. $4,000,000
2.	Sewage system	1,000,000
3.	Water supply from Rio Piedras	840,000
4.	Sewage cleaning system	100,000
5.	Urbanizations and housing	2,700,000
		$8,640,000

The main complex would include developments on three bays: Concha, Nenguange and Cinto, and on the Arrecifes-Canaveral beaches. Several twenty-story hotels were proposed providing a minimum of 5,600 rooms which would be able to accommodate more than 11,000 visitors (Ruan y Franky, 1972; Solomon, 1973). The development plan and timetable are presented in Table XV.

Also included in this proposed $25 million U. S. complex are an 18-hold golf course and sporting club; two commercial centers including restaurants, cafeterias, discotheques, taverns, movie theaters and souvenir outlets; a visitors' information center and marina developments in Cinto and Neguange Bays (Colombia, INDERENA, 1973b: 28).

Immediately after the publication of the formal plan in late 1972, CORTURISMO came under an emotional attack from many and diverse sectors of the Colombian public. Social reformers and university students argued that the level of development being proposed (4 and 5 star hotels) was discriminatory for the vast majority of Colombians would never be able to afford a visit to these facilities. Drawing from well documented international case studies, marine biologists and other scientists claimed that irreparable damage would be done to the park's fragile coral reefs, bays and wildlife. As one editorial stated, they did not want "Tayrona to be turned into another Acapulco ...where fifteen years ago its bays were sub-marine joys, today they are dead and populated only with beer containers, plastic bags and other trash" (El Tiempo, 1972:4A). INDERENA also responded, with a

TABLE XV. PROPOSED TOURIST DEVELOPMENT FOR TAYRONA NATIONAL PARK BY CORTURISMO.*

Area	Dev. Timetable	# Rooms	Class	
			4 Star	5 Star
Bahia de Cinto	1976-1979	1,250		1,250
Bahia de Neguange	1976-1984	900	500	400
Bahia de Concha	1975-1989	1,900	1,900	
Arrecifes-Canaveral	1985-1989	1,550	450	1,100

*This table compiled from information obtained from: Ruan y Franky, 1972; Colombia, CORTURISMO, 1972; Colombia, INDERENA, 1973b.

legally based argument, stating that developments of this type were specifically prohibited in areas declared national parks and therefore illegal.

To defend its plan CORTURISMO contracted a $2 million peso study to a private firm in order to assess the ecological impact of the proposed hotel construction on the flora and fauna of Tayrona. The results could have been predicted. The general manager of the National Tourist Corporation, Nicolas del Castillo, stated in an open editorial that:

> We have researched the topic and have sufficiently explained that the type of tourist development we are proposing... prejudices no one nor will it deteriorate in any form the ecology and so called ecosystems of the Park, of the Cinto or Neguange Bays (El Espectador, 1973:6A).

Quoting the study, CORTURISMO also defended its rationalization for wanting to attract tourists in the following unique manner:

> The Colombian government cannot allow itself the luxury of wasting these bays or not putting them into production. A developed country, like the United States for example, can afford to not use these parks for tourist purposes. But in our case, having such limited natural reserves, we should utilize this potential that will generate foreign income and investment (Colombia, CORTURISMO, 1972; Solomon, 1973: 24).

However, through all of these defenses, neither side seemed willing to acknowledge the existence of the other. This was extremely unfortunate since it resulted in nothing more than a test of political strength, leaving aside any serious evaluation of the resource, land-use alternatives, or social costs and benefits. A rational decision should have set up a matrix for the evaluation of alternative plans, including different sites for the location of a

tourist complex and various methods of utilizing the park's resources without destroying them. To this date this has not been accomplished in a comprehensive or coordinated manner.

As recently as March of 1974, President Misael Pastrana was presented with a petition signed by more than 10,000 professionals requesting that the government "suspend the efforts to change the natural and scientific destiny of Tayrona National Park" (El Tiempo 1974b:8A). This unprecedented outpouring of public concern caused both President Misael Pastrana and his successor Alfonso Lopez Michelsen to go on record as supporting INDERENA's efforts to preserve Tayrona (El Tiempo, 1974a).

The issue still remains in limbo. INDERENA is in complete control of the park today and resisting CORTURISMO's attempts to alter its mandate to manage Tayrona as a national park as defined by Colombian law.

Observations Concerning Possible Management Alternatives

The decision of how best to administer a land area can be approached, in large part, systematically. Economic impact statements and scientific studies (soils, vegetation, hydrology, and topography) form the necessary hard data to assist land managers in making their decision. However, the problem is not always that simple. Justifications, which are often termed emotional, therefore implying a lack of scientific rigor, do have a role in determining land use priorities because they reflect in some measure the feelings and

desires of the populace. National parks for example have for years been defended in many nations because they are part of a particular country's national heritage; even though it is difficult to place a dollar figure on national heritage and such esoteric ideals as the value for future generations. The U. S. National Park Service was founded on this very ideal. In 1872 when Yellowstone was established, few people could even believe that such natural wonders existed let alone understand why any part of the wilderness should be preserved.

The intangible values of Tayrona were elaborated in Ruan and Franky's report (1972) Tayrona National Park for Colombia when the authors stated:

> Tayrona National Park is an earthly paradise. This concept can be felt much better than explained because it is a sensual perception rather than a mental elaboration. It is necessary to know the park and be intimate with it to share in the marvel of this work of creation conceived in a sublime trance of poetic inspiration and harmonious arrangement of spaces and lavishly mixed colors. To alter this harmony with developments which introduce artificial elements would be to destroy the very essence of this earthly paradise...part of our national heritage, for present and future generations (Ruan y Franky, 1972:20).

Statements like this one notwithstanding, there still exists the necessity that Colombia examine various alternative solutions to this complicated problem. The answer should not be simply to have or have not, but to derive the best solution for Colombians. Both agencies involved have mandates from the national government and both are trying to carry them out. It is not as if one proposal is entirely worthless and the other is perfect.

William Hart (1966) proposes one matrix on which it is possible

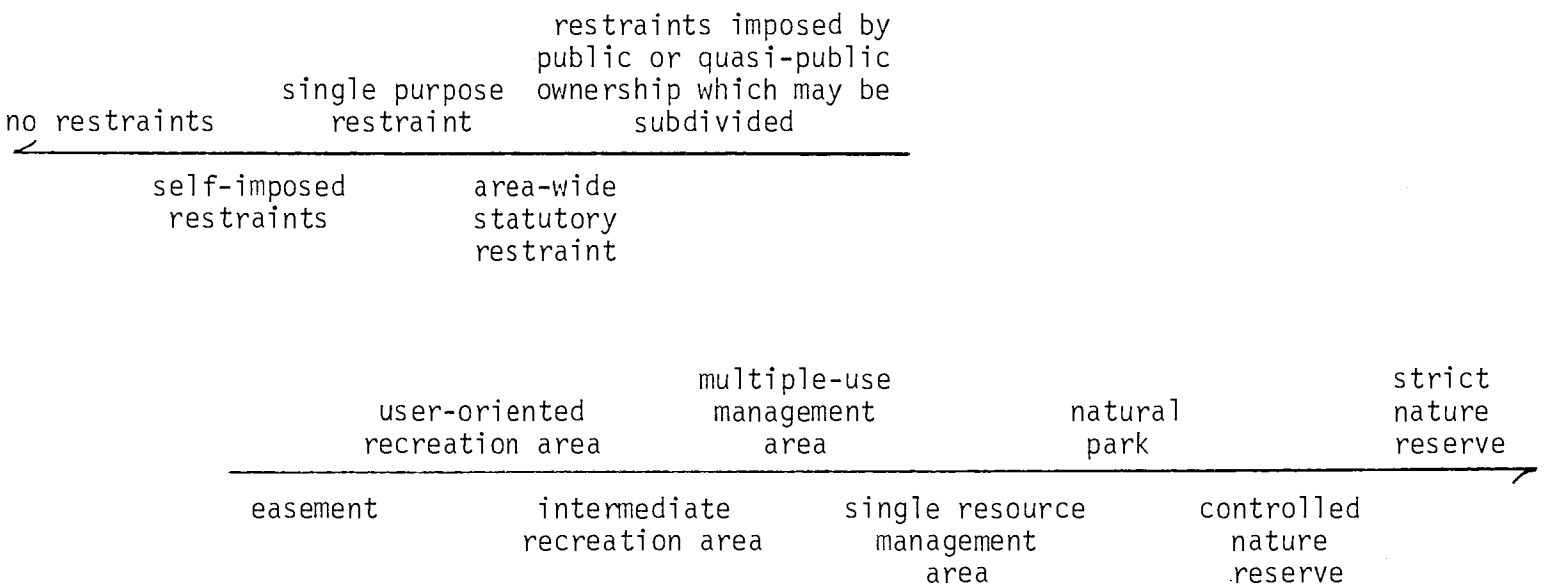
to plot various land uses according to the amount of human manipulation permitted in the natural environment. This matrix is seen in Figure 4. On one end of the spectrum "no restraints" at all can be imposed on the land or the land owner. The owner has unconditional rights to manipulate the land and its resources without concern for the consequences. At the other extreme is located what Hart terms a "strict nature reserve." In this classification the reserve's resources are preserved exclusively for scientific research and any human impact or manipulation is strictly monitored.

INDERENA's plan for Tayrona National Park most closely fits into the "natural park" category. Hart defines these areas as those which are:

> ...designated to provide for maintenance and exhibition of all resources in the area. Human interference is limited to provision of amenities which facilitate viewing, enjoyment, and understanding that part of nature which justifies the reservation. Great care must be taken that the facilities provided do not become so elaborate that they destroy the purpose of the park....Educational and interpretive use plays a significant role in guiding development of these areas (Hart, 1966:36).

Since CORTURISMO has identified the user it most desires as being the international tourists or upper-class Colombians, Hart would likely classify the type of intensive recreational tourist development which they are proposing as a "user-oriented recreation area." As he states, this classification applied to "Land and water areas on which a high degree of human alteration is permitted by society...in specialized outdoor recreation sites...located close to where people live or congregate" (Hart, 1966:35).

Figure 4. The Range of Social Restraints on Human Manipulation of the Natural Environment.*



*Source: William J. Hart. A Systems Approach to Park Planning. International Union for the Conservation of Nature and Natural Resources, Morges, Switzerland, 1966.

Each land-use alternative has certain implications in relation to the classification immediately before or after it. These implications can be computed by the amount of freedom lost by the private citizen as he moves towards the strict nature reserve or by the gains for the general public. Both methods imply a cost-benefit ratio which can sometimes be accurately projected; as in the amount of income which will be realized to the country if the hotels are constructed. Trying to determine the total value of the benefits which will be realized by the public if Tayrona remains a park is much more difficult. With this relative spectrum in mind, various issues surrounding the management options being considered for Tayrona National Park will be examined.

Alternative I, INDERENA's Plan: If the existing Colombian laws are to be complied with, the hotels must be located outside the boundaries of the park. INDERENA has by far the most secure legal standing in this controversy.

As a result of Accord No. 42, which established Colombia's System of National Park Reservations, a zoning scheme was determined for national parks which defined accepted and nonaccepted uses for particular zones. Accordingly the Primitive Wilderness Zone is to "be maintained in a natural state, with minimum alterations, conserving its primitiveness in perpetuity" (Colombia, INDERENA, 1971a:4). It is precisely within this zone that CORTURISMO has planned to locate its major concentration of hotels and supportive services on Neguange and Cinto Bays. The other areas planned by the tourist people are to be

located in areas zoned as Intensive Use by INDERENA, but even in this zone, hotels and other uses which substantially alter the natural environment are specifically prohibited by the statute.

Secondly, the social cost-benefit relationship should be mentioned. As stated above, the national government will be investing heavily in the necessary infrastructure to attract foreign investors and to insure the level of development desired. It has not been made entirely clear if the Colombian government will benefit more from the hotel plan, as the CORTURISMO people claim, or from the park plan. Undoubtedly, the former will offer some economic returns to the country, but as Kenton Miller related to the author, "All experience in the Caribbean in the tourism industry of the sort proposed for Tayrona has showed a short life of somewhat near 20 years after which the capital begins to decline quickly in value" (personal communication, July 16, 1974).

What has not been examined carefully enough is whether the number of jobs provided and tourist dollars exchanged will outweigh, on a long term basis, the values which a national natural park can provide. If after a period, the demand from international tourism declines, Colombia may be trying to maintain tourist interest with outdated facilities long since abandoned by foreign financiers, and most importantly with resources that may have been altered ecologically beyond the point of return. In the end, the government may find itself having to pay the tremendous costs of rehabilitating the natural resources or in writing the park off as a total ecological

disaster.

In Yellowstone and Mt. Rainier National Parks in the United States and in Banff National Park in Canada, heavy prices are now being paid to remove hotel-recreation complexes which were once thought to be compatible with national parks. Although it is not always the best administrative policy for one nation to follow another's example, in this case some lessons may be learned. Every international parks organization and convention, to the author's knowledge, has denounced in rather explicit terms developments which substantially alter the resource base.

Lastly, INDERENA has not mentioned in its defense the growing value of national parks in an economic sense. This may help to justify the benefits which can be gained by preservation, particularly since it has been demonstrated that over a long period of time parks can contribute more, even in a financial sense, than high class tourist complexes. This has been well documented in Kenya's case where the growing popularity of an outdoor experience has required the closing of several hotels to preserve game herds and natural environments (Mathews, 1962).

Also Ernst Swanson (1969) reported on the economic contribution of national parks in the United States. He too recognizes the many factors, both social and scientific, which must be evaluated when deciding upon the best land-use alternative for a national park. But if the resource is preserved and tourist facilities are located outside of the park, the long term contribution to the economy is

greater than the short term gains of a hotel complex located within a park. The National Park System in the United States, claims Swanson:

> ...has helped to generate new sources of important... income, which far exceed the annual appropriations for the system...and there is no reason to think the amount so contributed will not grow. Its growth depends upon two considerations: the rising economic well being of many people, and the extent to which parks and monuments can expand their services without affecting adversely the state of such irreplaceable assets (Swanson, 1969: 9:36).

Alternative II, CORTURISMO's Plan: CORTURISMO has proposed a management plan which will undoubtedly encourage a substantial amount of foreign investment into the Tayrona tourism complex. It has been estimated at near $25 million U. S. (Solomon, 1973:23). This development, according to CORTURISMO, will also insure "a great number of jobs for Colombians and will contribute noticeably to the economic growth and stabilization of Colombia's Caribbean coast" (Colombia, CORTURISMO, 1972:27). What has not been documented is how many jobs, for how long, and to what extent the growth provided by the tourist complex will contribute to the long term economic stability of the north coast. "Too often," says W. J. Hart, "large investments to support construction of major tourist facilities are justified on the basis of someone's judgement...rather than an analysis...to determine optimum returns to the total economy" (Hart, 1966:72).

CORTURISMO has not sufficiently studied these questions. In other words, do the potential costs and benefits merit the required investment in an industry which has been proven to be short lived in

this part of the world and which may result in the destruction of a portion of its national heritage?

Nevertheless, assuming that the National Tourist Corporation is permitted, even under strict regulations, to construct its tourist complex within the existing boundaries of Tayrona National Park, the first probable effect is that its United Nations recognition will be withdrawn. It is prestigeous for Colombia that 6 of its 9 national parks have met the requirements for inclusion in the UN list. However, in order to maintain this position, Colombia's national parks must continue to be areas "where visitors are allowed to enter under special conditions for inspirational, educational, cultural and recreational values...and where residential, commercial or industrial occupation is prohibited" (IUCN, 1974:17).

The construction of tourist facilities within Tayrona will also have many serious implications to its complex and fragile ecology, even though CORTURISMO claims to have sufficiently studied the problem and to have offered insurances that installation will not "deteriorate in any form the ecology...of the Park or the Cinto or Neguange Bays" (El Espectador, 1974:6A).

The road construction within the park will undoubtedly contribute to the volume of fresh water runoff and siltation reaching Tayrona's bays and could very well have disastrous effects on its coral reef ecosystems. Similar cases where reef banks have been damaged by salinity change or siltation have been documented by Hesse, Allee and Schmidt (1951), and Wallis (1961,1971).

In addition to the Colombian-Venezuelan highway which parallels the park to the south, there are 3 roads which penetrate Tayrona. One entrance road branches off from the main highway near the eastern end of the park and provides access to the Canaveral-Arrecifes recreation development and a second road crosses the boundary near its center and continues north towards Gairaca Bay turning off and proceeding eastward before actually reaching the beach. This road, which is not paved, continues to the Neguange Bay, proceeds along its inner bay and over the hills to the east, eventually cutting down to Cinto Bay. The third road access point enters near the western extremity of the park and traverses a rather narrow strip of land to Concha Bay. Each of these will have to be widened and graded under CORTURISMO's plan. Nearly 100 per cent of the runoff from these roads, with the exception of a small portion of the main highway, will flow directly into the Caribbean Sea. Furthermore, in the semi-dry ecosystem of Tayrona, negative environmental effects from the roads will not necessarily be eliminated rapidly once the construction phase is finished. Road cuts take many years to heal in this area. Dalfelt (1973) provides a good reference point to substantiate this view. He commented on an area ecologically comparable to Tayrona located in Venezuela where a road-cut made in 1963 "had made a far lesser impact (than the original road-cut in Tayrona) but which was still an open sore in the nature of the area" (1973:8) (parenthetical information supplied).

The massive clearing which will be necessary for construction

purposes will cause even more direct changes since all of CORTURISMO's developments are planned to be located on or directly adjacent to Tayrona's beaches. The effects of fresh-water runoff and increased siltation which have already been mentioned will also be a management concern in this case. In addition semi-treated sewage must drain into the bays or be pumped out of the park either to Santa Marta's water treatment plant or simply trucked and dumped into another watershed; both of which are unlikely because of the tremendous expense involved. A fourth threat to the reef is the danger from pollution on the Cinto and Neguange Bays where marina facilities are planned. These changes, claims marine biologist and underwater park expert Orthello Wallis, "may occur so rapidly and with such devastating force that coral reefs may take centuries to repair; but in the meantime the joys and pleasures and the scientific benefits of an undisturbed wilderness community are lost for generations" (Wallis, 1961: 2).

Lastly, any construction on Tayrona's beaches will eliminate nesting sites for the 6 species of marine turtles found within the park and will seriously affect the Caribbean fishing industry which depends so heavily on these feeding grounds for reproduction capability. Julio Carrizosa Umana, General Manager of INDERENA, evaluated the importance of this park to the fishing industry when he stated that "It is scientifically proven that the conservation of Tayrona National Park is indispensible if we want to conserve the fishing industry of the Caribbean" (El Espectador, 1974:8B).

Little research has been conducted by CORTURISMO concerning the ecological effects of its plan. Possibly with the publication of its formal environmental impact statement in February of 1975 several of these questions will be more comprehensively answered.

Alternative III, Hotel Industry Outside of Tayrona National Park: The possibility of investing further in an expansion of existing hotel developments and preserving Tayrona as a national park is probably the most logical solution to this delicate problem. There already exists a well developed, first class hotel complex on Rodadero beach, located just south of Santa Marta and about one hour's driving time from the park. If hotel promoters were able to attract the necessary capital into this area it would undoubtedly require less total investment without reducing the level of facilities desired. Much of the support facilities and infrastructure already exists and public acceptance for an alternative similar to this would be wide based.

Sierra Nevada de Santa Marta National Park

Introduction

The Sierra Nevada de Santa Marta National Park is comprised of an area of some 50,000 hectares and includes all lands within this range of mountains with elevations greater than 4,000 meters. In order to fully understand the ecology of the park however, one must examine it as part of the entire mountain system.

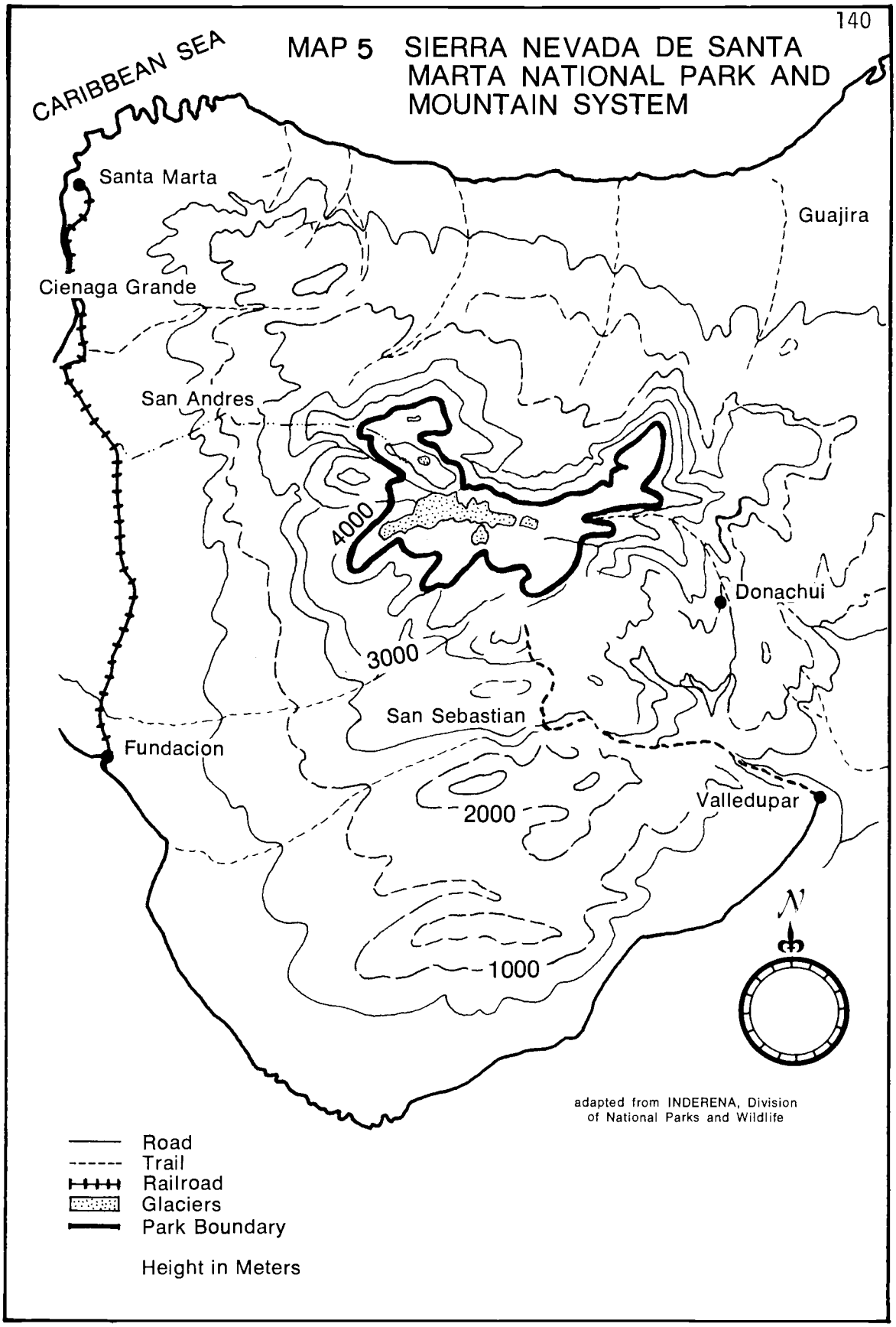
The Sierra Nevada de Santa Marta is a group of glaciated granite mountains located on Colombia's north coast and are geologically

isolated from the Andes (see Map 2). This mountain system, measuring less than 160 kilometers across at any point, is virtually an ecological island (Norton, 1974). As Map 5 illustrates it is bordered on the north by the Caribbean, on the west by the low-lying broad banana growing valleys and the Cienaga Grande, on the south by the Cesar River Valley and on the east by the Guajira peninsula. Rising from sea level to more than 5,800 meters in a distance of 48 kilometers, they are the world's highest coastal mountains with the greatest net change in relief (Todd and Carriker, 1922; Uhlig, 1968; Zadroga, 1970; Norton, 1974).

Most life zones existing in Colombia are represented in its 17,000 square kilometers. These range from the arid, desert-like foothills in the Guajira and Caribbean lowlands to the cloud forests on the northern slopes; from the Cersar Valley's sabana to the paramo, and finally to permanent glaciers and Pico Simon Bolivar, the country's highest point at 5,824 meters. The upper reaches, including Tayrona, Guardian, La Reina and Cristobal Colon Peaks, remain glacially active, and more than 200 alpine lakes are situated within the park limits.

Each life zone, depending on its elevation and slope exposure, has a characteristic flora. Therefore, this area exhibits one of the world's most complex and varied vegetations.[12] Several indigenous

12. The Sierra Nevada de Santa Marta mountain system is normally referred to as having four distinct altitudinal life zones: Tropical - sea level to 1,700 meters, Sub-Tropical - 1,700 to 2,600 meters, Temperate - 2,600 to 3,500 meters, and Paramo or Alpine - 3,500 meters to snowline at approximately 4,900 meters.


MAP 5 SIERRA NEVADA DE SANTA MARTA NATIONAL PARK AND MOUNTAIN SYSTEM
CARIBBEAN SEA
Santa Marta
Guajira
Cienaga Grande
San Andres
4000
Donachui
3000
San Sebastian
Fundacion
2000
Valledupar
1000
N
adapted from INDERENA, Division of National Parks and Wildlife
Road
Trail
Railroad
Glaciers
Park Boundary
Height in Meters

flora species are encountered including two types of Frailejon which reach heights of greater than 5 meters (Espeletia glossophylla; E. subneriifolia) (Colombia, INDERENA, 1973a:9).

Co-existing with this heterogeneous flora is an equally varied fauna, including mammals such as the tapir (Tapirus terrestris), two species of cat (Felis concolor; F. pardalis), at least the same number of fox (Cerdocyon thous; Eira barbara) and a species of otter (Lutra spp.). Cebus and Howler monkies (Alouatta seniculus) also are common in the coastal areas of the Sierra (Grimwood, 1968; Colombia, INDERENA, 1973a). Within the park boundaries however, few mammals are encountered; but wild horses are found in its lower limits and Brocket deer (Mazama americana) inhabit the paramo regions. No primates are known to be living within the park. One reptile, an endemic Tree frog (Atelopus carrikeri) has been identified. To date, INDERENA has not conducted an inventory of the park's fish population.

The most extensive animal studies which have been conducted within the Sierra Nevada system have been concerned with its birdlife (Todd and Carriker, 1922; Schauensee, 1964; Lehmann, 1966a). INDERENA has identified more than 300 species, both local and migratory, which inhabit the Sierra Nevada de Santa Marta. This figure becomes increasingly important when one considers that Colombia has already lost some 500 bird forms as a direct result of habitat destruction and the international pet trade (Lehmann, 1966a; 1966b).

Todd and Carriker (1922) have noted no less than 14 indigenous species or subspecies which are found in either the subtropical cloud

forest from 1,700 to 2,600 meters, or in the temperate zone which ranges from 2,600 to 3,500 meters in elevation. They are: White-tailed star frontlet hummingbird (Coeligena phalerata), Golden-olive woodpecker (Piculus rubiginosus alleni), Streak-back spinetail (Asthenes wyatti sanctaemartae), Red-rumped ground tyrant (Myiotheretes erythropygius orinomus), Rufus-breasted chat-tyrant (Ochthoeca rufipectoralis poliogastra), Cinnamon flycatcher (Pyrrhomyias cinnamomea assimilis), White-throated tyrannulet (Mecocerculus leucophrys montensis), White-capped dipper (Cinclus leucocephalus rivularis), Great thrush (Turdus fuscater cacozelus), Slate-throated redstart (Myioborus miniatus sanctaemartae), White-lored warbler (Basileuterus conspicillatus), Coal-black flower piercer (Diglossa carbonaria nocticolor), Plumbeous finch (Phrygilus unicolor nivarius), Yellow-crowned redstart (Myioborus flavivertex) (Todd and Carriker, 1922; Norton, 1974).

Although there are many interesting birds in the Sierra Nevada, the species which has undoubtedly received the most attention, from both laymen and scientists, is the endangered Andean condor (Vultur gryphus). In 1954 this bird became the first fully protected animal species in Colombia and since that time the government, universities, and interested people have worked to coordinate research efforts concerning the bird's fate and preservation (Colombia, Ministerio de Agricultura, 1954).

Norton reported that his observations in January of 1974 "suggest ...there are at least two distinct small colonies in the range" with

"a minimum of 9 condors, including 2 first year juveniles" (Norton, 1974:6,8). The author's own observations in January of 1972 would concur with Norton's findings although greater numbers were observed; a total of 13 or 14 individuals, also divided between an upper and lower colony. It is gratifying to note however that the amount of encroachment by man into the Sierras does not seem to have been of the type or concentration to force Colombia's national symbol from one of its few remaining refuges.

Early Exploration of the Sierra Nevada de Santa Marta

The uniqueness of the Sierra Nevada does not end with its physical and biological characteristics. Historically it is intriguing, and one of the most socially controversial areas in the country due to the continuing impact of Spanish and Mestizo cultures on the few remaining Indian groups.

A review of major Colombian historical sources supports the theory that the high elevations of the Sierra Nevada were unknown to Europeans as late as 1843. In that year the Governor of the Department of Magdalena offered "...a magnificent prize to anyone having the capacity to traverse the Sierra Nevada de Santa Marta" (Guhl, 1955:98). Eight years later, in 1851, Colonel Joaquin Acosta, a natural scientist, became the first white man to visit the glaciers of Colombia's highest mountains. Shortly afterwards Hermann Karsten, a German botanist-geologist conducted an algae study in the high paramo (Zeitschrift fur Erdkundke, 1880).

The uppermost reaches of the Sierra were first mapped by the famous Colombian geographer Colonel Agustin Codazzi and his French counterpart Elisee Reclus during the years of 1855 and 1856. However these important works were not published until five years after Codazzi's death in 1859 (Leon y Perez, 1864). In 1882 the Colombian government organized an official expedition under the direction of an adventurer, Jose Carlos Mano, to study mineral deposits and determine the economic feasibility of mining in the area. But their objectives were never fulfilled, nor were their results conclusive enough to warrant further interest by the government. At the turn of the century what can be classified as the early exploration period was culminated with an extensive and systematic research effort coordinated by the American Geographical Society and involving many Colombian agencies (Guhl, 1955). Since this time several expeditions with scientific, ethnological or recreational objectives have traveled into this area[13] (Carriker in Todd and Carriker, 1922; Reichel Dolmatoff, 1949, 1951, 1954-1955; Raasveldt, 1957; Cunningham, 1966; Uhlig y Mertins, 1968; Skinner, 1972; Norton, 1974).[14]

13. The author was a member of a mountaineering and general scientific expedition into the Sierra Nevada de Santa Marta during January of 1972. The expedition was coordinated by Kirk Breed and Herbert Curl.

14. Uhlig and Mertins, 1968, have published a very extensive bibliography dealing with the Sierra Nevada de Santa Marta. They include more than 40 sources both historical and current dealing with sociological and scientific issues.

Indigenous Populations and Colonists of the Sierra Nevada de Santa Marta

The Tayrona civilization was the first known human settlement of the Sierra Nevada. Originally their lands were confined to the Caribbean lowlands and the upper portions of what is now Tayrona National Park. Their numbers are estimated to have been between 3,500 and 5,000 and, until the arrival of the Spanish conquerors, they possessed an advanced system of agriculture which included extensive irrigation developments (Reichel Dolmatoff, 1965; Morales, 1972). After nearly 100 years of resistance to European pressure, the remaining Tayronas retreated into the higher reaches of the Sierra. They left behind a civilization which is often compared to the Incas, Aztecs and Chibchas in terms of technological sophistication.

The descendants of this vast civilization still live today in they Sierra Nevada de Santa Marta and are divided between two major tribes, the Arhuacos or Igka and the Kogi. The combined populations of all the tribes inhabiting the Sierra was estimated to be about 6,000 individuals in 1961 (Reichel Dolmatoff, 1961). The Arhuacos presently inhabit the lands which are outside of, but adjacent to, the park. The Kogi have continued to retreat further into the Sierra to avoid any contact with outside cultures and a portion of the land which they claim is located within the park boundaries.

The constant encroachment of white civilization has caused these people to abandon living sites several times and alter some of their tribal tradition. "Atanquez" states Skinner (see Map 5) "once

inhabited solely by Indians, is now entirely non-Indian, is (sic) a mestizo peasant community" (Skinner, 1972:4). Some of the Arhuacos have adopted western dress and have come to rely more on supplies from Valledupar. This is because farming in the elevations at which they are now living produces much less than in previous times when the tribe resided in the lower, hotter lands. Delgado (1968) and others (Reichel Dolmatoff, 1961; Skinner, 1972) have described this type of relationship as cultural co-existence where the dominant mestizo population continues to erode the Indians' political and religious base while simultaneously encroaching on his lands. This continuous process apparent in the Sierra Nevada today, is occurring in much of Latin America and, as anthropologists observe, "within the next two to three decades, the Latin American continent will be devoid of nearly all indigenous tribes as we know them today (Skinner, 1972:1).

The most notable exception to this trend in northern Colombia has been the Kogi, the most impervious to change and by far the most physically and culturally isolated tribe. Inhabiting paramo lands in the Sierra Nevada, they have even resisted increased contact with other Indians. This tribe, therefore, possesses more of the ancient traditions and as an Arhuaco Indian himself indicated, the only remaining mamas "are the Kogi who have fled from civilization....The Arhuaco who has been the victim of rape and looting...if forgetting his origins" (Skinner, 1972:3).

Settlers cleared land and started coffee farms on the northern slopes of the Sierra around 1900 (Uhlig y Mertins, 1968), and by 1930

some 500 colonos had claimed land in the area (Guhl, 1955). With the outbreak of the era of the Violencia in 1948, the Sierra Nevada became a focal point for migration as thousands of Colombians searched for a tranquil life. The Colombian government even publicized the area as a land of opportunity and by 1968 the CVM reported that more than 50,000 people inhabited the Sierra Nevada de Santa Marta (Colombia, CVM, 1968). The vast majority of these colonists were marginal farmers who cultivated coffee and raised small herds of cattle or sheep. Problems arose when the government abandoned agricultural credits to these people but many of the colonos remain. Continued population pressure in an area which produces minimal profits has created educational, health and other social problems for the settlers of the Sierra.

Historical Outline and Present Status

Decree No. 178 of 1933 reserved a portion of the Sierra Nevada de Santa Marta mountain system as a forest reserve consisting of "the majority of its western slopes up to the main northeast-southwest watershed divide" (Colombia, 1933). The park was established in order to insure a sufficient water supply for the banana zone which lay at the base of the mountain. All intensive agriculture and grazing were prohibited unless prior studies guaranteed that field run-off would not be altered in either quantity or quality.

In 1959 when law 2 was passed, the remainder of the Sierra Nevada system, excluding the municipality of Valledupar, was also

declared a forest reserve and its permanent snow covered areas a national park (Colombia, 1959). This law prohibited granting additional land titles to aspiring colonists, or technical and financial assistance to those farmers already residing within the reserve. Hunting, fishing and timber cutting were also theoretically prohibited. A violent public reaction ensued because only a few years before the government was encouraging settlement in the area. The campesinos now felt betrayed and unable to support their families. Several thousand demonstrators convened in Santa Marta and as a result the official policy was never enforced by local authorities. In effect, up to this time the Sierra Nevada de Santa Marta was neither a forest reserve nor a national park.

The CVM (Autonomous Regional Development Corporation of the Magdalena and Sinu Valleys) was created in 1960, and in 1963 with the passage of Decree No. 3304, was granted specific national park management responsibilities. It became increasingly apparent that some management decision would have to be made at least concerning the snow covered peaks of the Sierra Nevada for watershed protection. During the following year, the CVM requested that INCORA grant national park status to Tayronas, as the Sierra Nevada was originally named. With the passage of INCORA Resolution No. 191 and Executive Resolution No. 225 in 1964, the 114,000 hectare area was formally established as a national park (Colombia, INCORA, 1964).

Very little was done by the CVM to manage the area because of social unrest and access difficulties. Also the CVM was more

interested in developing the two coastal parks, Isla de Salamanca and Santa Marta (presently named Tayrona) for tourist use.

When INDERENA assumed the management of the park in 1968 they avoided the potential problem with colonos and indigenous tribes by altering its boundaries to exclude all but a few scattered Kogi holdings. The park's name was changed to Sierra Nevada de Santa Marta and its size reduced to 50,000 hectares, including only those lands above 4,000 meters in elevation.

In September of 1971, shortly after the park's new boundaries were defined, the Arhuacos were granted title to 185,000 hectares formerly located within the national forest reserve. This Indian reservation, all of which is outside the park, is being managed by a cooperative agreement between the government and the Arhuaco tribe (Colombia, INDERENA, 1971d).

There are no visitor facilities or inspector stations located in the park. INDERENA does not yet have the financial means to permit patrolling the area. In order to travel to the high peaks, an excursion of at least three days on foot or horseback from Atanquez is required. INDERENA's Division of National Parks and Wildlife has requested a budget for the Sierra Nevada for the first time in 1976 and is presently evaluating alternative zoning and development themes.

Purace National Park

Introduction

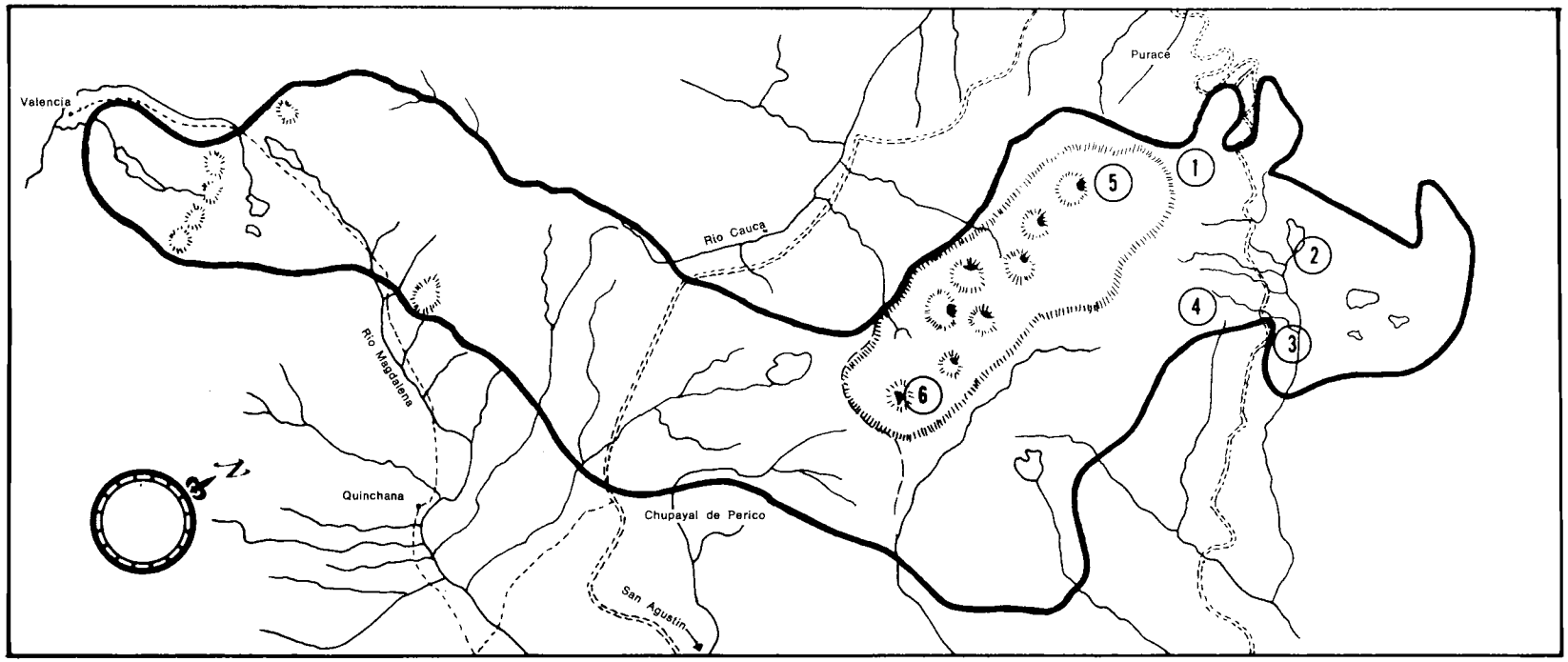
Purace National Park is located approximately 45 kilometers southeast of the city of Popayan and portions of its 80,000 hectares are situated in the Departments of Cauca and Huila (see Map 2). This park is one of Colombia's most complex, from a natural history standpoint.

The park's geologic values are its most obvious. Seven volcanic craters are located within Purace's limits including the famous volcan of the same name, and the permanently snow covered Pan de Azucar which is 5,000 meters in elevation. Numerous lagoons and falls dot the area and the origins of several of Colombia's most important rivers are found in its higher elevations, including the Magdalena, Cauca, Caqueta and Bedon.

Volcan de Purace, with an altitude of 4,700 meters has a crater of more than 500 meters in diameter and is the most active volcano within the park. This volcano has erupted as recently as 1954 (Hunsaker, 1972:445). In 1949, sixteen university students from Popayan who were studying escaping gases were killed by a violent eruption (Emilo Ramirez, 1968:230). All of the craters with the exception of Purace, whose rate of gas escape is once again increasing, are geologically dormant but not yet considered to be extinct.

The Termales de San Juan is a marvelous example of a hydrologically altered hot spring basin which includes more than 100 hot pools

MAP 6 PURACE NATIONAL PARK



1. Pilimbala recreation area
2. Laguna de San Rafael
3. Cascada de Bedon
4. Termales de San Juan
5. Volcan de Purace
6. Pan de Azucar

adapted from INDERENA, Division of National Parks and Wildlife

with water temperatures varying from 8° to 36°C (Cross, 1974). Mineral deposits have resulted in the waters being colored in various tones of green, yellow and blue. This area also possesses one of the most fascinating micro-climates for mosses anywhere in the country.

As might well be imagined, the park is an aquatic paradise and provides much habitat for plants and animals. Over 200 species of birds have been identified including: the endangered Andean condor (Vultur gryphus) of which the former director estimates only 4 pairs to be nesting within the park, the Cock of the rock (Rupicola peruviana), Quetzals (Pharomachrus mocinno, P. auriceps), the Black and chestnut eagle (Oroaetus isidori) and the Torrent duck (Merganetta armata colombiana) (Franky, 1971; Hunsaker, 1972; Colombia, INDERENA, 1973a). The park also provides habitat for 60 species of mammals including two endangered species which are listed in the IUCN Red Data Book: the Spectacled bear (Tremarctos ornatus) and the endangered Mountain tapir (Tapirus pinchaque). Animal distribution studies indicate that these two species may not be found in similar concentrations anywhere else in the western hemisphere. Also found with some frequency is the world's smallest deer, the Pudu (Pudu mephistophites wetmorei), the River otter (Lutra longicaudis) and the Puma (Felis concolor) (Franky, 1971b; Hunsaker, 1972).

The majority of the park's vegetation can be classified according to the Holdridge system into two primary types; Humid sub-Tropical and Very Humid sub-Mountainous (Espinal and Montenegro, 1963). The dominant species in the paramo areas is the Frailejon (Espeletia

hartwegiana), but the lower cloud forest also has several varieties of bromeliads and Sphagnum mosses.

Within the park one also encounters several sectors which have historic value. These areas possess pre-Columbian ruins, particularly one of the San Agustinian civilization and although they have not yet been systematically studied by archeologists, INDERENA has plans to initiate field research shortly.

Historical Outline and Present Status

In April of 1961, Purace became Colombia's second national park when the Governor of the Department of Cauca issued Decree No. 199. In establishing the park, Carlos Obando Velasco marked the first time in Colombian history that a public official, other than the President, had utilized the powers granted under Law 2 of 1959. This law formed the legal basis for national park creation. The Purace Decree prohibited all commercial timber exploitation and immediately suspended existing industrial contracts. Hunting was totally outlawed and sport fishing was permitted only in sites designated by the Minister of Agriculture (Colombia, Gobernador de Cauca, 1961).

Seven years later in July, 1968, the Decree which originally established the park was replaced with INCORA Resolution No. 92. In this new Resolution, INCORA cited more specific reasons for preserving the area as a park, namely its endangered wildlife and historic relics. The park boundaries were also enlarged to their present size.

The fourth Article of this Resolution however was unique and

still inhibits INDERENA from exercising control over the total park area. It sanctioned the sovereignty of an Indian reservation within the park limits and therefore placed it in direct conflict with the earlier mandate of managing the entire area as a national park (Colombia, INCORA, 1968b:6). Presently it is estimated that 90 Indian families, descendants of the Paeces civilization, live on the 2,400 hectare reservation. The remainder of the tribe live on lands adjacent and south of the park. Details of this controversy will be examined in the following chapter when INDERENA's management problems are discussed.

During the last six years the administration of Purace National Park has been the responsibility of INDERENA. In 1970 a director was assigned to Purace and since that time a considerable amount of development has occurred.

As Table XVI indicates, nearly all of Purace with the exception of the 2,400 hectare Indian reservation and a small Natural Recuperation zone is Primitive Wilderness. An extremely small area of less than 5 hectares has been purchased from the Indians at Pilimbala which is zoned Intensive Use.

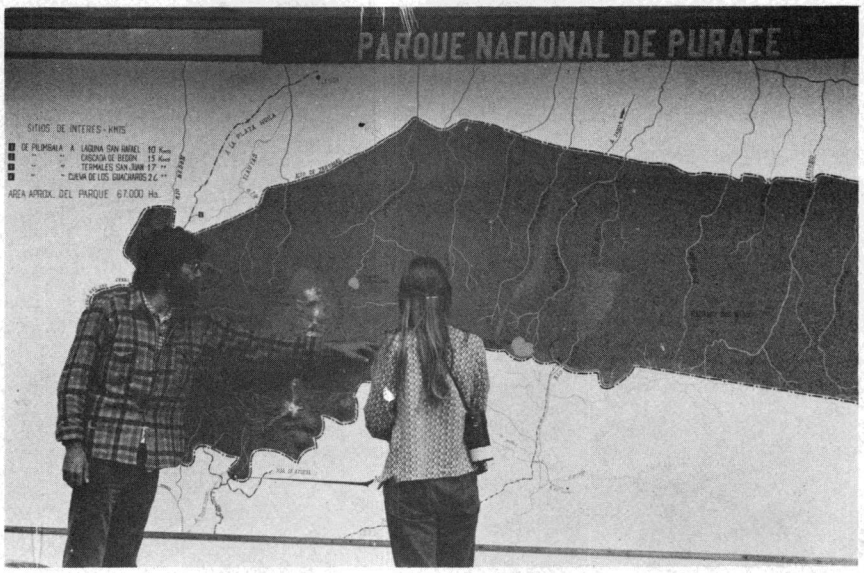
At Pilimbala, the natural sulfur springs have been diverted and now flow into six pools which are used by the public for bathing. Because this is the main visitor center, a large park model, illustrated in Photo 5, is provided. Also located at this site and pictured in Photo 6 are three vacation cabins which can be rented, five picnic shelters, a restaurant and parking lot. Presently, a concessionnaire

TABLE XVI. ZONING SCHEME FOR PURACE NATIONAL PARK.*

Classification	Hectares	% of Park
Primitive Wilderness	75,195 has.	94%
Indian Reservation	2,400	3
Natural Recuperation	2,400	3
Intensive Use	5	-

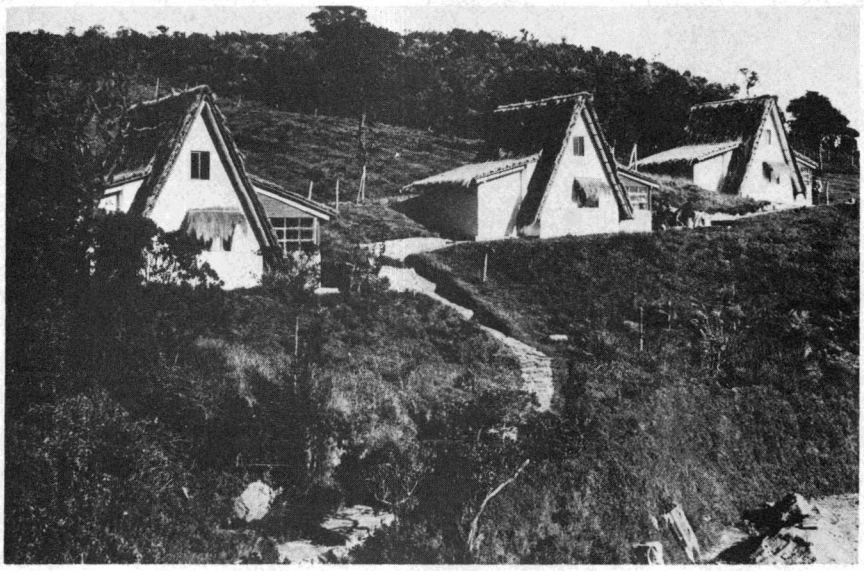
*This table compiled with the assistance of Heliodoro Sanchez Paez, forest engineer, INDERENA, 1974.

Photo 5. Relief map of Purace National Park, Pilimbala visitors center.



Photographed by: D. L. Golobitsh

Photo 6. Visitor cabins in Purace National Park, Pilimbala visitors center.



Photographed by: D. L. Golobitsh

operates these facilities for INDERENA.

The Termales de San Juan are located east of Pilimbala, in the Natural Recuperation area, and can be reached on a nature trail by horseback or foot travel from the main road. With the technical assistance of Peace Corps, INDERENA has developed this hot spring basin into a major interpretive attraction, because of its geological, botanical, zoological and historic importance. Interpretive signs, and a self guiding nature trail pamphlet have recently been put into use in order to begin an environmental education program (Cross, 1974: 2).

Visitation has been on the increase since records were first kept in 1971 when 15,000 visits were noted at Pilimbala. During the following year, 20,000 visits were documented and in 1973 visitation jumped by 7,000 to 27,000 (INDERENA, Division of National Parks and Wildlife archives, Bogota). There are seven inspectors, eight field workers and five watchmen, in addition to the park director, assigned to the project. The administrative offices for Purace are located in the city of Popayan.

Cueva de los Guacharos National Park

Introduction

Cueva de los Guacharos is a small 700 hectare park which is situated in one of the high valleys of the Rio Suaza, a main tributary of the Rio Magdalena, in the extreme southeastern corner of the Department of Huila (see Map 2). The park has elevations ranging from 1,800 to

3,000 meters above sea level, temperatures between 18° to 21°C, and receives 2,000 mm of average annual rainfall (Allas de Colombia, 1967).

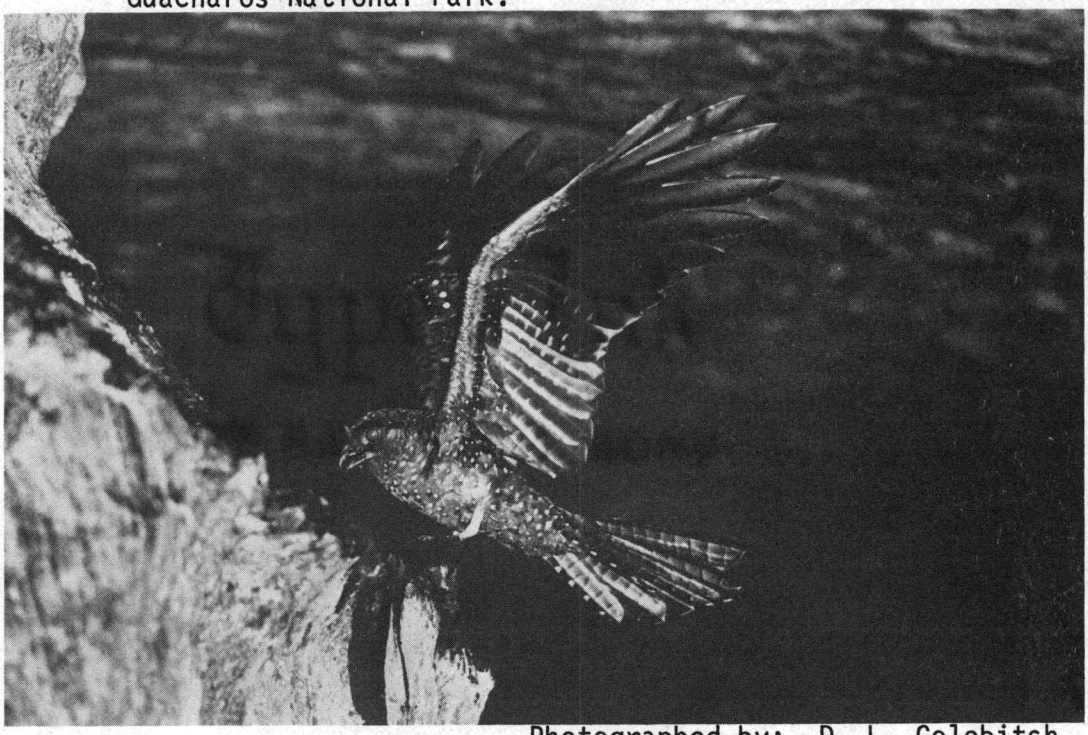
The main cave is the result of a flushing process of the Rio Suaza during high water months. This ecologically important cave is situated at 1,850 meters above sea level and has a constant temperature of 18°C. It is approximately 50 meters high, 75 meters wide and has an entrance tunnel of 150 meters in length (Kyshakevych, 1973:9).

Although colonos have claimed areas close to its northern boundary, Cueva de los Guacharos is one of two parks in Colombia's system without inholding problems. Espinal and Montenegro (1963) classify the park's vegetation to be primarily composed of pristine examples of the Very Humid sub-Tropical and Humid sub-Tropical forests. Several of the more common species are the pine (Podocarpus sp.), cedar (Cedrela sp.), walnut (Juglans sp.) and various palms and orchids (Colombia, INDERENA, 1973a).

The protection of the Guacharo oil bird (Steatornis caripensis), illustrated in Photo 7, was the main reason for the park's establishment. It is estimated by Kyshakevych that "95 per cent of the Guacharos encountered in the park inhabit its main tunnel" (1973:9). Also found in Cueva de los Guacharos is Colombia's largest Tinamou (Tinamus osgoodi hershkovitzi).

The primates, the Howler monkey (Alouatta seniculus), Wooly monkey (Lagothrix lagothricha lugens) and Brown capuchin monkey (Cebus apella) are also reported to be quite common. The caves also provide habitat for three species of bat. They are the Yellow shouldered bat

Photo 7. Guacharo oil bird (Steatornis carpensis), Cueva de los Guacharos National Park.



Photographed by: D. L. Golobitsh

(Sturnira erythromus), the White-lined bat (Vompyrops vittatus), and the Short-tailed leaf-nosed bat (Carollia perspicillata) (Hunsaker, 1972; Kyshakevych, 1973; Carlos Lehmann's personal notes, Museum of Natural History, Cali, Colombia, August 1, 1974).

Historical Outline and Present Status

As a direct result of Presidential Decree No. 2631 issued in November of 1960, Cueva de los Guacharos was established as Colombia's first national park. Alberto Lleras became the first person in Colombia's history to use the special powers granted in Article 13 of Law 2, 1959, which made it possible for government officials to reserve natural treasures as parks. In its review of the President's proposal, the Colombian Academy of Exact, Physical and Natural Sciences cited two important supporting reasons: First, that the illegal hunting of the Guacharos for the valuable oil they possess was having a noticeable effect on the birds' population. Secondly, they noted that Venezuela had taken steps to protect the oil bird, since it was discovered and classified in 1799 by Alexander Von Humboldt in the Venezuelan State of Caripe (Snow, 1961; Kyshakevych, 1973; Harroy, 1971).

The Natural Resource Division of the Ministry of Agriculture was charged with the administration and protection of the area. Together with INCORA they purchased the private property and eliminated all of the colonos situated within the park boundaries (Colombia, INDERENA, 1972f).

Since 1968, INDERENA has been responsible for the park's management. A general park map is found below. Visitor access is still somewhat limited and requires a several hour trip on foot or horseback from Palestina. For this reason, and because it has not been widely publicized due to its ecological fragility and lack of substantial management staff, only 429 visits were recorded at the inspector station during 1971. Although adequate visitation records were not available for subsequent years, the regional supervisor in Bogota estimates that the number of visitors has increased modestly during the last two years.

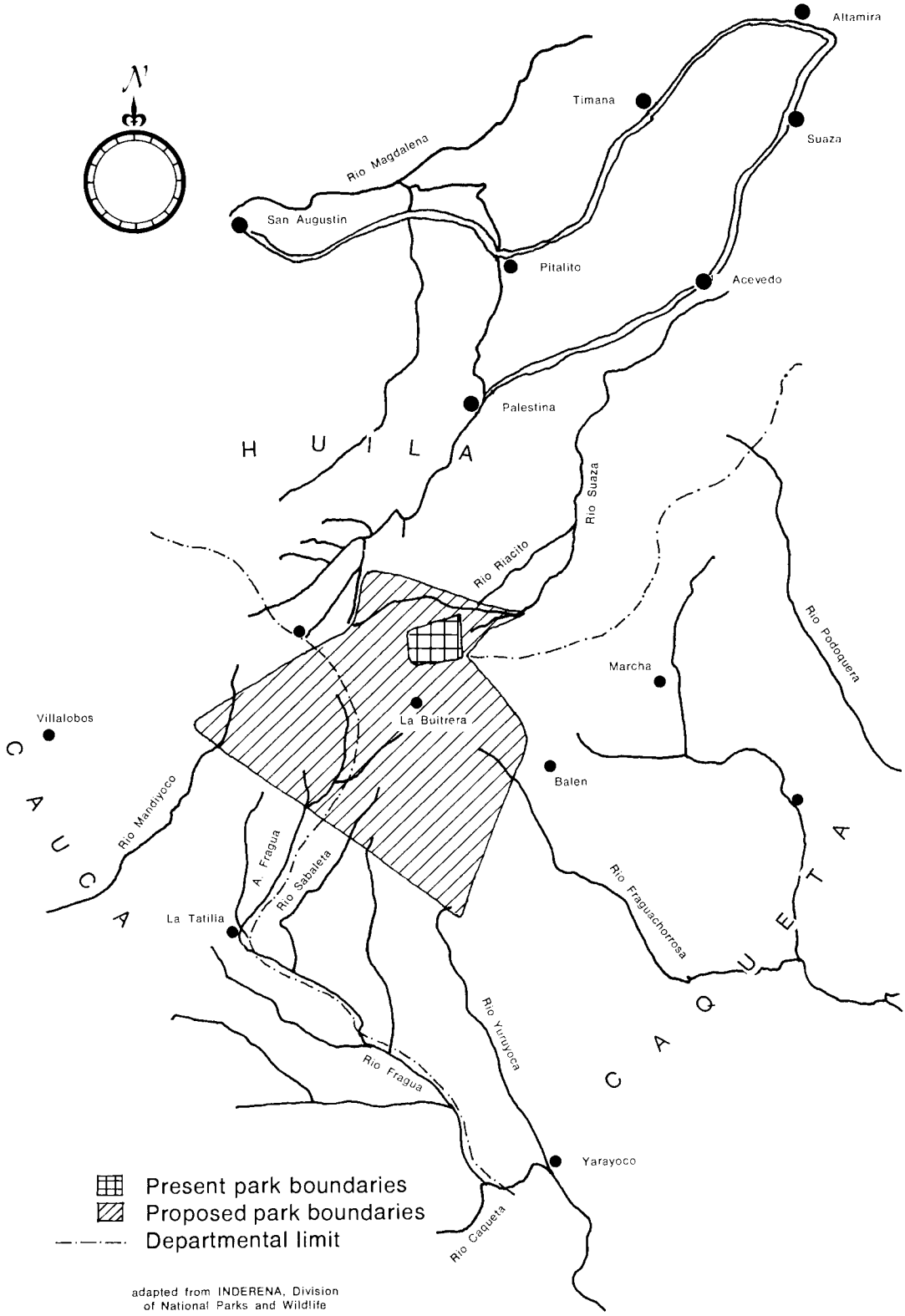
An initial management plan has been formulated and in 1973 a boardwalk was constructed to the main cave. INDERENA plans for the park to include a visitor center-museum and a herbarium. Presently four personnel are stationed in Cueva de los Guacharos and include a park director, two inspectors, and one laborer. In the immediate future INDERENA hopes to expand Los Guacharos from its present size to approximately 15,000 hectares. Included in this area which is presently privately owned is an additional cave which contains an estimated 750 Guacharos (Dankel y Parsegan, 1973:3).

La Macarena National Park

Introduction

Located in the Department of Meta, the Sierra de la Macarena is an isolated mountain lying east of the Cordillera Oriental. This massif has an extension of 125 kilometers from north to south and

MAP 7 CUEVA de los GUACHAROS NATIONAL PARK

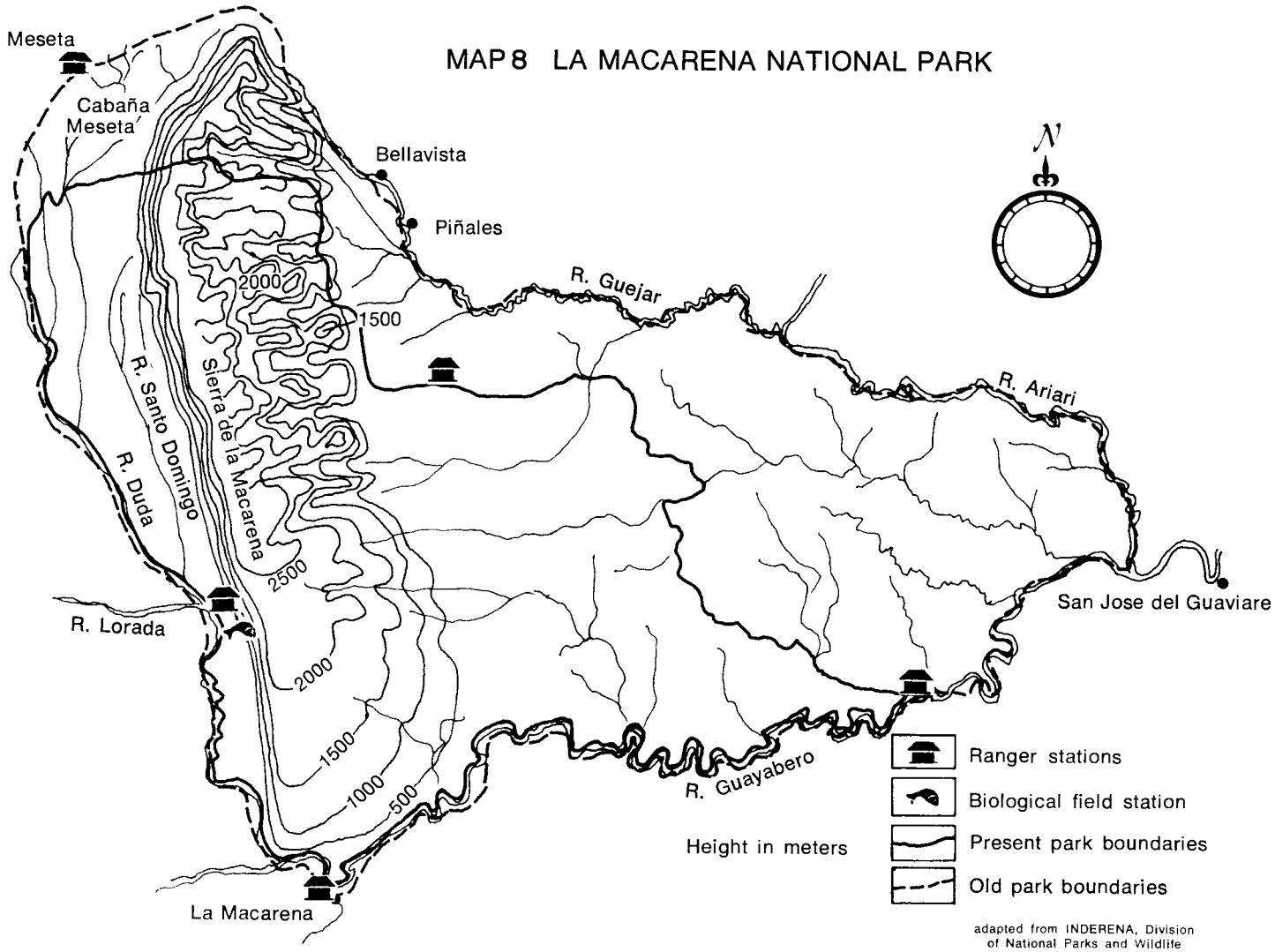


adapted from INDERENA, Division of National Parks and Wildlife

varies between 20 to 30 kilometers from east to west. According to the National Geographic Institute, the base of the Sierra is situated at an elevation of approximately 300 meters while the average altitude of the summit plateau is between 2,300 and 3,000 meters above sea level (Atlas de Colombia, 1967). Nearly all of the river drainage is to the east where the slope is much less abrupt than on its western edge. The remainder of the park which is diagramed in Map 8, is composed of lowlands to the east of the Sierra bordered by the Rio Cafra and Cano Cabra on the east side, the Canon del Taire on the north and the Rio Guayabero on the south.

The area's geographical location makes it a biological transition zone which possesses representative habitat for both flora and fauna species from the Andes, the plains of the Orinoco and the Amazon basin. As Dr. E. P. Killip, a tropical biologist stated, "The Sierra de la Macarena is probably the most interesting, attractive and valuable reserve that exists for biological studies. I feel that there is no other locality more important in the world" (Molano Campuzano, 1971:18). The decision to preserve the area therefore was not simply one for the benefit of Colombians, but one with obvious international implications.

INDERENA estimates that 90 per cent of the area included within the park is uniformly covered with forests consisting of three main formations: Very Humid Tropical Forest, Humid Tropical Forest, and sub-Tropical Rain Forest. Only the highest summits of the Sierra which are primarily rock outcroppings, and the flood plain of the Rio



adapted from INDERENA, Division of National Parks and Wildlife

Guayabero in the park's southern extreme which is true Savannah, are not forest covered (Philipson, 1952, 1961; Colombia, INDERENA, 1973a).

Despite the relatively limited number of scientific investigations which have been undertaken into the area, over 450 species of birds including 20 endemic forms have already been identified (Olivares, 1962; Hunsaker, 1972). Included among these are at least three species of Ramphastos; the Yellow-ridged toucan (R. culminatus), Black-mandibled toucan (R. ambiguus), and Cuvier's toucan (R. cuvieri). The Cock-of-the-rock (Rupicola rupicola), the endangered Harpy eagle (Harpia harpyia), the Amazonian umbrella bird (Cephalopterus ornatus) and the Paradise tanager (Tangara chilensis) are also found (Olivares, 1962; Grimwood, 1967; Schauensee, 1970).

The wildlife section of INDERENA reports Jaguar (Felis onca), White-lipped peccary (Tayassu pecari), and Tapir (Tapirus terrestris) to be common. The endangered Spectacled bear (Tremarctos ornatus) and Giant armadillo (Priodontes maximus) are also found in La Macarena National Park. Common reptiles include the Iguana (Iguana iguana), Anaconda (Eunectes murinus) and five species of turtles (personal interview, Dr. Federico Medem, November 10, 1974).[15] The area also has an extremely rich primate fauna of which four species are predominent: Spider monkey (Ateles belzebuth), Brown capuchin monkey (Cebus

15. Dr. Medem, who is considered to be the world's expert on South American Caiman and a very knowledgeable source on all reptiles, was one of Colombia's first scientists to study La Macarena in detail. He identified the five species of turtles living within La Macarena to be: (Geochelone denticulata), (Kinosternon scorpioides), (Phrynops gibbus), (Podocnemis unifilis), (P. vogli).

apella), Howler monkey (Alouatta seniculus) and Squirrel monkey (Saimiri sciureus).

The rivers which form the boundaries of the park and the islands which they contain are of tremendous ecological importance if it is to remain an ecologically self regulating area as INDERENA desires. Riverine fauna include the protected Capybara (Hydrochaeris hydrochaeris), Orinoco crocodile (Crocodylus intermedius), the nearly extinct Giant river otter (Pteronura brasiliensis) and Fresh water dolphin (Inia geoffrensis). The park's islands are also used as a nesting sites for Terecay turtles (Podocnemis unifilis) and as Grimwood states, "they (islands) form apparently the only nesting places of such birds as the Black skimmer (Rhynchops niger), the Large-billed tern (Phaetusa simplex), the Yellow-billed tern (Sterna superciliaris)...for whom the interior of the reserve offers no alternative sites" (Grimwood, 1968:7) (parenthetical information supplied).

Historical Outline and Present Status

The legislative history of the Sierra de la Macarena and its surrounding region has been lengthy and complex. Table XVII summarizes the major events in the history of the reserve.

The earliest legislation concerning the Macarena was Law 52 of 1948 which declared it a national reserve. Also created in name by the same act was a biological field station named Jose Jeronimo Triana which was to be used by both national or foreign scientists to increase the body of knowledge concerned with the region (Colombia,

TABLE XVII. LEGISLATIVE HISTORY OF LA MACARENA NATIONAL PARK.

Year	Legislation	Purpose	Agency
1948	Law No. 52	Establish La Macarena as national reserve	Colombian Congress
1949	Decree No. 438	Limits to be defined in separate Decree with assistance of Geographical Institute	Presidential Decree
1959	Law No. 163	Establish La Macarena as national monument	Colombian Congress
1963	Law No. 57	Field Station responsibilities given to Universidad Nacional	Colombian Congress
1965	Decree No. 2963	Defined original limits of reserve	Presidential Decree and Colombian Congress
1965	Contract No. 184	Inspectors training program and vigilance of reserve initiated	INCORA and CVM
1967	Contract No. 065	Research station staffed	INCORA and Universidad Nacional
1971	Accord No. 26	Establish La Macarena as national park and redefine boundaries	INDERENA and Colombian Congress

1948: Article 1). The real driving force behind this initial legislation was the Institute of Natural Sciences of the Universidad Nacional, which had been conducting various research efforts in the area since 1941 (Pinto, 1971). Although this law did not define the reserve's boundaries, Decree No. 438 of the following year declared that the limits would be established with the assistance of the National Geographic Institute after the necessary preliminary studies were completed.

Ten years later, as a result of Law 163 of 1959, the Macarena, which was yet not defined in more exact terms, was reserved as a national monument. However as Professor Polidoro Pinto of the Universidad Nacional stated, these separate acts, Law 52 of 1948, and Law 163 of 1959, did not contradict each other but "legally reinforced the protection of the reserve" (Pinto, 1971:1). In 1963, the Universidad Nacional was given full responsibility for the field station and for coordinating research efforts in the reserve.

Two years later, in 1965, the forthcoming legislation, defining the reserve's boundaries, was elaborated by the President of the Republic and approved by the Congress. Decree No. 2963 defined the limits of the area to include the entire Sierra and much of the surrounding territory. In all some 1,131,350 hectares of land were nominally reserved. Grimwood writes that the:

> ...boundaries are understood to have been decided upon the recommendations of a team of investigators composed of a representative of the Ministerio de Agricultura and two representatives of the Instituto de Ciencias Naturales, which issued its report in November of 1964...(Grimwood, 1968:3).

Unfortunately, neither Grimwood nor this author was able to locate the committee's report.

As a result of Contract No. 184, in 1965 between INCORA and the CVM, an inspector training program was initiated and guarding of the Macarena was begun on a semi-regular basis. The CVM was invited to participate, even though the Macarena was outside of its jurisdiction, because of its prior experience in natural resources management primarily on Colombia's north coast.

In order to insure that the Jose Jeronimo Triana biological field station would become a working reality, INCORA and the Universidad National entered into an agreement, Contract No. 065, 1967, whereby the latter was to appoint a full-time professor and director, and a staff of graduate field assistants to begin initial flora and fauna inventories of the reserve. The director also had the responsibility of assisting visiting scientists with the logistics of their research.

Seven inspector stations were established and staffed by late 1967 and INCORA began to study the problems associated with colonos and alternative relocation sites outside of the reserve's limits. Until the late 1950's the only human inhabitants of the Macarena region were the indigenous Tinigua and Pamigua tribes. The Jesuits had founded missions in the llanos during the early 1700's and discovered the Sierra but had very little contact with indigenous tribes. The Sierra itself was never inhabited except in the southern most portion and annual floods and access difficulties into the interior have restricted settlement to the highland banks of the original

river boundaries.

According to INCORA and CVM records, farmers began moving into the region in noticeable numbers in 1958 and their numbers have continued to increase to the present. Unfortunately because the reserve's boundaries were not determined until 1965 and because of a lack of publicity about the Decree even after it became law, many of these people chose to settle on land which was officially inside the reserve. Table XVIII traces the population growth into the area.

It became obvious to INDERENA when they assumed the management of the reserve in 1968 that the continuing influx of settlers was not only having a negative effect on the flora and fauna but was endangering the entire concept of a biological reservation. Something had to be done, they felt, to change the course of what would have undoubtedly resulted in the total destruction of this unique resource.

In early 1971, INDERENA proposed two alternatives. One was an extensive relocation program, including generous government loans, to help reimburse the colonos for investments made to improve their land. The second was to simply zone-out or redraw the boundaries to exclude the inhabited areas. Unfortunately the latter solution was selected because it was obviously the politically correct one to a very sensitive social problem. This decision was an ecological disaster and will be discussed in the following chapter. However with the passage of Accord No. 26 in September, 1971, some 501,350 hectares were eliminated from La Macarena National Park and therefore opened to unlimited development. This accord also gave the Macarena full park

TABLE XVIII. POPULATION INFLUX INTO THE SIERRA DE LA MACARENA REGION.*

Census Year	Agency	Inhabitants	Farms
1967	CVM/INCORA	1,461	575
1969	INDERENA	3,180	838
1970	INDERENA	4,800	1,247

*Source: Luis Andres Torres, 1970. "Estado Actual de la Colonizacion - Reserve Biologica La Macarena." INDERENA.

status and redefined its boundaries to include the remaining 630,000 hectares.

Travel into the park is almost exclusively by small river boat or canoe and therefore very difficult. Although very few people other than scientists have ever been into the interior of La Macarena, future plans call for road construction to a proposed visitor center in its northeastern section. Nature trails, a museum, micro-habitats with live animals, and a day-use area are planned. Presently a park director, 2 technical assistants, 20 inspectors and 6 boat operators are assigned to the park.

Las Orquideas National Park

Introduction

One of the areas most recently designated national park status in Colombia, Las Orquideas is located in the southeastern portion of the Department of Antioquia in the western range of the Andes (see Map 2). The area presently contains some 30,566 hectares, 90 per cent of which is in a pristine state. The reason is that Las Orquideas has not been heavily colonized because of a lack of access.

Nearly 70 per cent of the park or more than 21,000 hectares is situated in either temperate or hot zones and the tremendous variations in climate provide many vegetation and animal habitats.

Four distinct vegetative formations have been identified by Espinal and Montenegro (1963) using the Holdridge classification

TABLE XIX. CLIMATE ZONES IN LAS ORQUIDEAS NATIONAL PARK.*

Elevation	Hectares	% of Park	Weather Type
0-1,000 meters	9,200 has.	30.5%	hot climate
1,000-2,000	12,000	39.4	temperate climate
2,000-3,000	7,200	23.6	cold climate
3,000+	3,000	6.5	paramo

*This table compiled with information from the following sources: Dankel, 1972; Colombia, INDERENA, 1973a; and the visitors' pamphlet from Las Orquideas.

system. A Very Humid Tropical Forest is located in the low lying western most portion of the park and receives as much as 8,000 mm of rain annually. The central area is covered with sub-Tropical Rain Forest, and the eastern one-half by sub-Mountainous Rain Forest. The northeastern peninsula contains the park's two highest peaks, Musinga at 3,850 meters and Morro Pelado at 3,485 meters, and is predominately populated with Mountain Rain Forest species. Three of the more interesting species found in these forests are the balsa (Ochroma spp.), Silk cotton tree (Ceiba spp.) and the Wax palm (Ceroxylon spp.), the world's tallest palm and Colombia's national tree (Colombia, INDERENA, 1973a).

However, the most important vegetative family found within the park is Orquidaceae, and representatives from more than 22 genera have already been identified. Experts have estimated the total number of Colombian species to be between 2,000 and 3,000 (Ospina Hernandez, 1969a:1).

This pristine area is also very rich in fauna. Although a comprehensive inventory has never been undertaken, INDERENA plans to begin this process in the following year. Among its many birds are found herons, toucans, parrots and many species of hummingbirds. Mammals include various species of cat, deer, bear and a sloth.

Historical Outline and Present Status

As early as the 18th century, the area now included in Las Orquideas National Park was known to be of great scientific value.

Alexander Von Humboldt journeyed into this area (Von Humboldt, 1859) and during the first part of the 19th century several famous European botanists visited Colombia and conducted reconnaissance expeditions under the direction of the well known botanist Jose C. Mutis (Ospina Hernandez, 1969a:1). As a result of their extensive work, the field of tropical biology gained formal recognition in the established European universities and valuable pictoral and dried specimen collections of orchids were catalogued.

This notoriety, subsequently led to the destruction of many orchid species at the hands of exploiters. As Dr. Mariano Ospina Hernandez documented, "the uncontrolled destruction of natural forests and other orchid habitats...and the unchecked ambition of orchid merchants and collectors...are basically the two main forces contributing towards the extinction of native orchids" (Ospina Hernandez, 1969:169). Ospina, a Colombian Senator, has identified more than 22 species of Colombian orchids which he has documented to be in serious danger of extinction.

In 1968, the Latin American Conference on the Conservation of Renewable Natural Resources was convened in Bariloche, Argentina. Recommendation No. 10 encouraged the protection of orchids and its rapidly disappearing habitat in Latin America. It read in part as follows:

> Considering the serious decline in the distribution of orchid species, of Cactaceae, Bromeliaceae and succulent plants in general in many parts of Latin America,

> the IUCN Latin American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April 1968,
>
> recommends governments to select and establish sanctuaries for native species and to enact any required legislation for their protection (IUCN, 1968 Recommendation No. 10).

As a direct response, INDERENA initiated basic field studies to substantiate the need for establishing Las Orquideas as a national park. Plagued with serious budget problems in 1972, the formal recognition had to be postponed until early 1973 when Accord No. 14 was passed by INDERENA's board of directors. This Accord which was confirmed by Executive Resolution No. 017 in March of the following year specifically prohibited:

> ...the acquisition of uncultivated lands, selling of privately held lands (with the exception of sales to INDERENA), hunting, fishing and all types of industrial activity, agricultural practices except for those which the Renewable Natural Resources Development Institute, INDERENA, considers conducive to the conservation or beautification of the area...(Colombia, INDERENA, 1973c).

Four major management objectives were immediately outlined by the Division of National Parks and Wildlife. They included the protection of the area's natural values, the facilitating of public understanding of the park through field interpretation, the maintenance of the botanic species, especially members of the Orquidaceae family, and the initiation of a longitudinal field research program. It was felt that fulfilling these objectives would enable Colombia to contribute to the body of scientific information concerned with tropical orchids and succulent plants.

In anticipation of the park's recognition a preliminary master

plan was drafted including recommendations for access, facilities location, future land acquisition and a zoning scheme (Dankel, 1972). Presently access to the limits of the park is restricted to horseback or foot travel from either Urrao or Frontino, the closest towns to which motor travel is possible. The map located on the following page indicates that the park has been classified into six zones: Primitive Wilderness, Natural Recuperation, General Recreation, Intensive Use, Historic-Cultural and Buffer.

Table XX indicates that by far the largest percentage of the park, 68 per cent, is zoned Primitive Wilderness. A relatively small area of 1,570 hectares has been designated for intensive visitor use. The only site with historic-cultural value, although at present located outside the limits of the park, is a mine which has been abandoned for more than 100 years.

The Preliminary master plan recommends the inclusion of three new areas. These additions would increase the park's size by approximately 16 per cent or 4,800 hectares (Dankel, 1972:4). The inclusion of area A, found on Map 9, would preserve the land between the Penderisco and Jengamecoda Rivers on the west and east and the Murri River, and an extended line of the Calles River (westward) on the north and south. It has also been recommended that area B in the most northeastern section and area C surrounding the mine be included in Las Orquideas to buffer encroachment near a planned access road in the former and in the latter to insure that the historic values of the area are preserved.

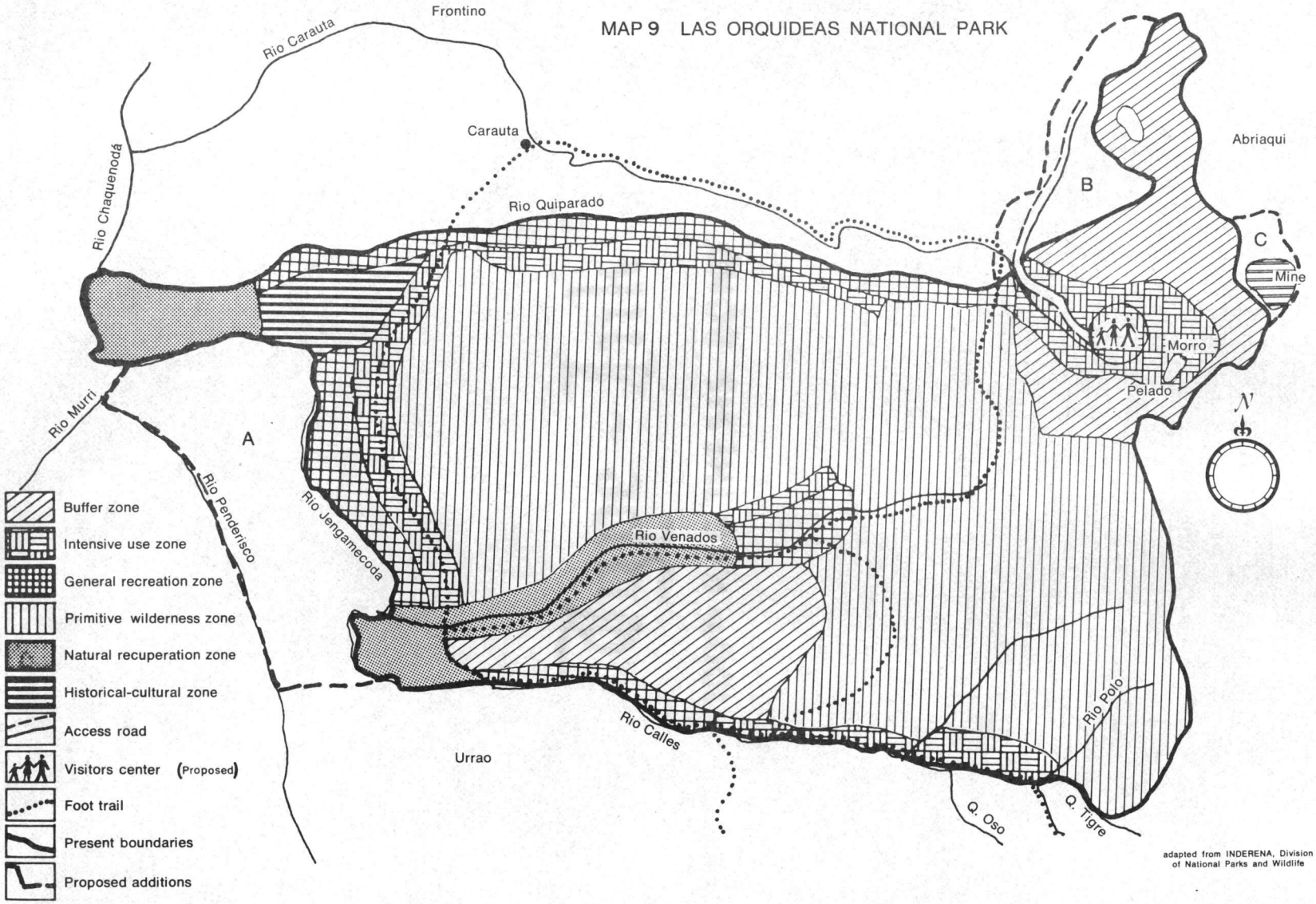

MAP 9 LAS ORQUIDEAS NATIONAL PARK
Frontino
Rio Carauta
Carauta
Rio Chaquenodá
Rio Quiparado
Abriaqui
B
C
Mine
Morro
Pelado
N
Rio Murri
A
Rio Penderisco
Rio Jengamecoda
Rio Venados
Rio Calles
Urrao
Rio Polo
Q. Oso
Q. Tigre
Buffer zone
Intensive use zone
General recreation zone
Primitive wilderness zone
Natural recuperation zone
Historical-cultural zone
Access road
Visitors center (Proposed)
Foot trail
Present boundaries
Proposed additions
adapted from INDERENA, Division of National Parks and Wildlife

TABLE XX. PRELIMINARY ZONING PLAN FOR LAS ORGUIDEAS NATIONAL PARK.*

Classification	Hectares	% of Park
Primitive Wilderness	20,800 has.	68%
Natural Recuperation	2,310	7.7
General Recreation	2,980	10.0
Intensive Use	1,570	5.3
Historic-Cultural	990	3.0
Buffer	1,920	6.0

*Source: David A. Dankel. "Parque Nacional Natural Las Orquideas: Informe Sobre Algunas Aspectos de Planeacion Del Parque." Unpublished report. INDERENA, Bogota, Colombia, 1972.

It is estimated that less than 30 families are living within the present park boundaries in areas which have been designated General Recreation and Intensive Use. Presently there are seven INDERENA personnel officially assigned to the park including a director, two field assistants, and five laborers.

Los Nevados National Park

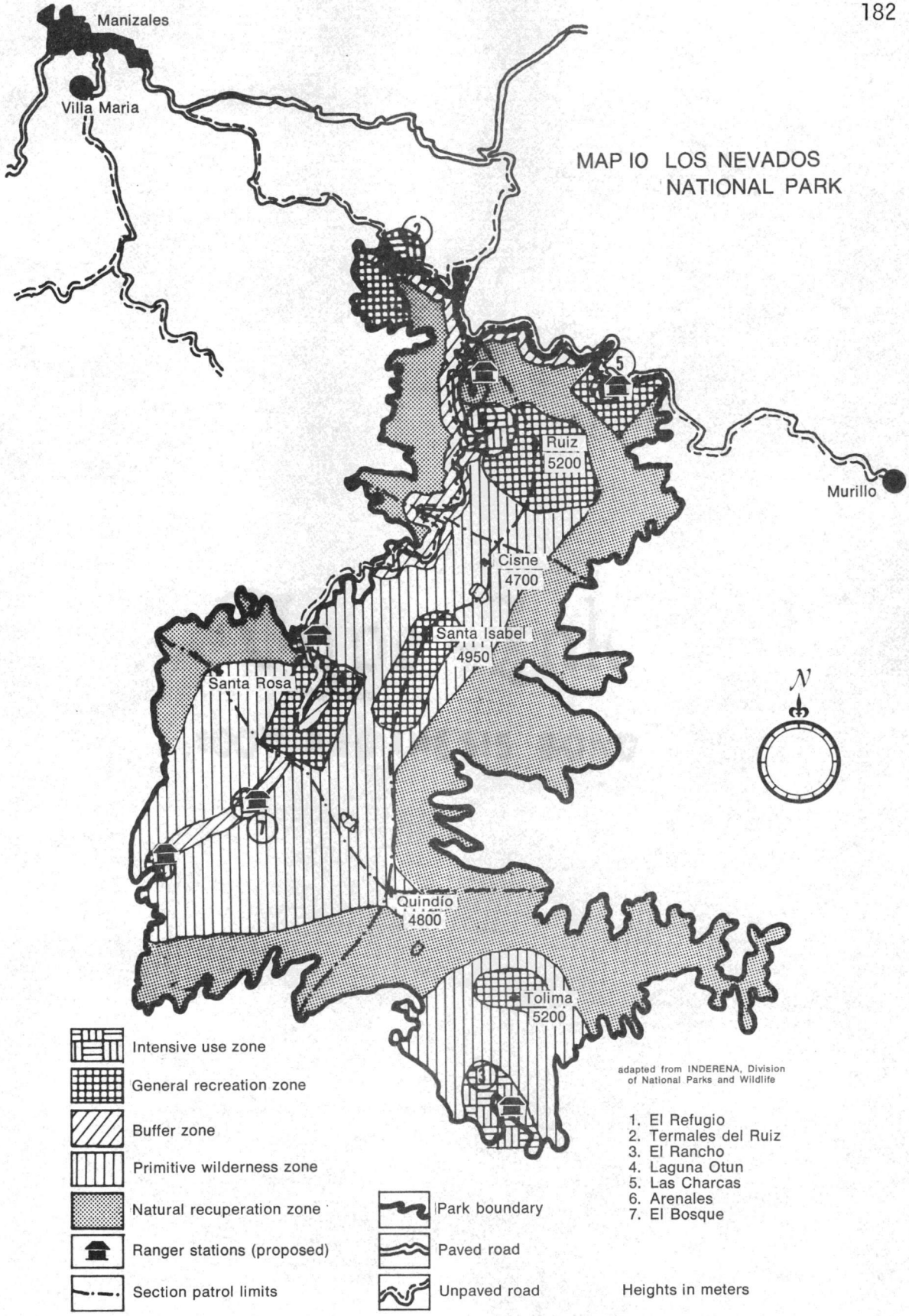
Introduction

Situated in the Departments of Tolima, Risaralda, Quindio and Caldas (see Map 2), Los Nevados National Park is composed of the major mountain peaks in the Central Range of the Andes and their surrounding lands. Included in its 38,000 hectares are lands varying in elevation from 2,600 meters to more than 5,200 meters above sea level. The major peaks in the park from north to south are identified in Table XXI and on Map 10. Three of these peaks, El Ruiz, Santa Isabel and Tolima, are permanently covered with snow since the perpetual snowline at the park's latitude (between 40°30' south latitude and 40°45' north latitude) is located at approximately 4,850 meters above sea level. However the other lower peaks are frequently covered with snow during the winter or lowland rainy season (Atlas de Colombia, 1967).

Because the park includes areas from low lying warm country with temperatures of up to 21°C to permanent snow land with below zero temperatures, a great many vegetative biomes are found. The park's plant communities change with altitude from Mountain Rain Forests in the lowlands to the treeless paramo with its characteristic Frailejon

TABLE XXI. ELEVATIONS OF MAJOR PEAKS IN LOS NEVADOS NATIONAL PARK

Peak	Elevation Meters
El Ruiz	5,200 meters
El Cisne	4,700
Santa Isabel	4,950
Quindo	4,800
Tolima	5,200



MAP 10 LOS NEVADOS NATIONAL PARK

(Espeletia hartwegiana) which continues up to the snowline (Colombia, INDERENA, 1973a).

The various plant communities provide habitat for many different species of wildlife. But according to the present director, man's activities below the snowline have so altered the area that "several animal species have probably disappeared from the park" (personal interview, Oscar Perez Palacio, Manizales, October 7, 1974). The Spectacled bear (Tremarctos ornatus), Tapir (Tapirus pinchaque) and at least two species of deer (Mazama rufina; Odocoileus virginianus) are reported to have once inhabited the park. Rabbits, eagles and several species of ducks however are still quite common in Los Nevados.

One of the most interesting aspects of the park's natural history is recorded in its geology. The general land form is dominated by the central range of the Andes mountains with its many radiating ridges forming deep river valleys. The terrain, with its massive lava flows, reflects the volcanic origin of the mountains. Thick layers of ash, which are exposed in road cuts, support the theory of this area being one of the most volcanically active areas in the hemisphere. However, while volcanism acted to build mountains, glaciation and erosion forces were active in altering their appearance. A small amount of glacial activity is still present on the three tallest peaks, and the broad U-shaped valleys which the great glaciers scoured out are visible throughout the area.

Lastly, there are possibilities that archaeologic values may also be found within the park limits. The ancient cultures of the Quimbaya

and Pijao are believed to have existed in the area. These civilizations have not been investigated intensively, particularly within Los Nevados, but it is very probable that relics will some day be found.

Historical Outline and Present Status

According to Article 13 of Law 2, 1959, "...the permanently snow covered mountains and theis surrounding areas..." were declared national parks (Colombia, 1959:7). Therefore, part of the area which is now included in Los Nevados National Park was declared property of the State in 1959 although nothing was ever done at that time to define the exact boundaries or to protect the land from further encroachment or misuse by man. Fourteen years later, INDERENA's board of directors passed Accord No. 15, officially creating Los Nevados National Park and prohibiting the buying and selling of land without government permission. Even though the President did not issue Executive Resolution No. 148 approving the Accord until the following year, INDERENA initiated a management program in March of 1973 and assigned a director to the park.

This area, however beautiful the scenery and apparent natural values seem to be, has been altered dramatically by human activities. The lower portions of Los Nevados have been inhabited nearly continuously since the Spanish conquest. It is estimated that of the total land surface only 30 per cent or 11,400 hectares represents ecosystems as they existed in the Central Andes some 400 years ago. With the exception of the permanently snow capped peaks which comprise

approximately 15 per cent of park area, all of the land is held through private claims. At this writing, INDERENA cannot relocate the farmers without their permission, and therefore grazing, field burning for pasture improvement, and cultivation activities continue by the park's 3,000 residents (personal interview, Oscar Perez Palacio, October 4, 1974).

Because of higher budget priorities within the Division of National Parks and Wildlife, the only portion of Los Nevados which is presently developed is the northern section surrounding El Ruiz. A vigilance and registration cabin, located at Arenales, is staffed with two inspectors and a watchman. This facility was completed in March of 1974. The National Tourist Corporation owns and operates a restaurant-hotel, El Refugio, at snowline on Pico Ruiz which is one of the main attractions in the park.

Access is excellent and bus trips to El Refugio are scheduled twice a week from Manizales. It is estimated by the present director that between 25,000 and 30,000 persons will visit Los Nevados this year.

A pilot project aimed at identifying basic characteristics of the park's visitors was undertaken by INDERENA with the assistance of Peace Corps during the first year of operation (Shores, 1973). Although the data has not yet been verified by subsequent research, several interesting observations can be made from the preliminary information reported.

Of the total 10,000 registered visitors to Los Nevados during

the months of April to December of 1973, 60 per cent were recorded on Saturday or Sunday and 83 per cent had been to another national park during the previous 12 months. As Table XXII indicates, only 6 per cent of the total visitation is made up of non-Colombians. Nearly 80 per cent of the visitors are in the park for less than 6 hours, probably indicating a visit to El Refugio for either the view or to see and touch snow. Combined, these two reasons account for 80 per cent of the total visitation. Nine per cent of the visitors travel to Los Nevados for snow climbing activities since it is only one of two areas in the country which has the resources for this sport.

Hot mineral springs are found at several sites throughout the Central Range of the Andes. However, the only two such areas located near the park are presently excluded from its boundaries. Developed recreation areas including mineral pools for swimming, restaurants and hotels are located at Termales del Ruiz at the north entrance to the Park and El Rancho just outside of the southern boundary and within easy driving distance of the city of Ibague. The owner of El Rancho has indicated a willingness to sell this development to the government. The INDERENA Regional Office in Medellin also plans to re-zone the park to include the Termales del Ruiz. To accomplish the latter should not be difficult because it is owned by a semi-public agency, the Beneficencia de Manizales.

A preliminary master plan has been drafted, and it divides Los Nevados into six distinct management zones to insure that "...the total character of the park is conserved and that each area receives

TABLE XXII. ORIGIN, LENGTH OF VISIT AND MOTIVATION FOR VISITING LOS NEVADOS NATIONAL PARK.*

Origin		Length of Visit		Visit Motivation	
Bogota	22%	Less than 6 hours	79%	View	47%
Medellin	18	7-12 hours	11	Snow	33
Manizales	13	More than one day	10	Climb	9
Foreigners	6			Other - research, ski	11
Other cities/ Colo.	41				

*Source: John Shores. "Unpublished Analysis of Los Nevados National Park Visitor Survey, October-December, 1973." Manizales, Colombia. INDERENA.

the necessary amount of protection to preserve its natural and cultural values..." (Colombia, INDERENA, 1974c:5). The six zones which the park map outlines are: Primitive Wilderness, Natural Recovery, General Recreation, Intensive Use, Historic-Cultural, and Buffer.

Within the area zones Primitive Wilderness INDERENA has adopted a policy which permits only minimal development and therefore guarantees protection of the existing natural values. The preliminary master plan proposes that two vigilance cabins be situated in the southwestern portion of the park. The snow covered portions of El Ruiz, Santa Isabel and Tolima are zoned as General Recreation areas. Recreation developments are also planned for Las Charcas and the Lagana Otun areas. Both of these sites will include a vigilance station, picnic area, sanitary facilities and an interpretive program. The Lagana Otun site offers additional recreational possibilities because of the water resource and is therefore planned to include a boat launching facility, camping area and visitor center.

Three Intensive Use developments are proposed assuming that the two hot mineral spring areas, mentioned above, are eventually included within the park limits. At the Termales del Ruiz, administrative quarters and interpretive trails are planned. The El Rancho Intensive Use area, will include an inspector's cabin, camping and picnicking sites. The development at El Refugio will remain basically unchanged with the exception of an interpretive program to include snow walks.

Buffer zones line all of the park roads and will remain completely natural. This zone is formed by an imaginary boundary which,

according to the present director, acts as a sound and sight filter from the road to the park (personal interview, Oscar Perez Palacio, October 4, 1974).

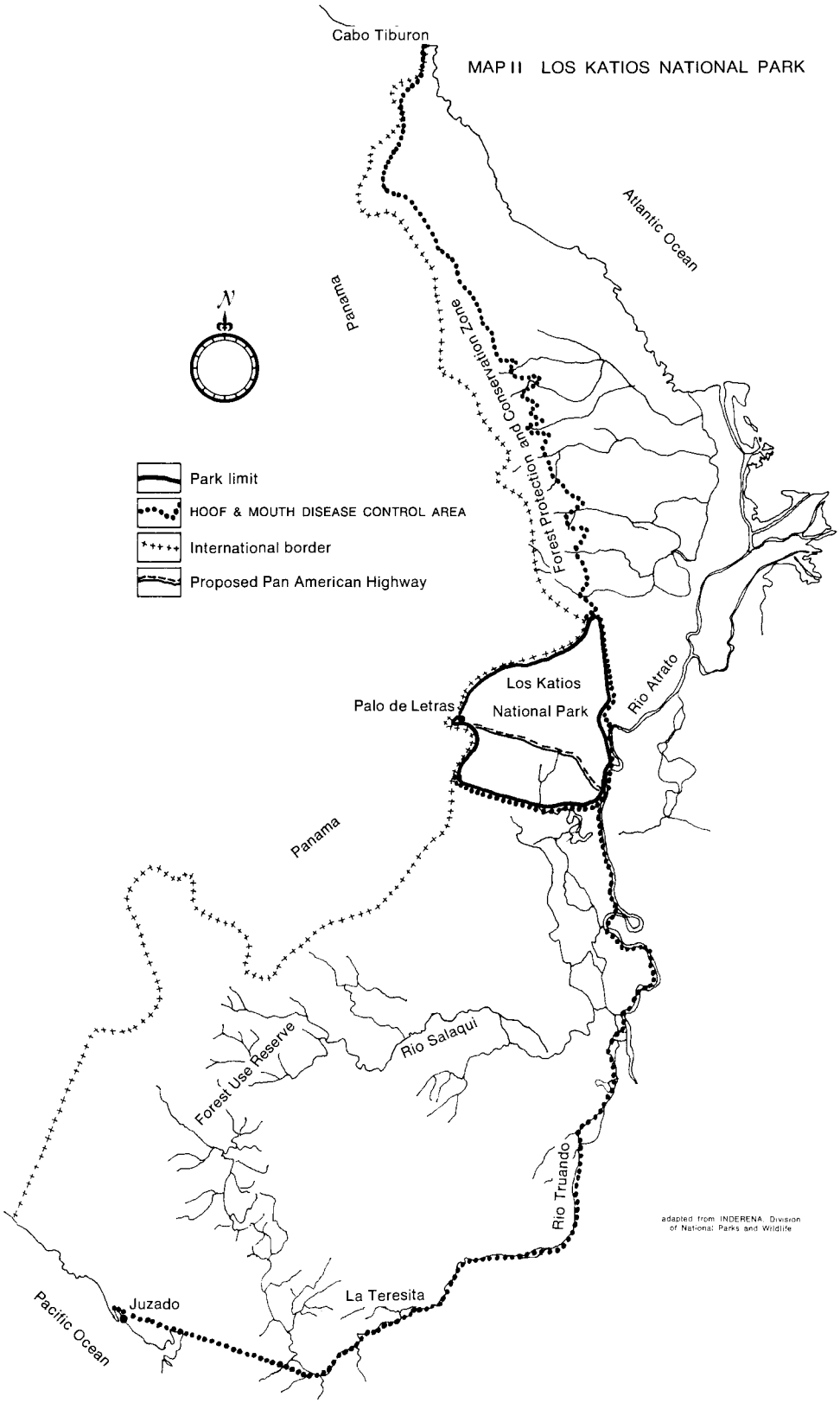
The remainder is zoned Natural Recovery and as soon as the existing private property owners are eliminated, these areas will be allowed to begin the processes which will someday lead to a return of the natural vegetation. With the exception of the existing inspector's station, located at Arenales, no development is planned for this zone.

To date, no area has been designated as Historic-Cultural. However, as further archaeological studies are undertaken, it is assumed that whatever archaeological remains are discovered will be adequately protected.

Los Katios National Park

Introduction

The most recent area to receive national park status in Colombia is Los Katios which is located in the Department of Choco on the Panamanian border (see Map 2). Included in the park are 52,000 hectares with elevations ranging from 5 to 602 meters above sea level. Los Katios actually consists of a strip some 30 kilometers wide on either side of the proposed Pan American Highway route which is scheduled to pass through Palo de Letras. The Rio Atrato, as Map 11 indicates, forms the park's eastern limit and has one of the greatest volume fluctuations of any river in the world. This is because the Darien Gap zone receives more average rainfall than any other location


Cabo Tiburon
MAP II LOS KATIOS NATIONAL PARK
Atlantic Ocean
Panama
and Conservation Zone
Forest Protection
N
Park limit
HOOF & MOUTH DISEASE CONTROL AREA
International border
Proposed Pan American Highway
Los Katios
National Park
Palo de Letras
Rio Atrato
Panama
Rio Salaqui
Forest Use Reserve
Rio Truando
adapted from INDERENA. Division of National Parks and Wildlife
La Teresita
Juzado
Pacific Ocean

in the western hemisphere (Atlas de Colombia, 1967).

This portion of the Darien range has been classified by Espinal and Montenegro (1963) using the Holdridge system to be divided among four major ecological formations. The Humid Tropical Forest receives between 2,000 and 4,000 mm of rainfall annually and has temperatures continually greater than 24°C.

One of the wettest areas in the western hemisphere is located within the portion of the Rio Atrato floodplain found in Los Katios National Park. Vegetatively the area is a Very Humid Tropical Forest which receives between 8,000 to 12,000 mm of rain annually (Atlas de Colombia, 1967).

In the sub-Tropical Rain Forest temperatures range from 17° to 24°C and up to 4,000 mm of rain is recorded in an average year. The remaining distinguishable vegetative formation is the sub-Mountain Very Humid Forest. Because of the ecological uniqueness of the Darien Gap range, many endemic vegetative species are found in Los Katios. Although a complete study of the area has not yet been completed, INDERENA has identified various unique species or subspecies including members of the orchid, begonia and palm families (Colombia, INDERENA, 1973a).

In the region where Los Katios is located, one encounters the only zone in South America which is populated by fauna species generally considered to be unique to Central America. This is due to the funneling of animals through the Darien Gap, and to the barrier presented by the Rio Atrato which forms the park's eastern boundary.

These include: the spring pocket mouse (Heteromys desmaretianus), the Wild chaco-chachalaca turkey (Ortalis cinereiceps), and the endangered Central American tapir (Tapirus bairdii) (Melton). Also at least two species endemic to the Darien Gap region are found in Los Katios. They include: the Cassins or Chestnut-mantled oropendola (Gymnostinops cassini) and the Darien mouse (Peromyscus dariensis) (personal interview, Jorge Ignacio Henandez Camacho, October 30, 1974).

Historical Outline and Present Status

In late 1972, the United States Department of Agriculture, encouraged by its counterpart agencies in both Canada and Central America, approached the Colombian government about establishing a hoof-and-mouth sanitary area on its border with Panama. Panama had already established a similar area on its side of the border extending the entire width of the country. The countries to the north of South America were becoming increasingly concerned about the possibility of hoof-and-mouth disease spreading northward; particularly since it was felt that the impending completion of the Pan American Highway would provide a direct route for its transporation. Central and North America are presently free of this serious afflication while diseased herds have been diagnosed in every South American nation.

Both Central and North America have had much experience with the disease but as a recent U. S. Department of Agriculture publication states, "Foot-and-mouth diseases have been the most persistent and difficult of animal diseases to keep out of the country and to

eradicate once it has entered" (U. S. Department of Agriculture, 1974:10). Many Central American nations and Mexico have been involved in joint efforts with the United States and Canada to bring the affliction under control and finally eradicate it. This has at times necessitated the mass slaughter of thousands of cattle and great expenditures of time and money by government agencies.

Colombia expressed its desire to cooperate by establishing a national park in this area. In early 1973, the Colombian Agricultural Livestock Institute (ICA - Instituto Colombiano Agropecuario), INDERENA and the U. S. Department of Agriculture (USDA) began exploring the possibilities of preserving the area's resources while at the same time cooperating in efforts to control the spreading of hoof-and-mouth disease.

Within the same year on August 18, the Colombian Minister of Agriculture entered into an agreement with the USDA to "...develop a program oriented at the eradication and control of hoof-and-mouth disease from the Uraba Zone" (Colombia, INDERENA, 1973d:1). Shortly afterwards in September, Los Katios was officially established as a national park when Accord No. 37 was passed. Its objectives were to conserve the flora, fauna and scenic natural beauties with scientific, educative, recreative and esthetic ends.

ICA and INDERENA were named as the competent government agencies to develop an action plan which would enable the agreement's objectives to be realized. Specifically INDERENA was charged with identifying conservation areas with detailed management goals while

ICA was to work towards the control and eventual eradication of hoof-and-mouth disease from the same areas.

In addition to the park, two adjacent areas, each having distinct management objectives, were reserved. The forest protection and conservation zone serves as a buffer between Colombia and Panama and no agricultural or forestry activities are permitted. The southern forest use reserve zone also prohibits any cattle production or agriculture but allows strictly controlled timber harvesting. These two areas are managed by the Forestry Direction of INDERENA.

Los Katios is centrally located in the hoof-and-mouth disease sanitary area which spans the entire Colombian-Panamanian border. The park has strict management regulations which include the relocation of the 133 inholdings and monitoring all traffic on the Pan American Highway (personal interview, Humberto Arturo Hermida Arbelaez, August 28, 1974). The latter will be accomplished with the assistance of the Colombian Army. It is hoped that with the combination of these three zones, hoof-and-mouth disease will be prevented from spreading into the remainder of the Americas and that the area's natural values will be preserved. However, even with a strict cattle monitoring program, there are no guarantees that the disease will be contained. As Ochoa and Lobo have documented, several migratory wild animals and birds can act as carriers and, of course, their control is nearly impossible (Ochoa y Lobo, 1974).

To facilitate Colombia's objectives, the USDA has budgeted $7.7 million U. S. for the period of 1974-1978. ICA and INDERENA have each

received 50 per cent of this total figure with which to hire personnel and purchase equipment. The USDA advisor reserved the right to inspect the project site, review work plans, budgets and equipment at any time.

To date, according to the park director, 46 of the 56 approved positions have been filled and the remainder of the personnel will be hired by June of 1975. Included are a director, a field biologist, three engineering field assistants, 17 of the 18 approved inspectors, a secretary, 16 skilled workers, 3 boat operator-mechanics, 2 watchmen and 2 cooks.

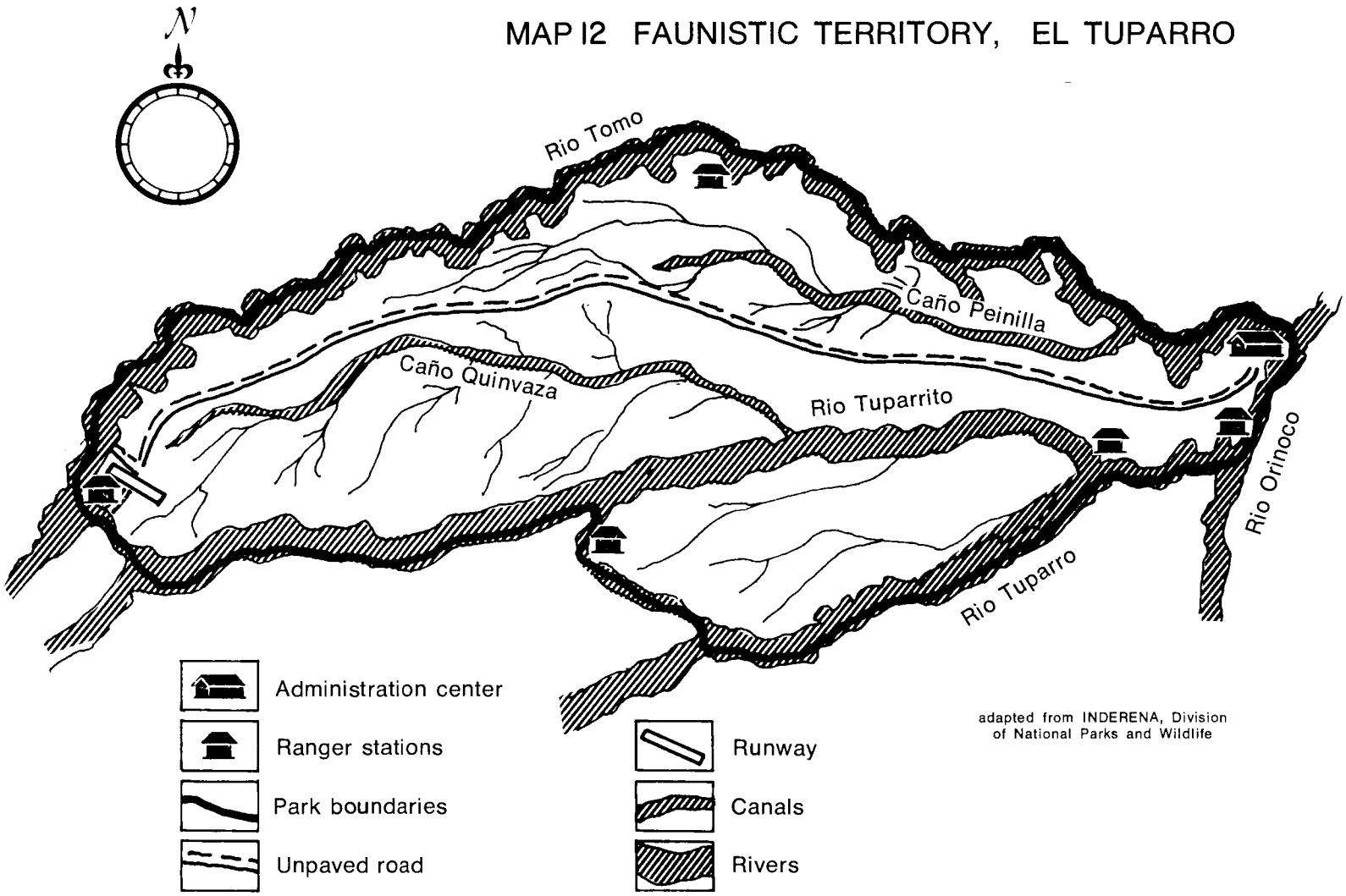
The planning staff from INDERENA's National Office has proposed two visitor centers for Los Katios, one near Palo Letras and the other near the highway crossing with the Rio Atrato. Micro-habitats, dioramas, interpretive nature trails and picnic areas will be located at both centers. A biological field and research station including a herbarium which will be available to both students and professional scientists is also proposed.

El Tuparro Faunistic Territory

Introduction

Receiving its name from the river which forms its southernmost boundary, El Tuparro was established as the country's first faunistic territory by INDERENA in August of 1970. Its limits, identified on Map 12, are the Rio Tomo to the north, the Rio Orinoco to the east, and the Rio Tuparrito to the southwest and west. The area which is

MAP 12 FAUNISTIC TERRITORY, EL TUPARRO



adapted from INDERENA, Division of National Parks and Wildlife

comprised primarily of low lying grasslands or llanos and gallery forests which border the territory's major rivers, contains 380,000 hectares and is located some 600 kilometers northeast of Villavicencio in Vichada (see Map 2).

El Tuparro has elevations ranging from 75 to 250 meters above sea level and an average annual temperature greater than 30°C. The area's vegetation formations correspond to a transitional zone between Dry Tropical Forests in the west and Humid Tropical Forests in its eastern portion where more than 2,000 mm of rainfall is recorded each year. Among the most common vegetative species are the cedar (Cedrela sp.), locust (Hymenaea courbaril), scrub oak (Curatella americana), and the dominant pasture grasses (Andropogon bicorne; Trachypogon vestitus) (Espinal y Montenegro, 1963; Atlas de Colombia, 1967).

Not only is this area rich in flora, but its fauna is one of Colombia's most diversified. El Tuparro received recognition as an equivalent reserve just two years after it was established primarily because it includes habitat which is protected for three rare species: the Giant river otter (Pteronura brasiliensis), the Giant armadillo (Priodontes maximus) and the Orinoco crocodile (Crocodylus intermedias). Each of these species is fortunately protected by law in Colombia (Colombia, 1972d). In addition mammals including the Colombian white-tailed deer (Odocoileus virginianus gymnotis), Capybara (Hydrochaeris hydrochaeris), Tapir (Tapirus terrestris), Jaguar (Felis onca) and four species of primates: the Brown capuchin (Cebus apella), Cinnamon capuchin (C. albifrons), Squirrel monkey (Saimiri

sciures) and the Bearded howler (Alouatta seniculus) inhabit El Tuparro.

Several interesting bird species are also found within the territory: the Red ibis (Eudocimus ruber), Cattle egret (Bulbulcus ibis), Fork-tailed flycatcher (Muscivorus tyrannus), Maguari stork (Euxeneura maguari), Yellow rumped cacique (Cacicus cela), and the valuable Scarlet blue macaw (Ara macao). Common reptile species include the Iguana (Iguana iguana), Boa (Boa constrictor), Anaconda (Eunectes murinus), and at least two turtles: the Amazonian turtle (Podocnemis expansa) and the Teracay (P. unifilis) (Grzimek, 1968; Hunsaker, 1972; Colombia, INDERENA, 1973a).

Historical Outline and Present Status

INDERENA Accord No. 19 of 1970 established El Tuparro Faunistic Territory. Executive Resolution No. 307 of the same year, confirmed its status. The main goals of this area are to:

1. Facilitate the investigation, conservation, and restoration of wildlife.
2. Establish, and teach techniques for the management and utilization of the country's wildlife (Colombia, INDERENA, 1971e:1).

The area originally reserved was 250,000 hectares, and subsequently in 1972 it was enlarged to its present size. Prohibitions were in accordance with international standards adhered to by the World Wildlife Fund and the IUCN. Specifically Article 13 of the original Accord stated that it was "...prohibited to sell fallow lands or to engage in uses which are incompatible with research,

conservation, propagation, and progress of the wildlife" (Colombia, INDERENA, 1970c:2).

Since 1970 INDERENA has constructed an administration center, five inspector cabins, and cleared an earthen runway and an access road. Most of the travel within the reservation is still by boat. A professional staff of 2 forest engineers, 1 biologist, 3 technical assistants, and 10 inspectors are permanently assigned to the territory. There is almost no visitation to El Tuparro except for scientists because of its distance from Colombia's population centers, the difficulty in overland travel and lack of adequate accommodations. However, the area does offer excellent conditions for field research on almost any of the lowland llanos wildlife.

Los Pharomacrus Faunistic Sanctuary

Introduction

Colombia's only officially approved faunistic sanctuary is an area situated in the Department of Cauca west of the Cordillera Occidental (see Map 2). Named after the Quetzal genera, Los Pharomacrus is a 3,000 hectare area located between 1,200 and 2,300 meters above sea level, 70 kilometers west of Popayan.

Approximately 3,000 mm of rain falls annually on its Very Humid Mountain and Humid sub-Tropical Forests (Espinal y Montenegro, 1963). These dense forests permit very little light to penetrate the upper most canopy and as a result, the sparse understory is primarily ferns and short broad-leafed palms (Colombia, INDERENA, 1973a).

The area possesses a varied fauna. Deer, Margay and Spotted cats, and monkies all reside in the sanctuary. The most diverse wildlife are its bird forms. Torrent ducks, oropendolas, tanagers, toucans, wild turkeys and eagles are all represented. Also at least two species of quetzals, the golden headed (*Pharomacrus auriceps*) and the White-tipped (*P. antisianus*) find suitable habitat in the preserve (Schauensee, 1964; 1970).

Historical Outline and Present Status

Accord No. 17 of 1972 confirmed faunistic sanctuary status on Los Pharomacrus. The Division of National Parks and Wildlife has outlined a policy which encourages both field research and conservation activities in such areas.

Because little pressure is being placed on Los Pharomacrus by either *colonos* or developers, INDERENA has assigned only 2 inspectors and a watchman to the area. The director of Purace National Park is responsible for coordination of any activities that occur within the sanctuary and also assists the inspectors in managing a small information center on its southern boundary. No further development plans are being considered at present.

Summary

Colombia's system of National Park Reservations includes 9 national parks, 1 faunistic territory and 1 fauna sanctuary. These areas range from the snow covered peaks of the Sierra Nevada de Santa Marta

and Los Nevados to the rich biological diversity exhibited in La Macarena. In total 1,247,168 hectares have been reserved by law and are presently being managed by INDERENA, the Renewable Natural Resources Development Institute. This total amounts to 1.2 per cent of the total surface area and territorial waters of the country.

In addition to these areas, the Division of National Parks and Wildlife has proposed the inclusion of new areas in the immediate future. The Flamenco fauna sanctuary proposal encompasses a unique area on the Guajira desert coastline which would protect some 450 hectares of beach and marine shallow feeding grounds for Flamingos (Phoenicipterus ruber). Also being proposed as a fauna sanctuary is Iguaque, an area of 8,000 hectares located in the Department of Boyaca. Los Estoraques is a 450 hectare area located in the Department of Norte de Santander which is geologically very similar to Bryce Canyon National Park in the United States. If accepted it would be Colombia's first unique natural area. Lastly an additional national park, Curiche, is being projected for the Department of Choco. If approved, this 35,000 hectare site would preserve the first portions of Colombia's vast Pacific Ocean coastline. When these four projects are finally recognized, each major ecological biome will be represented in Colombia's System of National Park Reservations.

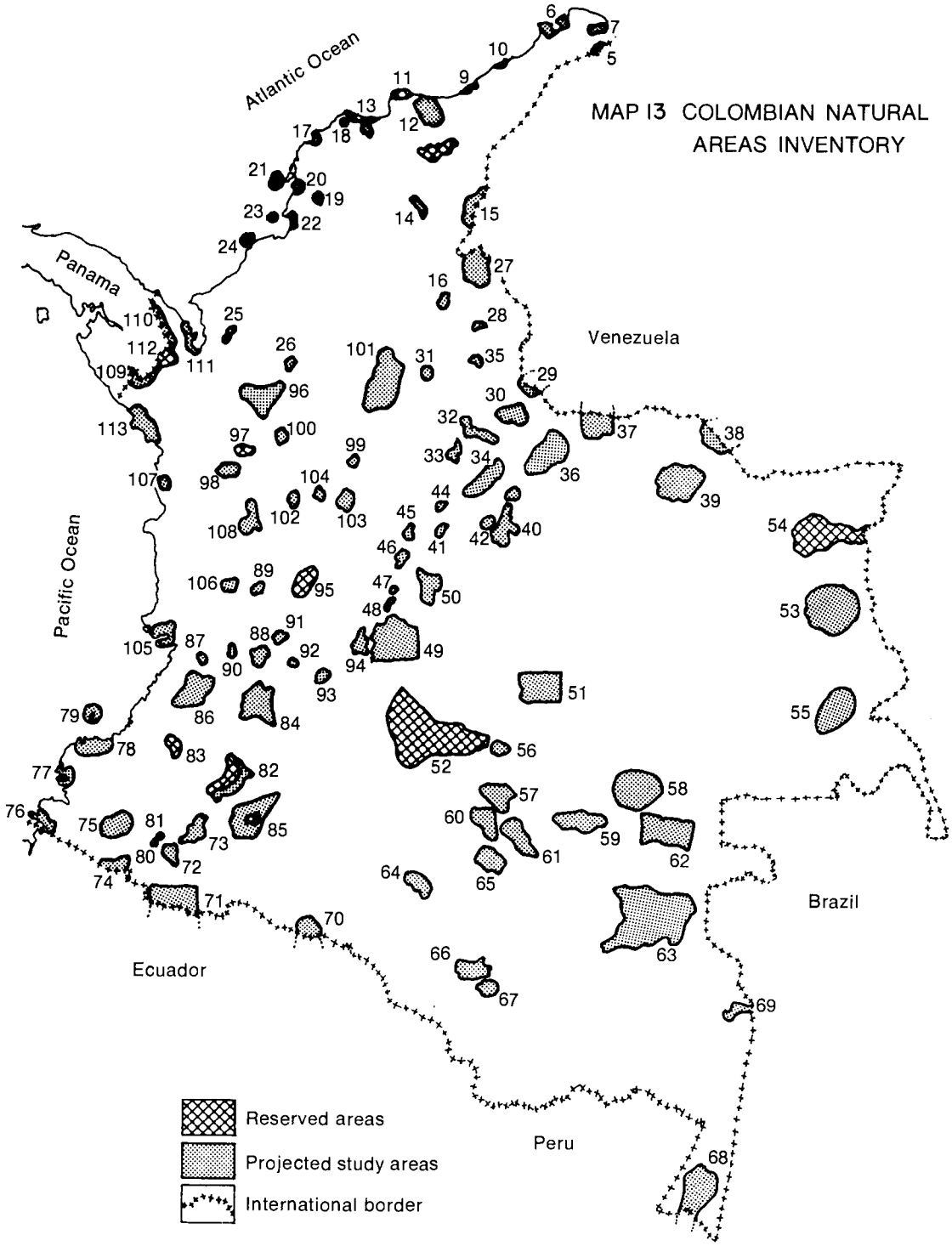
Colombia is also one of the few countries in the world to have begun the process of conducting a comprehensive natural areas inventory. In all, some 102 additional areas which possess special habitat or a particular flora or fauna species have been identified as

TABLE XXIII. SUMMARY OF SIZE AND LOCATION OF COLOMBIA'S NATIONAL PARKS AND EQUIVALENT RESERVES.

Park or Reserve	Hectares	Location, Dept.
Salamanca	20,912 has.	Magdalena
Tayrona	12,000	Magdalena
Sierra Nevada	50,000	Magdalena
Purace	80,000	Cauca
Guacharos	700	Huila
Macarena	630,000	Meta
Orquideas	30,556	Antioquia
Nevados	38,000	Tolima, Risaralda, Quindo, Caldas
Katios	52,000	Choco
Tuparro	380,000	Vichada
Pharomacrus	3,000	Cauca
Total	1,297,168 has.	

potential reservations. These sites are identified in Map 13. Undoubtedly several of these areas will be eliminated for one reason or another as scientists begin the initial field visits. Nonetheless, Colombia's desire to engage in long range natural resource management should not go unrecognized. No less than 18 per cent of its total land area will be studied under this proposal and according to the wildlife office, the detailed resource inventories may require 25 years to complete. Fourteen of these sites are located on borders of neighboring countries and the potential for international parks has been recognized.

It should be obvious that Colombia's reservations, while not without faults, have reserved the most endangered and unique areas and taken the initial steps to insure that a portion of its natural national heritage will be soundly managed in perpetuity.



adapted from INDERENA, Division of National Parks and Wildlife

V. ANALYSIS AND DESCRIPTION OF SELECTED MANAGEMENT PROBLEMS IN COLOMBIA'S NATIONAL PARK SYSTEM

Introduction

Chapter IV described the history and present status of each area included in Colombia's System of National Park Reservations. The present chapter will identify and analyze park management problems expressed by employees of INDERENA's Division of National Parks and Wildlife.

As is the case with any system of national parks whether it be young or old, administrators and field personnel are daily faced with management problems or concerns which affect the attainment of the desired administrative goals.

Both Canada, which was the first federal government to establish a national park service in 1911, and the United States which followed in 1916, are still faced with administrative problems of a social, economic, political or ecological nature. Time therefore does little to eradicate the existence of these problems but only gives administrators more experience for resolving new issues. Ruurs (1974) analyzed seven national park systems in various parts of the world and found that each one still had serious management concerns which affected their entire park program. Wetterberg (1974) interviewed national level park personnel from ten South American nations and discussed their major administrative problems in his study.

Park problems are not always the result of poor management

decisions. Legislative mandates are sometimes the cause of concern for administrators who must work in the real world, trying to balance visitor pressures and demands with the need for preservation. One of the most famous legislative paradoxes is found in the organic act which established the U. S. National Park System and the following seemingly contradictory goals:

> To conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations (U. S. Congress, 1916).

Many systems also begin with inherent problems because they fail to analyze the particular desires of their culture but simply imitate another country's management model. As Forster states: "Management decisions are often made in the absence of definitive or workable international criteria and without comprehension of alternative courses of action, or of their long range effects on national park values" (Forster, 1973:3). Buchinger believes that "great care must be taken not to make the same mistakes" in Latin America (O'Gorman, 1972:9).

Many of the most recent additions to the world community of national parks have been from the less technologically advanced nations where development pressures are great and support for development is more politically popular than preservation causes. This has often resulted in incompatible uses and structures being allowed in reserved areas. Subsequently these uses have, in many cases, become tremendous management problems especially as a nation's attitude toward conservation changes and the importance of national treasures

becomes more popular than the growth for growth's sake philosophy.

Colombia's relatively young system of national parks exhibits examples of such problems. This is not to their discredit but rather an inevitability which occurs when any nation undertakes a program with such far reaching implications. When resources are taken out of production, in the traditional sense, it is only normal that reactions come from every segment of the society. One only has to recall the tremendous conflicts which occurred in the early years over the establishment of Yellowstone National Park or more recently over the Wilderness Preservation System in the United States.

The Colombian park system is now more than ten years old and has overcome many of these initial growing pains. No system, however, is without problems.

Data Collection and Analysis

In order to obtain the information reported in this chapter, the author interviewed 44 INDERENA personnel from the Division of National Parks and Wildlife utilizing the format found in Figure 1 (specifically questions b, c, and d). The respondents were divided into four classifications permitting a more in-depth analysis of how various levels of INDERENA employees viewed their park system. The four classifications were as follows:

1. Professionals from INDERENA's national office in Bogota, Division of National Parks and Wildlife (Prof./Nat.).
2. Professionals from INDERENA's regional or sectional offices

having national park administration responsibilities (Prof./Reg.-Sec.).

3. The superintendent of each Colombian national park under INDERENA's jurisdiction (Prof./Park).
4. Non-professional inspectors assigned to a particular national park (Field/Park).

The interview matrix is presented in Table XXIV.

The interviewees were asked to list and rank the five most important management problems which they faced. The national office personnel responded from a national scope, the regional office respondents from a regional perspective and the last two groups, the park directors and field inspectors, in relation to their particular park. It was decided to not present each interviewee with a prepared list of alternative problem areas from which a simple prioritizing could have been undertaken. This might have influenced their responses and therefore sacrificed spontaneity. With three exceptions all of the interviews were conducted on an individual basis. In the cases of the inspector personnel (Field/Park) from Isla de Salamanca, Tayrona and Purace National Parks, group interviews were conducted because the researcher could not schedule an individual time with each person. For purposes of consistency, inspectors' opinions from each park were grouped and reported as a single interview.

Two methods are used for presentation of the interview results: First an analysis of each individual group is presented. This was done because of the distinct perspectives, and the significantly

TABLE XXIV. INTERVIEW MATRIX OF INDERENA NATIONAL PARK EMPLOYEES.

Employee Classification	Number and Site of Interviewees	Total
Prof./Nat.	10 - Division of National Parks and Wildlife - Bogota	10
Prof./Reg.-Sec.	1 - Central, Bogota 1 - Manizales 2 - Santa Marta 1 - Villavicencio 1 - Medellin 1 - Popayan	7
Prof./Park	9 - Superintendent or acting director of each national park	9
Field/Park	4 - Salamanca 5 - Tayrona 1 - Guacharos 3 - Purace 2 - Macarena 1 - Orquideas 2 - Nevados	18
Total		44

different terminology used by each level to describe the detailed problems they faced. A numerical value was applied to each problem as ranked by the respondents: 1 for the least significant and 5 for the most serious. The results have been totaled and a relative scale ranking the seriousness of management problems, for each group, presented. In order to check the validity of the rankings, square-root values were computed on the totals for each management problem. This procedure tends to stabilize the variance. This test verified that the ranking was valid.

The second method of presenting the interview results is a frequency check list of management problems which permits a general comparison of the totals of the four groups. This section is concluded with a discussion of possible alternative solutions for the most commonly shared management concerns.

To obtain the most frank and honest responses, the interviewees were assured that they would not be identified. Therefore numbers are used to represent a particular office or park because to identify the specific site would effectively disclose the name of an interviewee, particularly in the case of the regional managers and park superintendents. Only in the general discussion in the last portion of this chapter, and only where professional ethics were not believed to be violated, are parks named.

Interview Data Presentation by Groups

National Office Administrators

The results of the responses offered by the national level administrators are presented in Table XXV. Ten separate problems were identified at least once during the course of the ten interviews which were conducted with professional personnel of INDERENA's Division of National Parks and Wildlife in Bogota. While portions of the discussion which follows may seem to be quite negative, the reader should recall that the respondents were asked to comment confidentially on the problems they faced. Had they been requested to outline INDERENA's successes, the discussion would have naturally taken a different tone.

While identified to be the number one problem by only two individual interviewees, general finances were mentioned by nine out of the ten national office respondents to be among the top five management problems. In several interviews, financial concerns were directly related to impeding the achievement of the Division's goals and the ultimate reason for much discontentment in the field. Four respondents described the Division's problems of increasing responsibilities, with 7.7 million pesos less in 1974 than in the previous year, as approaching a crisis state. One interviewee voiced this candid opinion of how the morale of the Division has been affected by these financial woes:

TABLE XXV. MANAGEMENT PROBLEMS IN ORDER OF SERIOUSNESS AS IDENTIFIED BY NATIONAL OFFICE ADMINISTRATORS.

5 = most serious 1 = least serious

	Interviewee										
Management Problem	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	Total
General finances	5		4	2	5	3	2	2	2	1	26
Lack of public support for park program	2		5	3	3		3	4		4	24
Lack of trained field personnel		4	2	4		2			5	5	22
Problems associated with inholdings in parks	3	2	1			5	5	3	3		22
INDERENA organization	4	5		1	4	4		1		2	21
Lack of scientific data about parks		3					4		4	3	14
Problems with long-range planning objectives			3					5			8
Development pressures		1		5							6
Lack of eminent domain power	1				2	1	1				5
Pressure for special favors					1				1		2

> It is frankly disheartening to continually propose research projects only to have them refused because of a lack of funds. There is not even any money for field trips. On one hand the INDERENA administration criticizes us for never accomplishing anything here (Division of National Parks and Wildlife) but on the other I guess they expect us to pay for our research out of our own pockets. This Division is going to lose several of its best employees because of boredom and lack of support if the situation doesn't change drastically (personal interview, Division of National Parks and Wildlife, October 16, 1974).

Also because the Division of National Parks and Wildlife was uncertain of receiving future budget requests, the cessation of many ongoing projects and a complete re-evaluation of long-range plans was required in late 1974. As one national office administrator stated, "This is a planning nightmare or rather a game. We are required to submit long-range goals and budget requests but they often turn out to be nothing more than an academic exercise rather than an exercise in professional park management" (personal interview, Division of National Parks and Wildlife, November 25, 1974). This situation has resulted in the wasting of construction materials, the refiguring of project costs because of delays and material price increases, and the loss of some experienced personnel who have grown impatient with the overwhelming uncertainty which underlies every proposal. A basic example mentioned by several respondents was a reference to the claim that since August 1974 the parks and wildlife office would be moved to Barranquilla. "We don't even know where our families will be living or where our children will be going to school next year. These concerns obviously affect our work," complained one long-term employee (personal interview, Division of National Parks and Wildlife, November 27, 1974).

If the Division's budget were sufficient and stable it would enable the parks and wildlife professionals of Colombia to engage in meaningful long-range comprehensive planning and facilitate the proper protection of the areas for which they are responsible. Marion Clawson stated the necessity of dependable park finances in a paper presented at the Second World Conference on National Parks. He told the delegates:

> Nations must realize that they cannot have national parks on the cheap....Economically valuable resource developments necessitate capital investment and continued annual expenditures, and there is no way to avoid such expenditures (Clawson, 1972:124).

A lack of public support for the parks program was also thought to be a serious management concern for the Division. Seven interviewees felt this problem important enough to be ranked among the top five. Since the national office must enjoy substantial support from a wide base of publics, if it expects to continue with its development plans, this concern deserves immediate attention by the Division. The importance of this problem and several possible alternatives for obtaining such support will be discussed when selected management problems are analyzed in detail in the last portion of this chapter.

As Table XXV indicates, a lack of trained field personnel, particularly inspectors, and the problems associated with inholdings within park boundaries, each received a total of 22 points, being ranked very close to the two preceding problems. Both issues were mentioned by a majority of the interviewees and both were continually related to a lack of financial support. "It's not that we don't want

to train our park inspectors," claimed one section manager, "but you tell me how it can be adequately accomplished without the proper logistical and financial support. Just the training budget in the U. S., even considering the relative differences in the size of the systems (U. S. and Colombia) is undoubtedly several times larger than our entire budget" (personal interview, Division of National Parks and Wildlife, August 21, 1974). However, this concern was believed to be a bit more complex by some respondents and the following statement, while not solicited from any given individual, is felt to represent an opinion noted by the interviewer on more than one occasion and gives a further insight into this problem:

> It is not certain that even with the proper support, INDERENA would have adequately trained park inspectors. First would be the difficulty of finding someone dedicated enough to undertake this task for it would require a lot of work and result in very little glory. Second would be the problem of continually educating new inspectors because these positions have not traditionally attracted career-minded people (general opinion expressed by national office interviewees).

The issues associated with inholdings are complicated by the three types found in Colombia's parks: illegal colonos, legally held lands, and easements administered by another public agency. That these private pockets exist, and the desire to rid the system of them, was mentioned by a majority of the national level administrators but it was not their most serious concern regarding inholdings. The damage to the ecosystem, be it of an esthetic or biological nature, which results from these uses is what the respondents noted much more frequently. Seven of them felt it to be among the top five issues

confronting the park system on a national level. A biologist's statement is representative of the Division's general concern:

> It is not so bad that we have inholdings in our park system; this is more often the rule than not. The problem is that the way these people (inholders) are using their resources is affecting the basic concept of a park being an ecologically self regulating area. Either we must somehow adequately protect our parks, or we must stop trying to deceive the world by telling them that these areas are self regulating. As a biologist I am sometimes embarrassed to meet with international conservation representatives because I know they have so many misconceptions about my country's park system (personal interview, Division of National Park and Wildlife, September 17, 1974).

The last concern to receive a substantially high rating was that the present organization of INDERENA is not acceptable. It was the general consensus that the Division of National Parks and Wildlife suffered noticeably in the major reorganization of INDERENA which occurred in June of 1974. As a result of this bureaucratic reshuffling, parks no longer enjoy equal status with forestry, fisheries, soils, or watershed management but are subordinate to the Environmental Conservation Direction. One of the chief wildlife researchers told the author that getting parks on equal status with other resource divisions was his number one concern. He felt this reorganization to be the basis for not only many administrative complexities, but the ultimate reason for a reduced Division budget in 1974:

> We are not only competing with the other institutes that depend on the Minister (Agriculture) for their budgets, but now we must compete within the Direction (Environmental Conservation) which competes with the other Directions within INDERENA for funds. This is clearly an unacceptable situation in a country where parks are already playing such a biologically important role...that of a genetic bank and providing relatively undisturbed areas for scientific research (personal interview, Division of National Parks

and Wildlife, September 19, 1974).

This problem was also noted by the researcher in much of the daily office conversation.

In addition to these major problems, about which there was a high degree of consensus as to their seriousness, five other concerns were identified at least once during the individual interviews. A lack of basic scientific data about the parks was mentioned by four respondents as being a significant problem for the Division. Two biologists who rated this issue as their number two concern claimed that management and zoning decisions were being made arbitrarily to simply impress upon other Colombian agencies that the park system was in some way advanced and scientifically based. "Very little resource data exists in several national parks but nonetheless we are making planning decisions that would normally require months of field study" (personal interview, Division of National Parks and Wildlife, October 17, 1974).

The problems of long-range planning objectives were mentioned by only two administrators, although one ranked it as being the Division's most serious concern. Both interviewees to note this issue, related it to the lack of a sufficient budget and the substantial pressure for granting special favors. Long-range planning has been reduced in the words of one concerned employee to "an exercise in futility." In continuing, he complained that while the

> ...system looks good on paper it is primarily by good fortune and the hard work of a few people that so many ecologically diverse areas are included today. We have not until very recently begun looking at the country as a whole, at least

> in terms of a system of parks and reserves. Planning is largely still a hit and miss operation here for we do not have the support of all the agencies necessary to intelligently conceive and execute a management plan (personal interview, Division of National Parks and Wildlife, December 10, 1974).

Another concern mentioned above is the pressure for special favors. These pressures are primarily of a political nature and were recognized by two of the respondents as the fifth most important problem from a national scope. The pressures which are described were initiated primarily by various high ranking government employees and organizations in order to try to influence the development of park policy and activities which were related to private interests. For the most part, they are inconsistent with the objectives of reserved areas and have included pressures to exploit the natural environment for both its renewable and nonrenewable resources. Also requests to grant park concession contracts to politically influential persons instead of following the stated policy of trying to involve the local residents, and the outright demanding of land leases for private dwellings or agricultural purposes were noted. To date, the Division has been able to resist most of these threats but as one administrator lamented to the author, "Sadly we may see oil wells in the Macarena and hotels on Tayrona's beaches simply because we lack the necessary palanca here to affect high level government decisions and the selfish interests of the politically powerful" (personal interview, Division of National Parks and Wildlife, August 16, 1974).

Two other issues were surfaced here but have already been mentioned in the previous chapter: development pressures and lack of

eminent domain powers.

Regional and Sectional Office Managers

Managers from seven regional or sectional offices having national park responsibilities were interviewed, and a summary of their perceptions of important park problems is presented in Table XXVI. Several of the same issues mentioned by national office administrators were also noted among the seven distinct problems identified on the regional level although they were ranked differently by the two groups.

A high degree of agreement existed in regard to the most important problems from a regional perspective. With the exception of finances, which was ranked as the number five issue, the first three concerns identified by this group of interviewees were also ranked as being very important by the national office personnel. A lack of public support for the parks program was perceived by all of the respondents except one as either the number one or two concern which they faced. The regional or sectional offices are undoubtedly more sensitive to the reactions and demands of the local residents and must enjoy their support for particular projects in order to avoid long term conflicts. "We can have a park on paper" voiced one regional office manager, "but unless the campesinos support the project it will never really be protected: (personal interview, regional office, October 3, 1974). The manager was indicating that park boundaries will not be honored and such practices as grazing and poaching will continue unchecked unless the local residents can be shown that long

TABLE XXVI. MANAGEMENT PROBLEMS IN ORDER OF SERIOUSNESS AS IDENTIFIED BY REGIONAL AND SECTIONAL OFFICE ADMINISTRATORS

5 = most serious 1 = least serious

Management Problem	Interviewee #1	#2	#3	#4	#5	#6	#7	Total
Lack of public support for park program	5	3	4	5	5	4	5	31
Problems resulting from in-holdings and colono pressure	4	5	5	3	4	3	4	28
Lack of adequately trained park staff	3	4	2	4	3	5	2	23
Lack of support from national office		2	3	2	1	1	1	10
Finances	2				2	2		6
Lack of eminent domain power	1	1					3	5
Development pressures			1	1				2

term benefits of managing the area as a park outweigh their personal short term interests.

Both the problems resulting from inholdings and colono pressure and the lack of an adequately trained park staff were mentioned by every interviewee and were ranked as the number two and three overall problems, respectively. The fourth most serious issue from a regional scope, while receiving substantially less total points than the previous concerns, is important. Six of the respondents specifically mentioned that the field offices received less support from the national office than was desired. A lack of communication and coordination of plans and programs exists between these two administrative levels. On several occasions the author noted that the opinions of the regional personnel were not being solicited for plans of parks for which they would eventually be held responsible. In one of the western regions, the office manager clarified the complexity of this problem:

> There is much unnecessary duplication of work which could be eliminated if the field people were simply involved in the planning process more actively. They (national office) take credit for our successes and blame us for the failures. My park was literally planned in Bogota after a one-week visit by the national office boss; that includes boundaries, buildings and programs! This is no way to run a park system, is it? (personal interview, regional office, October 3, 1974).

The author subsequently questioned one reliable national office source about this complaint and while he recognized its existence, it was claimed to be the result of more than simply an unwillingness to cooperate with field people. During the course of the discussion

which followed, this administrator mentioned that one of the Division's major problems which affects planning coordination is the lack of any previous natural areas management experience:

> There are only five or six top quality scientists in all of INDERENA and the Division has at the most two of them. The remainder of its employees are either long term civil servants who inherited their positions or young people just out of school who have had no parks training. We are sort of in a trail and error period here but unfortunately our errors may affect our resources for many generations to come (personal interview, Division of National Parks and Wildlife, November 11, 1974).

Financial concerns was thought to be the fifth most serious issue and was mentioned by only three interviewees. However, several others indicated why they excluded finances from their ratings. Regional administrators felt they did not have much influence on the budget that was finally approved for their programs. It seemed to be a higher level administrative issue determined in Bogota, depending on how all of INDERENA fared in their negotiations with the Minister of Agriculture.

Lastly because INDERENA lacks the power to force property owners to sell, they will always have owners claiming that the price offered is not sufficient. As a result these private pockets will exist until the Division gains eminent domain powers. Also without proper financial support, INDERENA cannot even force illegal colonos out because they must also be compensated for improvements made to the land they claim. Two regional and one sectional office director ranked the lack of eminent domain as being one of their top five management problems. It is also a management impossibility, they claim, to

effectively regulate the associated inappropriate uses on these lands. The only additional issue mentioned as being important by the coastal respondents was the development pressure for hotels in Tayrona National Park.

Park Directors

Table XXVII contains the results of the nine interviews which were conducted with the individual park directors or acting directors in each Colombian National Park.[16] Twelve distinct problems were identified and subsequently grouped by the author for purposes of presentation and discussion. Apart from not having a fully operative park, which nearly everyone mentioned, the most serious concern that Colombia's park directors expressed was that the land declared to be national park was public in name only and actually held by inholders. This problem was serious enough to have warranted seven directors mentioning it. Six stated it to be either their number one or number two problem area. Only in Los Guacharos and Los Nevados, neither of which has been settled by colonos or property owners, was this problem not ranked as a major management concern.

16. Primarily because of a lack of access or visitation, neither the Sierra Nevada nor Las Orquideas have a full-time park director at this time. Therefore the most knowledgeable person from the regional office was interviewed in the case of these two areas. The directors of Los Katios and Tayrona were interviewed in Bogota. Also since the directors in both Purace and Isla de Salamanca had been recently replaced, the author interviewed the former directors who are much more knowledgeable about the areas' management problems.

TABLE XXVII. MANAGEMENT PROBLEMS IN ORDER OF SERIOUSNESS AS IDENTIFIED BY EACH OF THE COLOMBIAN NATIONAL PARK DIRECTORS

5 = most serious 1 = least serious

Management Problem	Interviewee #1	#2	#3	#4	#5	#6	#7	#8	#9	Total
INDERENA does not own park land - inholdings	1	4	5		5	4		5	5	29
Ecological problems resulting from incompatible uses or structures	5				4	5		3		17
Lack of adequately prepared inspectors	4	3		2	3	1	1	1	1	16
Inadequate environmental interpretation program-public support	2	2		3	1		3		4	15
Lack of support from national office				1	2	3	4	4		14
Lack of equipment and facilities			1	4			5			10
Gaps in scientific knowledge about park			4					2	3	9
Access difficulties			2			2			2	6
Lack of enforcement power				5						5
Difficulty with comprehensive planning objectives			3				2			5
Development pressures for tourism		5								5
Lack of safety for visitors	3	1								4

What the interviewees defined as ecological management problems resulting from incompatible uses or structures existing within or near to the park boundaries was ranked as their second most serious concern. The seven unacceptable uses identified by at least one of the respondents were: Roads, power lines, poaching, agriculture, burning, grazing, and mining. While these existing uses or structures were listed and ranked separately from that of inholdings, every interviewee recognized their interconnectedness. These conflicts were mentioned in only four parks, but where they exist, they were felt to be very serious. In two parks incompatible uses were ranked as the most important management concern.

While the directors ranked the lack of adequately prepared inspectors as their third most important concern, it was the most frequently mentioned. This issue was among the top five in every park possessing inspectors. The superintendents in the most heavily visited parks (Salamanca, Tayrona, and Purace) unanimously agreed that their field staffs were not properly trained to be meeting the public, answering their questions or conducting interpretive walks. One director in talking about his personnel problems specifically referred to this concern:

> It is not physically possible for me to meet each visitor to my park. They have enough questions that I could literally spend my entire day responding to them. The sad part is that not enough of my inspector staff are properly trained to assist me. Not one inspector has ever received any interpretation training from anyone but myself (personal interview, Colombian park director, October 22, 1974).

Six park directors ranked an inadequate environmental interpretation program as being an important management concern. Over-all, this issue was the fourth most serious. The problem could be partially solved, according to several respondents, by investing a percentage of the park budget in basic outdoor education projects. However this problem also has an administrative origin as the directors themselves generally expressed:

> Whatever the motivations of the regional office personnel, they are much more interested in having people simply recreate, than in interesting anyone in venturing out beyond the high-use area to explore nature. That will satisfy a great majority of our visitors at present; but our responsibility is to all of the public. Regional managers are in general more interested in the quantity of visitors to help justify an increased budget than in the quality of an individual visitor's experience (general opinion expressed by park directors).

While most of the directors claimed to have plans for outdoor education projects in their particular parks, all admitted that should the office grant permission to proceed with a program, none really could. The related problems of adequately prepared inspectors to lead nature walks or present slide talks would undoubtedly hamper the program's progress. Also simply freeing a minimum number of personnel for interpretive duties would jeopardize routine maintenance and patrol responsibilities in several parks. One director elaborating on this point frankly stated that he did not want an interpretation program in his park because his staff and equipment were now spread so thin that the added responsibility would destroy his entire work plan. In nearly every case, the lack of an outdoor education program was related directly to a lack of public and financial support for

local park goals.

The lack of interest and support from the national office in Bogota was also mentioned by this group, but as their fifth most serious concern. It was ranked very high in two parks, and in three others this issue was important enough to be mentioned among the five most serious problems. In Los Katios a lack of interest from the national office was not mentioned as a concern. This is partially due to the fact that it has a very ample budget from the U. S. Department of Agriculture and is relatively autonomous from decisions made in Bogota which directly affect the administration of the country's other parks.

However it must be re-emphasized that concerns of this nature are not unique to Colombia but are a common lament in many park operations. This is partially because parks are often mistakenly relegated a low priority in national government planning. Nor are these concerns necessarily a reflection on central office officials. There usually is a genuine shortage of funds for field travel and a shortage of personnel to cover all legitimate field problems. Also field officials sometimes forget that headquarters personnel have to undergo time-consuming political and budgetary rituals that leave them exhausted. The main office routine is unfortunately grueling, and not necessarily the type of job field people imagine.

It is also interesting that the directors from the three northern parks did not mention this issue. This is felt to be a result of two factors: First, the strong and semi-independent administrations found

in the INDERENA coastal offices and second, Salamanca and Tayrona are reasonably well financed because of tourist demands. As a result, the directors are able to plan with much more consistency than in the other regions. "They (coastal offices) want to have as little to do with the national office as is possible," stated one national office administrator (personal interview, Division of National Parks and Wildlife, November 11, 1974).

During the interview process, seven additional problems were mentioned by at least one of Colombia's directors as being an important issue in his park even though individually they may have scored low when compared with the concerns expressed about the entire system. Three of these issues, gaps in the scientific knowledge about the parks, difficulties with comprehensive planning objectives, and tourism-development pressures have already been mentioned in relation to one of the groups previously examined.

The remaining four concerns were the following: a lack of sufficient equipment and facilities; access difficulties mentioned in the cases of three parks - Los Guacharos, La Macarena and Los Katios; the lack of enforcement powers, mentioned as the main problem in one park; and a lack of safety precautions for park visitors, noted with reference to the two coastal parks, where a significant number of drownings have occurred because of a dangerous riptide.

Park Inspectors

The park inspectors had an exceptionally high consensus as to the

most serious problems. From a total of 18 inspectors who were interviewed from seven national parks, only nine separate issues were identified.[17] The results were organized by park since that was the reference point from which they were asked to respond.

As was anticipated, the author experienced some difficulty when interviewing this group of non-professional INDERENA employees since they tended to misinterpret the questions. This was not their fault but probably an inherent problem when one expects professional and non-professional people to respond to similar inquiries with the same base of understanding. In several instances, these respondents identified personal problems which were felt to affect their work in the park rather than park management problems. While surfacing this type of information was not the major goal of the interviews, the author feels that it is important to report these findings along with the responses that are more comparable with the other groups. The problems of a personal nature reported in Table XXVIII were mentioned with such regularity that they were undoubtedly important to the inspectors and affected their performance in the park. Therefore a certain amount of care will be required when trying to cross-correlate the responses of the three professional groups with those of the inspectors.

For example, a low salary and not being paid regularly, which

17. No inspectors were assigned to the Sierra Nevada de Santa Marta National Park as of December, 1974. The author did not visit Los Katios National Park and therefore inspectors from that park were not interviewed.

TABLE XXVIII. MANAGEMENT PROBLEMS IN ORDER OF SERIOUSNESS AS IDENTIFIED BY PARK INSPECTORS.

5 = most serious 1 = least serious

Management Problem	Park #1	#2	#3	#4	#5	#6	#7	Total
Low salary and not being paid regularly	3	4	3	4	5	4	4	27
Lack of concern from regional and national office	5	3	5	1		1		15
Lack of sufficient training and field preparation			4	3		2	5	14
Lack of equipment		5			4	5		14
Not being able to live with family	4	2	2	2	2			12
No interpretive information to distribute to the public	2			5	1		1	9
Understanding concept of national park	1					3	2	6
Vigilance problems - lack of enforcement powers					3		3	6
Dealing with public's lack of respect for resources		1	1					2

was noted by nearly every inspector interviewed, is really not a management problem of the park itself but a personnel problem which must be resolved with the administration. This issue, while never indicated to be the most serious in any individual park, received twelve points more than the next most important concern. One Macarena inspector stated that it had been three months since he had received a check. "How do they (INDERENA administration) expect me to feed my family?" he asked (personal interview, Colombian park inspector, November 2, 1974). This problem was noted to be more serious for inspectors living near large cities because of a higher cost of living.

The second most frequently mentioned problem was that of a lack of concern from either the national or regional offices. Even in the parks which are located near to a regional or sectional office, the concern is obviously important. It was mentioned in five of the total of seven parks in which inspectors were interviewed. One inspector stated how often he notes concern from his bosses at his remote outpost, "The last time I received a new uniform was when the bosses from Bogota visited the park in February (1974). We are stationed out here without even any method to contact the office in case of an emergency because our radio is broken" (personal interview, Colombian park inspector, November 2, 1974).

In four parks, the inspectors indicated that they had received insufficient training and field preparation for some of the responsibilities within their park. Three individuals mentioned to the investigator that they had particular research interests which they

desired to pursue but that there was no encouragement from their bosses to do so. Equally important is a problem familiar to many park systems around the world; that of a lack of field equipment. In the three parks in which this problem was noted, it was ranked as either the first or second most serious concern. Stated one inspector:

> We have two patrol boats here and both have been broken for nearly eight months. Although I cannot state it with any positiveness, it is understood that the regional office has received much free equipment from international organizations. Well none of it has ever made it out to this station. I sometimes believe it is stored until someone important is going to visit a park and then a real performance is put on to try and impress these visitors. This is no place for someone with a weak spirit (personal interview, Colombian park inspector, November 2, 1974).

Although primarily a personal concern, the fifth most frequently mentioned issue was that of not being able to live with their family. Noted by married as well as unmarried inspectors, several of them complained that they only leave their park on an average of once a month for a home visit. There is no simple solution to this problem since INDERENA cannot afford to build family living units for the married staff within the parks nor do the inspectors want to risk leaving their position to begin searching for a new job.

The remaining four problems which were mentioned at least once during an interview are of relatively minor importance. Three inspectors from the Isla de Salamanca who were interviewed together, one from Las Orquideas and one from Los Nevados mentioned the fact that although helping to protect the resources, they personally did not understand the concept of a national park. One inspector boasted of

killing a brown pelican and also stated that he regularly hunted turtle eggs. While this man may have been fabricating these stories to somehow impress the author, a lack of basic conservation knowledge by park inspectors themselves is considered to be a major problem not only for the park, but for all of INDERENA.

In Cueva de Los Guacharos and Tayrona the opposite opinion, that of the public's lack of respect for the parks' resources, was mentioned by the inspectors. In Los Guacharos, visitors to the delicate caves where the oil bird lives not only litter but disturb the birds and their nests. Poaching of this valuable bird for the oil it contains was also noted. In Tayrona, robbing of the ancient burial sites by professional guaqueros and tourists is a constant policing problem.

Lastly, in two parks, both of which have large inholdings, the lack of enforcement powers was ranked as being among the top five management problems. The tremendously large areas that were supposed to be guarded by such small forces and the difficulty of transportation when advised of an infraction made the inspectors' vigilance patrols nearly impossible. Also the fact that in several areas the police or military authorities did not cooperate in arresting violaters apprehended by INDERENA, made the inspectors feel as if their job was unimportant.

General Comparison Among the Four Groups of INDERENA Employees Interviewed

Table XXIX indicates that there were 28 distinct management

TABLE XXIX. COMPARISON OF MANAGEMENT PROBLEMS AND FREQUENCY MENTIONED BY GROUP INTERVIEWED.*

Management Problems+	Interviewees				Frequency Noted
	Nat.	Reg.	Dir.	Insp.	
Problems with inholdings Roads Power lines Poaching Agriculture Burning Grazing Mining	7	7	7		21
Lack of trained personnel	6	7	8		21
Lack of public support for parks - no interp. program	7	7	6		20
General finances	9	3			12
Lack of support from national office		6	5		11
Lack of scientific park resource data	4		3		7
INDERENA organization	7				7
Low salary and not being paid regularly				7	7
Lack of eminent domain power	4	3			7
Lack of equipment and facilities			3	3	6
Not being able to live with family				5	5
Lack of concern from regional office				5	5
Development pressures	2	2	1		5
Planning problems	2		2		4
No interpretive information to distribute to public				4	4

*Nat. = National office
Reg. = Regional office
Dir. = National Park directors
Insp. = Inspectors

+The issues listed from roads to mining are specific problems of inholdings.

TABLE XXIX (continued).

Management Problems	Interviewees				Frequency Noted
	Nat.	Reg.	Dir.	Insp.	
Lack of sufficient job preparation				4	4
Difficulty in understanding park concept				3	3
Access difficulties			3		3
Vigilance problems - lack of enforcement powers			1	2	3
Lack of visitor safety			2		2
Special political favors	2				2
Lack of public respect for resources				1	1

problems identified during the interview process. Park inspectors tended to identify personal concerns, which although important from their perspective, were not perceived to be so by the other groups. The inspectors shared only two problems in common with another group: A lack of equipment and facilities, and a lack of enforcement powers.

There was generally a high degree of agreement as to the most serious management concerns among the three professional groups of respondents. Of the 15 problems identified to be important by at least one of the professional categories,[18] four were unanimously thought to be significant. Problems with inholdings, and a lack of trained personnel were noted with the most frequency. Each was identified 21 times. A lack of public support for the parks program, which was recorded on 20 occasions, ranks as the third most important management problem within INDERENA. The last common concern, that of development pressures in the case of Tayrona National Park, was recorded only 5 times.

Additionally, five problems were mentioned by members of two groups. Financial problems, and a lack of eminent domain powers were identified in common by national and regional personnel. The national administrators and park directors believed planning problems, and the lack of scientific park resource data to be commonly shared problems, while regional managers and park directors exclusively noted the lack of national office support as a shared area of concern.

18. This number does not include the seven specific ecological problems identified by park directors as being a result of inholdings.

Description of Selected Management Problems and Possible Solutions

In this section selected management problems existing within Colombia's national parks are described and where appropriate possible alternative solutions to these issues are offered.

Inholdings in Colombian National Parks

Probably every country in the world which possesses a system of national parks or reserves has had to consider the sensitive issues involved with inholdings in areas declared to be part of the public domain. Although ideally it is probably most desirable to have parks that are entirely in public ownership, there are only a few countries of the more than 130 which have reserved areas where this is the case. In the United States, for example, only seven national parks are entirely free from private ownership (Cahn, 1968:32). Because of escalating land values, extended court cases, and legal details, the U. S. Park Service has been slow in its attempt to purchase or even condemn the many private pockets within U. S. National Parks. These are obviously complex issues which, in order to obtain a workable solution, invariably involve considerations other than just the values to be derived from the park. Many times far-reaching social, economic and political consequences result from the decision of how to best deal with inholdings.

Tracing the history of how individual countries have resolved these incompatible uses provides us with little more than a spectrum

of alternatives, ranging from ignoring the problem to eliminating all property claims and forcing the abandonment of legitimate and illegitimate land claims without any compensation. While both of these extremes have their advantages and disadvantages, each country must ultimately decide how best to handle this issue. Case studies are of course a valuable aid, but what is feasible in one area may be, because of a difference in government philosophy, monetary circumstances, social problems or any number of variables, impossible to implement even in a culturally similar country.

For example, Costa Rica successfully relocated 28 colono families in Santa Rosa National Park within a six-day period by involving ten government agencies and the United Nations (Sutton, 1972b:186). All this was accomplished at a total cost of $16,000 U. S. It was tremendously successful for Costa Rica, but in Colombia the same program might not work. It remains for Colombians to test its applicability.

The problem with inholdings in Colombia is threefold: illegally claimed land by colonos, privately and legally held properties, and public easements managed by another government agency. Three of the four groups interviewed specifically identified the existence of one or all of these types of inholdings as being a major management problem. Personnel from both the national and regional offices of INDERENA noted inholdings to be one of the most important conflicting interests and the source of much political pressure for private benefits at the expense of the country's parks.

The park directors' responses also indicated the fact that

INDERENA does not own all of the land which has been declared to be within the park boundaries. This is a serious problem in seven of Colombia's nine national parks. Only in the cases of Los Guacharos, which because it is a small caved area, and Las Orquideas which has almost no access, was this problem not mentioned. Although the inspectors did not mention the existence of the inholdings to be a particular problem, in two parks they rated the vigilance and enforcement problems associated with colonos as a concern.

Legally the issues surrounding this problem in Colombia present a confused picture. Article 14 of Law 2, 1959, specifically prohibited the existence of private lands within national parks and carried the power "to expropriate the lands or improvements of private holdings that exist within them" (Colombia, 1969:7). These powers however were never assigned to a particular government agency and were therefore never utilized. Subsequently Decree 2420 of 1968 which instituted INDERENA and Accord No. 42 of 1971 which established the Colombian System of National Park Reservations both made reference to parks being part of the public domain excluding private uses or interests. But, as was the case before, INDERENA was never granted specific eminent domain powers with which to enforce either of these laws.

Initially the problem with both the numbers and types of inholdings within reserved areas was not very serious. But with INDERENA's formation, the publication of approximate boundaries, and the initiation of a vigilance program, the problem, particularly with colonos,

grew substantially worse. Colombia began experiencing what many other nations had found to be a predictable pattern with regard to national park establishment: the declaration of a parcel of land as part of the public domain often starts a rush by squatters to claim land with the hope of being reimbursed for their capital investments when forced to abandon the park lands. Additionally much land was sold to unknowing private individuals by corrupt land speculators after it had been designated a park; the result of insufficient circulation of park laws and the lack of exact boundary data by INDERENA. Finally, other public agencies have claimed portions of certain national parks. Two noteworthy cases have occurred: One in the case of Salamanca where a strip of land running the entire length of the island was designated for road and power line construction, and a second in the Sierra Nevada where a large Indian reservation was carved out of the existing park.

The National Parks and Wildlife Division of INDERENA proceeded with the establishment of national parks even when private or settled lands were known to be existing within the proposed boundaries. The process at least gave the hope that these parks on paper would someday be de facto reserves and allowed INDERENA to begin both a vigilance program and the acquisition of lands held by persons willing to sell. However one of the major problems with these initial efforts was that a cut-off reimbursement date for land improvements was never established. INDERENA attempted to control the influx problem with boundary patrols but as one administrator told the author, "In the

early days we never had enough inspectors in any of our parks to prevent illegal entrance by colonos or poachers and to a large extent that is still the case today" (personal interview, Division of National Parks and Wildlife, September 20, 1974). Presently however, the official boundaries and cut-off dates are much more widely circulated and the control of additional colono influx has been noticeably slowed in a majority of the parks.

A previous chapter, discussed the substantial progress which has been made by INDERENA toward eliminating existing colonos and purchasing private properties on a park by park basis. Despite not having condemnation powers, funds from the National Agrarian Reform Institute (INCORA) were initially used for the reimbursement programs as well as for the purchasing of lands on which to relocate colonos.

The problem with colonos, although much less serious as a whole today, is still present in the Macarena, the Sierra Nevada de Santa Marta and Purace National Parks. No one is exactly certain of their numbers in the first two parks, but in Purace they have remained constant since the park's declaration in 1961. This resulted in an influx of 30 families into the park's most northwestern portion. To date, these families are still residing within the declared boundaries because government funds were never authorized for purchasing their lands nor was a re-establishment site chosen.

The problem has been "resolved" in a different manner in the other two cases. In what seems by the author to have been an attempt to obtain a rapid management solution, the boundaries of the Macarena

and the Sierra Nevada were redrawn to exclude colonized areas. What these decisions overlooked was the fact that the new boundaries are no more defensible than the original ones and that the concept of these parks being ecologically self regulating has been substantially weakened.[19] This is at best a temporary solution, for the Sierra Nevada has no inspector staff to impede further colonization, and there is good reason to believe that the thousands of colonos presently living within the old Macarena boundary will also continue to erode this unique area in search of additional resources. Dr. Federico Medem, with the perspective gained by nearly three decades of work in the Macarena area commented concerning the colono situation in a personal interview with the author:

> There is simply no ecological foundation for redrawing the park's boundaries. INDERENA lacks the power to enforce these just as the old boundaries, and it's not their fault. The only way to insure that ten years from now the Macarena won't be again halved, bowing to the population pressures of the colonos, is to utilize the military for boundary defense and in sufficient numbers that the colonos get the idea that this area is going to be a true biological reserve - at any cost (personal interview, Dr. F. Medem, November 10, 1974).

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19. Not even the largest parks in East Africa, which are several times the size of Colombia's largest reserve, are self regulating ecological units according to Dr. Antoon de Vos. For example, Serengeti National Park which covers an area of 5,800 square miles is not self regulating according to the accepted scientific definition "since hundreds of thousands of animals migrate beyond its boundaries at certain times of the year." Dr. de Vos published these remarks in a paper entitled "Problems in National Parks Management in East Africa" Canadian National Parks: Today and Tomorrow. Calgary, Alberta, October, 1968.

The picture of private legal inholdings is much clearer. Table XXX summarizes the most recently available information with reference to the four national parks having the most serious problems.

In the cases of both Salamanca and Tayrona, the total amount of land legally held has been substantially reduced since 1965 when the first censuses were conducted because of land owners willing to sell their properties. Now however since the remaining lands in these two parks becomes more valuable daily and the owners better organized and more politically influential, INDERENA will undoubtedly not be able to acquire these remaining properties without eminent domain powers. One official commented in reference to Tayrona: "The government, by not forcing these owners to sell, is providing a few influential people with vacation homes that because of spiraling land values are the best financial investment possible in the country" (personal interview, Division of National Parks and Wildlife, August 14, 1974).

In both Purace and Los Nevados however the amount of land legally held has remained practically unchanged since their respective establishment dates. Purace's difficulties revolve around a 2,400 hectare Indian reservation located in the southwestern portion of the park. Originally the Governor of Cauca declared the reservation to be park of the park and had planned to simply relocate the Indians to an area adjacent to the park's southern boundary. These descendants of the Paeces civilization, who have long since abandoned their tribal dress and customs were never considered as an indigenous tribe by

TABLE XXX. PRIVATE LEGAL INHOLDINGS IN SELECTED COLOMBIAN NATIONAL PARKS AS OF AUGUST, 1974.

Park/Year	Hectares	% of Park
Salamanca (1973)	4,200 has.	20%
Tayrona (1972)	600	5
Purace (1973)	2,400	3
Nevados (1974)	33,300	85

park officials. However they produced a valid land title from 1892 and also claim to have a land decree directly from the Crown of Spain dating from the early 1600's. The Colombian government had no choice but to recognize the sovereignty of their titles and therefore the Indians remain in the park. They are restricted from selling land to persons outside of the tribe by law. INDERENA has proposed that strict regulations monitoring the management of the natural resources within the area be put into effect, but as of yet they lack both the power and political support with which to impose and enforce such regulations.

Approximately 85 per cent of Los Nevados, which has recently been declared a national park, is privately and legally held according to a 1974 census conducted by the INDERENA sectional office in Manizales. Because these people are predominately cattle and sheep ranchers, a special dilemma has resulted. INDERENA has no money with which to purchase any of these properties even if selected owners were favorable to selling. Although this would at first appear to present no apparent problem for these farmers, since the value of their lands is increasing rapidly, they no longer qualify for agricultural credits from the Minister of Agriculture. Also because the area has been declared a national park, farming and grazing activities are theoretically prohibited by law. The farmers are therefore caught in an economic limbo; unable to invest in their lands or buildings because they will not be reimbursed for any improvements made after the establishment date, unable to receive government aid, and yet unable

to sell to INDERENA.

Each of the cases mentioned above is somewhat unusual, but in order to deal with this problem in an administratively coherent manner, a basic park philosophy and regulation document is needed. Exceptions to the stated policy must not be allowed to become so common that the effectiveness of the rule is weakened. Colombia is fortunate in this regard in that Accord No. 42 (Colombia, INDERENA, 1971a) defines the exact management goals of each type of area within the system. This type of document may be unique to all of Latin America where it is more the accepted policy to consider potential problems on a case by case basis. While this statute permits no inholdings within the boundaries of any reserved area, for the complex reasons discussed above many inholdings are still found within the system.

In light of this information, the only acceptable alternative in Colombia is to eliminate all private properties and land claims as rapidly as possible and strictly enforce the existing national park zoning scheme. This will require that INDERENA be granted expropriation powers and the necessary funds for land acquisition and relocation funds.

The road to complete ownership of public parks is not an easy one, but if Colombian law is to be enforced and the integrity of the system maintained worldwide, the process must be initiated.

Ecological Problems Resulting from Incompatible Uses Existing Within Colombian National Parks

As was mentioned in the first portion of this section, most of the uses judged by Colombian conservationists to be in opposition to national park management goals, are a direct result of the lack of control over inholdings or undesirable uses immediately outside the park boundary. Normally, park managers do not permit the existence of incompatible uses on public lands, particularly ones with long-term effects. There have been notable exceptions particularly in the U. S. where carrying capacities have been exceeded and congestion has resulted in big city problems and serious degradation of the resource base and the national park idea. In 1967, serious crimes committed in national parks rose 67 per cent as compared with a 16 per cent rise in the crime rate in U. S. cities (Cahn, 1968:10). This is generally thought to have been caused by overcrowding and overdevelopment in the park (The Conservation Foundation, 1972).

Since overuse is not yet one of the problems with which Colombian reserves are presently faced, most of the problems identified by the park directors which result in ecological alteration or degradation are derived from the more predictable sources: lack of control over illegal, legal and public easement inholdings. Colombia should however heed the warning of Clawson (1972), Schloeth (1972) and others who have predicted that all countries will soon experience the pressures from overuse. Planning to face this issue should begin now while comprehensive plans can be carried out in a rational manner

rather than late attempts to save the resources in a patchwork fashion.

It is not necessarily the case that inholdings are intrinsically incompatible with park goals when properly managed. Many park systems grant life leases whereby the present owners continue to live in their home and are awarded fair market value. The property, which is normally strictly zoned, passes into the public domain upon their death. But as George Hartzog, former director of the U. S. National Park Service, has stated many times, inholdings get out of control and the resulting uses may have either an esthetic or biological impact on the area which "are a threat to the dignity of the park" (Cahn, 1968:32). His examples of some of the uses being conducted on inholdings in U. S. parks makes this point amply clear:

> On private lands within parks you will find lumber yards, pig farms, gravel pits, logging operations, and sheep and cattle ranches...plus power plants and mine shafts, auto junk yards, garbage dumps, private plane landing strips and proliferating residential subdivisions (Cahn, 1968: 32).

Colombia's problems are not nearly as diverse as those confronting the U. S. system but they are not any less complex; involving socio-economic, political and biological variables.

Presumably because they are more directly aware and therefore more sensitive to the field issues, ecological park problems were ranked as being important by both regional office administrators and park directors (see Tables XXVI and XXVII). Examples of these problems were noted in four parks: Isla de Salamanca, Purace, La Macarena and Los Nevados. These areas include both old and young

parks and at least three distinct ecosystems. The seven problems referred to in the text of this section are as follows: Roads, power lines, poaching, agriculture, burning, grazing and mining.

Specifically identified by the former director of Salamanca to be its number one management problem was the existence of the highway which traverses the entire length of the park. William Hart identified major road construction to be one of the greatest "forces operating against the recreation resource base" (Hart, 1966:64). The road which connects Barranquilla and Cienaga was constructed in 1953 and therefore preceded the park establishment by more than ten years. The fact that the highway will remain is not questioned by anyone, but the road's continued impact on the park, which has resulted in multiple problems, can be considerably lessened according to park personnel.

The most severe impact to the island, as a result of the highway, is of a biological nature. The road-bed construction, which required substantial bulldozing from adjacent areas, effectively formed a several-meter-high barrier to the free interchange of salt and fresh water so vital to maintaining the island's delicate vegetative balance. The park has been biologically divided into two parts according to Ciardelli (1968); the result being that the Caribbean side has become more salty and that the southern Cienaga side almost exclusively a fresh water area. Grimwood (1968) documented the fact that the vegetation suffered tremendously as an apparent result of this salinity change and claimed that large areas of mangroves were completely

eliminated. Also when the habitat was altered so drastically, the logical result was that the animal life of the area also reacted. Dr. Gilberto Toro who spent several years studying the ecology of Salamanca offered this statement concerning the highway's effect on the park's wildlife:

> According to the biological history of the area, 25 years ago, before the road was constructed, the island was a different site from how it appears today. Many mammals have been either eliminated or forced to move because of habitat alteration. Also the native bird and fish populations have altered their traditional nesting sites and feeding grounds. This can be directly attributed to the construction of the highway (personal interview, Gilberto Toro, Division of National Parks and Wildlife, September 20, 1974).

The road also created other problems not the least of which is a safety hazard. INDERENA has neither check points, at the limits of the island, nor the ability to regulate speed on this highway. Speeds of 130 kph are easily attainable and with the recent completion of the Magdalena bridge from the mainland, the volume of traffic has at least doubled according to park inspectors. There are not only several serious vehicle accidents each year, but the danger to pedestrian traffic and wildlife is extreme. The author hiked approximately 4 kilometers of this highway during a field visit in December, 1974, and encountered four carcasses of recently killed small mammals, the remains of two snakes and 12 birds; all obviously victims of highway traffic. "This is a race track direct from Barranquilla to Santa Marta," according to one inspector, "and the effects to the park from the noise, vibration and road kills, not to mention esthetics are horrible" (personal interview, Colombian park inspector,

December 6, 1974). In addition, there has been a noticeable increase in the amount of roadside litter, the quality of runoff to areas adjacent to the road[20] and the effect on the visitors' experience as a result of the increased volume of traffic.

If properly regulated for visitor use only, the highway would serve a very valuable purpose; that of permitting "the driver and passangers to enjoy the scenery along the route" (Miller, 1967:60). Two possible alternative solutions to this problem are presented. The first would be to relocate the highway for through traffic outside of the park, south of the Cano Clarin Nuevo (see Map 3). While undoubtedly a very costly proposal, the existing bridge is located south of the Cano and therefore could serve both park and through highway traffic.

An alternative to this proposal would be to install guard stations at both ends of the park and strictly monitor both the speed and volume of trans-park traffic. This proposal is the minimum which should be undertaken in order to help regulate the park's most serious problem. It is also suggested that because the maintenance of the roadsides is an expense presently incurred by INDERENA, the possibility of a through traffic toll-park entrance fee be seriously considered to help defray these expenses.

What was judged to be the second most serious incompatible use

20. Storm runoff water, with a detectable oil film, was noted in drainage ditches adjacent to the highway. A water quality analysis was not completed, but the result of this runoff is obviously not positive.

existing on the Isla de Salamanca is also the result of a publicly managed right-of-way. In 1971 the National Energy Office and the Public Works Division appropriated a strip of land approximately 12 meters wide paralleling the highway for the construction of 180 high tension towers in order to improve electrical service to several coastal cities. Although vigorously opposed by INDERENA as a potential ecological disaster there was really never any possibility of an alternative site being selected or the cable being buried. As one high-ranking coastal official from INDERENA stated, "It was a beautiful example of a decision based purely on economics and another case when INDERENA's lack of political palanca was very obvious" (personal interview, regional office, December 7, 1974). The location of the towers was defended primarily on the basis of the existing road eliminating a maintenance access problem and the fact that private land would not have to be purchased. When the construction began however INDERENA received yet another surprise. The tower platforms were installed on the Caribbean side of the highway, therefore resulting in an esthetic problem for the park's administration. An additional justification put forth by the power companies in an attempt to explain why towers had been selected over an underground cable was that the island's birds would utilize the powerline as a roost, therefore enhancing the wildlife viewing potential for park visitors.

By early 1972, the cable was functioning and the proof that it would have severe esthetic and ecological consequences was beginning to become abundantly clear. One of the most serious effects

immediately noted by park personnel resulted from the clearing of the right-of-way with the use of indiscriminate herbicides to prevent the mangrove vegetation from returning. No exact scientific data was ever compiled, but the park's wildlife, particularly the birds, suffered heavily. An inspector told the researcher that many egrets and other species died from what was judged to be poisoning. Also as illustrated in Photos 8 and 9, the results of the "bird-roost-theory" became very clear, much to the dismay of the park staff.

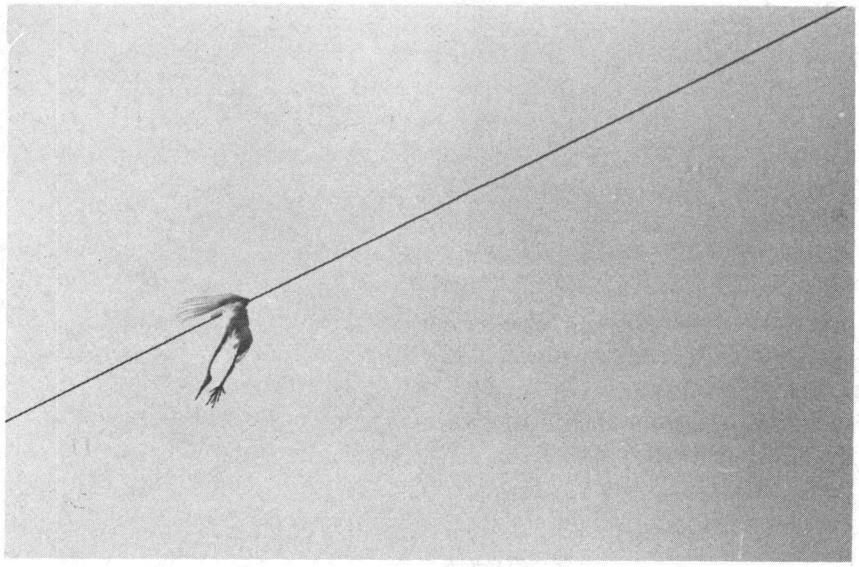
In the long run, the most serious effect of the location and construction of this powerline within the Isla de Salamanca may be the fact that a very serious precedent was established. The existence of the highway, and the electrical potential created by the powerline have already been used as supporting evidence for the hotel-tourist project in Tayrona National Park. What will prevent future "powerline" type decisions from being made in other national parks? Certainly the importance a nation places on the social advancement of its citizens cannot be overlooked. But basic park values should not be readily sacrificed in the future without a serious evaluation of the alternatives and their long-term effects on the country's resource base.

It has been the experience in many national parks around the world that the illegal poaching of wild animals is a serious problem. Ruurs identified poaching as "the most serious over-all management problem" in six of the park systems he analyzed (Ruurs, 1974:54). He recommended that a more concerted international effort be made to work

Photo 8. Scene on the Cano Clarin, showing power lines, Isla de Salamanca National Park.

Photographed by: D. L. Golobitsh

Photo 9. Many birds are being killed on the Isla de Salamanca as a result of wire collisions and electrocution.



Photographed by: D. L. Golobitsh

towards the solution of this issue. Colombia is no exception to this general rule and it was found to be a particular concern in three parks: Isla de Salamanca, Purace and La Macarena. This problem is inherently related to the presence of indigenous populations and colonos residing either within the park area itself or in the immediate vicinity.

Primitive people have always depended on wild animals as one of the main sources of food. It is generally accepted that because their numbers were so few and sparsely concentrated, the over-all impact on animal populations was minimal. In Latin America where spontaneous settlement has historically been almost a right, groupings of immigrating rural populations have increased greatly and the impact of man on animal numbers and habitat began to have its effect.[21] This is true to a certain extent even in the case of concentrations of indigenous peoples, for in 1969 Pierret and Doujeanni estimated that a typical Indian family on the Rio Pachitea in Peru annually consumed 30 monkeys, 7 tapir, 50 peccaries, 220 turtles, 20 deer and 110 birds (Pierret y Dourjeanni, 1966). These numbers, combined with the effects of a slash and burn system of agriculture, has led to large areas being literally denuded of all the original plant and animal species.

Hunting, other than for specifically approved scientific purposes,

21. This has been particularly true in the areas near La Macarena and the Sierra Nevada de Santa Marta since the outbreak of the Violencia in 1948 when many thousands of people fled the city in order to avoid persecution.

has been banned in all Colombian reserves since the passage of Law 2 of 1959, but without enforcement potential, poachers both knowingly and unknowingly enter national parks in search of game. In addition to subsistence hunting however, both Indian and colono populations in Colombia have been enticed into the economic web of supplying the illegal hide exportation business. This situation has undoubtedly intensified the pressures on the wildlife rich areas in Colombia. Van Wyk in a recent article concerned with the effects of poaching, summarized the contributing factors to this world-wide problem.

> Increased poaching intensity can thus shortly be ascribed to population pressure, poverty and famine, tradition, the taming of earlier wilderness areas, ignorance and greed. To this also can be added factors such as better weapons, availability of more and better transport, and the accessibility of earlier remote areas as a result of better roads (Van Wyk, 1972:300).

In La Macarena National Park, the problem of poaching has been a serious once since the migrations to this area began in the early 1950's. Los Micos, for example, located within the original boundaries of the Macarena had an estimated population of 5,000 persons in 1972 according to government census figures. First hunting for survival and later for profit, the colonos have "systematically destroyed what was possibly one of the most biologically significant areas on the planet" according to Dr. Medem (personal interview, Dr. F. Medem, November 10, 1974).

Dr. Antonio Olivares noted 13 species of birds found in La Macarena area which are collected either for their plumage or for the pet trade (Olivares, 1969) and Perry stated as recently as 1972 that

representatives of the Crocodilia found in the Macarena are either "seriously threatened" or "exterminated" with the main incentive being the demand for their valuable skins (Perry, 1972:439). Many of the large mammals including members of the cat and primate families have also been hunted within the reserve, and there is little, if anything, INDERENA can do to stop this flow of valuable hides to the world's markets. Of course, the rarer the animal the more financially profitable is the catch and therefore while the more common species are being exploited, the endangered ones are being hunted to the point of extinction. "The flow of skins and other animal products from the Macarena is incalculable" according to a sectional biologist in Villavicencio (personal interview, sectional office, November 13, 1974).

There is an additional public education problem in the Macarena with campesinos, who are trying to abide by the law, but do not understand when animal collection is conducted in the name of science. "Not understanding why these visitors (scientists) can kill monkeys for experiments and why they cannot do the same for food is one reason why people here resort to poaching" according to a Macarena inspector interviewed in Villavicencio. "They get the idea that this is a hunting reserve for a privileged few" (personal interview, Colombian park inspector, November 13, 1974).

Lastly, a very real problem expressed by an inspector in the Macarena gave the author a new insight into this complex and sensitive issue. He commented:

> Many of the people poaching in this park are poorer than we and have been our friends for years. Do you really think that we are going to arrest them? We also have been forced to harvest some animals in order to supplement our diet out here in the field and are therefore also technically breaking the law (personal interview, Colombian park inspector, November 6, 1974).

On the Isla de Salamanca the general problems with poaching are primarily from nearby residents who enter the park illegally for subsistence hunting. The magnitude of the problem is however much less serious than in other areas; sadly because the animal populations have already been drastically reduced. But even with controls, the prospect of unassisted return of many of the major mammals, where numbers have been reduced below reproduction levels, will take much longer than is normal because "immigration from surrounding areas is inhibited by its island state" (Grimwood, 1968:6).

There has also been a limited amount of illegal duck hunting and fishing but its magnitude is not considered to be serious at the present time. Grimwood (1968) and others have reported that large numbers of flamingos, most likely from Salamanca, were at one time exported live from Barranquilla. However this trapping occurred before the park's declaration and since that time the remaining flamingos have abandoned these Caribbean beaches.

Both the endangered Mountain tapir (*Tapirus pinchaque*) and the Spectacled bear (*Tremarctos ornatus*) inhabit Purace National Park and have undoubtedly been poached by both *colonos* and members of the Paeces tribe since the park's establishment in 1961. However the major problem today in Purace is entry for illegal fishing. While

inspectors patrol the areas most frequented, the former director frankly admitted that there was a lack of enthusiasm to do so. Local police will not detain violators and, since most of the fishing is for subsistence reasons, the problem is not felt to be so grave as to be endangering any particular species. The problem from a management standpoint is that a precedent is being established. "If Purace gets a reputation as a fishing paradise where regulations are not enforced, we could someday have a serious problem" (personal interview, Division of National Parks and Wildlife, October 22, 1974).

A fourth obvious change resulting from inholdings are the results of devastating agricultural practices including burning for pasture restoration and the grazing of domestic livestock. These problems were cited in reference to both La Macarena and Los Nevados during the interviews with park directors and field personnel. An important legal difference prevails in the case of these parks with reference to the land base: In Los Nevados, the farms are legally titled and of a constant size, while in the Macarena, a slash and burn agriculture prevails where colonos are continually clearing additional forest.

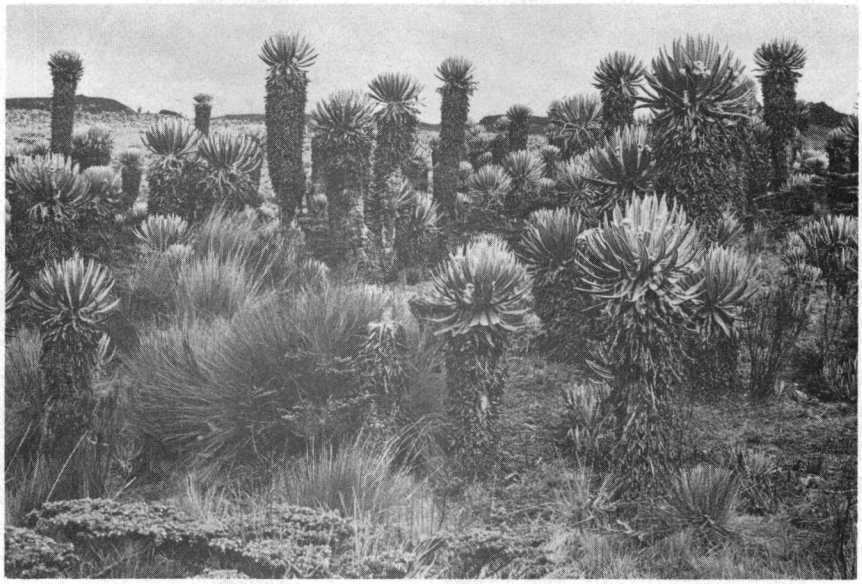
In the case of the Macarena, very few colonos farm their land on a permanent basis because the more forest a family can clear the more land they can claim. Approximately every two to four years the old land is abandoned, new forest cleared, the slash burned, and crops and pasture planted among the stumps. Claims are therefore constantly being enlarged and there is no relationship between a farmer's

ability to work his land and the size of the holding. Grimwood (1968) and others have confirmed that a tremendous acreage of pristine forest has been reduced to unusable stubble as a result of these practices. Resulting problems include the loss of much of the fertile soil through increased erosion and laterization, and the destruction of the rain forest habitat as well as eradication of much of the wildlife itself.

There is little chance of completely halting this cycle in the case of the Macarena. People will continue to clear and build up to the new boundary and as the situation worsens, additional pressure will once again be placed on the park's resources to supply the land-hungry colonos with pasture. There has historically been a lack of understanding by the colonos about the reasons the government forbids the cultivation of rich lands. The Macarena is a textbook example of this pattern. Unless a grassroots conservation education program is initiated and the campesino family made to feel proud of his park heritage, these patterns will continue to destroy one of the world's resource wonders - La Macarena.

In the intensively managed land within Los Nevados National Park, burning and grazing form the basis of the agricultural patterns. As Photos 10 and 11 illustrate, the delicate paramo vegetation is burned annually to insure tender grazing lands for the following year. The present director told the author that the existence of exotic animals has altered what fragile natural vegetation has not been burned. Until this problem is entirely eliminated, an intensified flora and

Photo 10. Detail of Paramo vegetation with dominant Espeletia spp., Los Nevados National Park.



Photographed by: D. L. Golobitsh

Photo 11. Annual burning of the Paramo for pasture maintenance, Los Nevados National Park.

Photographed by: D. L. Golobitsh

fauna regeneration program would be a hopeless endeavor. He stated:

> The wildlife population existing in an undisturbed paramo area is rich and varied. What little remains in Los Nevados is an ever present reminder of how man's activities can so completely alter what was once a unique zone in all of Colombia (personal interview, Colombian park director, Los Nevados, October 3, 1974).

The last incompatible use mentioned in reference to Los Nevados was that of illegal mining activities. Surface sulfur deposits are readily exploitable and both colonos and indigenous people have supplemented their meager incomes with the sale of this mineral. Operations are of a very small scale and because of access difficulties there is relatively little that INDERENA can do to uniformly enforce a prohibition against this mining activity.

None of the reservations within Colombia's system have completely escaped the impact of man and, as a result, all exhibit examples of various ecological problems. The task which faces INDERENA of trying to minimize further negative effects, is not an easy one. Human settlement to some degree has now reached nearly every corner of the country with the exception of the Amazonian interior. Settlers give little concern to the illegal harvesting of wildlife or the clearing of forested areas in order to introduce domestic animals and better their way of life. In addition, public agencies have also had a serious impact on the mismanagement of reserved lands.

Fortunately Colombia has a comprehensive set of laws pertaining to natural resources management and a nucleus of dedicated and capable naturalists. This is an encouraging beginning. What lies ahead however may seem to be an uphill battle; that of enforcing the existing

laws and convincing all Colombians that it is a wiser long-range decision to protect the country's resources than to continue development at any cost.

Lack of Public Support for Parks Program

The lack of general public support for the park program was ranked very high by both national and regional administrators and as the fourth most important problem by the directors of Colombia's national parks. This problem exists in many countries and has been particularly well documented in the case of Latin America; in Costa Rica by Boza (1972), in Chile by Hartwig (1970), in Argentina by Buchinger (1972) and South America in general by Wetterberg (1974). The latter emphasized one of the foundations of this problem by stating that "People visit the areas (national parks) without even realizing they are in a national park" (Wetterberg, 1974:104). The author's own field work substantiates this opinion and in fact in two parks as Table XXVIII indicates a number of INDERENA inspectors themselves admitted not understanding the concept of a national park.

In Colombia, in addition to the understandable apathy towards conservation measures from people who are still trying to satisfy basic survival needs, Franky (1970) claimed this apathy extends to urban high-level government leaders. There seems to be a very general apathy in regard to national parks and conservation in Colombia similar to what Vogt (1946) identified to have existed when Mexico was trying to gain public support for its preservation system

nearly 30 years ago. Similar situations undoubtedly existed in other Latin American countries and it has generally been through the hard work of a few dedicated individuals or groups that the first reserves were dedicated.

The problem can partially be answered by the fact that in 1971, 64 per cent of the Colombian population was still considered to be functionally illiterate (Low-Maus, 1971:16). Also national parks are a rather recent phenomenon in Colombia and there is not a great deal of general information freely available nor a comprehensive conservation education program instituted in the school system. It is therefore understandable that without a knowledgeable public, park program support has been minimal.

Additionally while Colombia has experienced a great increase in the numbers of visitors traveling to the country's historical treasures and tourist attractions, national parks have not been included in travel agency promotion programs. At least four national parks are located near enough to large population centers to permit day trips into the parks while returning to the city at night. Extraordinary hiking and camping opportunities can also be found for persons interested in this type of outdoor recreation.

Assuming that gaining public support is a desirable end, since it may assist park administrators in defending the importance of their programs, several alternatives to help alleviate this problem are elaborated below.

One of the most logical sources for gaining public support for

national park programs is from private groups whose goals are often in agreement with conservation objectives. Precisely because of their private status, these groups can publicly oppose inappropriate park uses or lobby in support of preservation causes where such action may be politically unwise for public agencies. Mario Boza, the director of Costa Rica's young national park system documented that similar groups have been of great importance in his country particularly in opposing uses incongruent with national park philosophy. "The best method of obtaining the support of these groups" claims Boza "is by showing them how parks contribute to their interests and the attainment of their own objectives" (Boza, 1972:189).

The growth of nature defense or conservation clubs in Colombia is, in general, a rather recent phenomenon. As the following list indicates, the oldest organizations, which have recently begun supporting national park goals, were originally established for other purposes:

1. Instituto de Ciencias Naturales, Universidad Nacional. Established as the Botanical Institute in 1938 and in 1940 with the present name. (Institute of Natural Sciences, National University.)
2. Club de Jardineria Bogota. Established in 1941. (Bogota Garden Club.)
3. Museo Departmental de Historia Natural, Cali. Established in 1954. (State Museum of Natural History, Cali.) Until his untimely death in August of 1974, this museum was the

laboratory of naturalist F. Carlos Lehmann.

4. Asociacion Colombiana de Recreacion. Established in 1966. (Colombian Recreation Association.)
5. Instituto Colombiano para la Conservacion de la Naturaleza. Established in 1972. (Colombian Institute for the Conservation of Nature.)
6. Asociacion Nacional para la Defensa de la Naturaleza. Established in 1973. (National Association for the Defense of Nature.)
7. Asociacion Colombiana de Amigos de los Parques Nacionales. Established in 1973 in response to the Tayrona hotel construction controversy. (Colombian Association of the Friends of National Parks.)[22]

For example, the oldest organization found to be actively engaged in the conservation effort is the Institute of Natural Sciences of the Colombian National University which, since their founding in 1938, has traditionally supported field research in the biological and physical sciences. Recently they have become disturbed with the disappearance of natural habitat in Colombia and, as a result, strongly support INDERENA's efforts. This organization's prestige has been a very positive addition to the credibility of the conservation movement in

22. This listing was compiled by the author after reviewing public testimony submitted in support of pending national park legislation since 1964; the first year when much park activity was recorded on the national level. It is not an exhaustive compilation and does not include private professional associations.

Colombia.

As was anticipated, the majority of these groups, when questioned by the author, indicated that at present their memberships were relatively small and not very representative of the entire social spectrum of Colombia; being composed primarily of upper class individuals. One of the most vocal segments of several of the newer organizations is university students whose interest in conservation is thought to have arisen from two primary sources: A popular movement supporting the preservation of the country's resources from exploitation by foreign governments, and a growing interest in nature and the out-of-doors because of the increased leisure time, mobility and discretionary income which this generation is enjoying for the first time. Two cases in point have been the students' overwhelming reaction to save Tayrona from becoming an upper class tourist mecca and the campaign to keep foreign oil investments out of the Macarena.

A second possible method for gaining public understanding and support for the national parks program might be for INDERENA to improve and expand the existing environmental interpretation program. Freeman Tilden in his book Interpreting Our Heritage indicates that quality interpretation not only stimulates one's curiosity but initiates a participation phase during which attitudes can be changed. Proper interpretation can obviously result in a deepening appreciation of the importance of national parks.

Colombia has begun this in-field education process and has excellent potential and basic facilities for presenting outstanding

interpretation programs in Salamanca, Tayrona and Purace National Parks. At the present it would be advisable to concentrate interpretive efforts in these three parks which, because they receive nearly 75 per cent of the total Colombian park visitation, would have the greatest impact in public education. Also minimal investments would be required in these areas.

To date, however, regularly scheduled programs by sincerely enthusiastic personnel are almost non-existent. An inspector from the Isla de Salamanca expressed this reaction when the investigator questioned him about outdoor education in his park:

> We have a projection room but the slides are all ruined. A Peace Corps volunteer built the boardwalk but there are only two inspectors who have any interest in leading a tour out into the mangroves. After all we do not get paid any more if we do that type of work. The micro-habitats are in terrible shape. I would estimate that the average visitor spends about five minutes on the boardwalk, looks at the caiman pool and leaves Los Cocos Visitor Center. They spend much more actual time in the picnic area (Cangaru) and there we have no interpretation program (personal interview, Colombian park inspector, December 7, 1974).

It is thought that the development of a basic program is a method to insure a substantial contribution to understanding the concept of a national park by the public. Wetterberg suggests however, "...at first, park interpretive programs would likely receive little use where widespread park support does not exist" (Wetterberg, 1974:114). Many countries have proven that the benefits derived from educating the public far outweigh in the long run their initial inputs. Colombia is at the crossroads where these benefits are needed to confront the crises which are threatening the very concept of a national park.

The effort must be sincere however, as Perez M. Olindo warned the delegates to the Second World Conference on National Parks:

> If through education, we succeed in turning the conservation idea into a way of life, then a secure future will emerge. If, on the other hand, insufficient effort is made to enlist the support of the general public, then the national park idea must be seen as being transitional and of no serious consequence to future generations (Olindo, 1972:58).

The Director of Colombia's Division of National Parks and Wildlife identified a third alternative which may help educate the public: the use of the mass media to spread the conservation message. Simon Max Franky stated as early as 1970 that INDERENA would be utilizing such means "...as radio, television, films, the press, etc....in educational programmes on parks and conservation" (Franky, 1970:6). To date the full potential of these types of publicity has not been realized, but nonetheless a start has been made. Several successful newspaper series have been published in large circulation dailies in Bogota, Barranquilla and Medellin. Also one of the most emotion laden controversies in the country's conservation history, that of the development issue in Tayrona, received extensive press coverage and limited radio coverage including a mock debate by university students. Another media method which has proven to be very popular is a series of conservation posters which have been published and widely circulated by INDERENA.

Still many possibilities remain. Canada, the U. S. and many other park systems have excellent series of interpretation films which, although costly, serve as an introduction for park visitors. They also are widely circulated in schools on every level. The

Division of National Parks and Wildlife in Colombia has but one film about the Isla de Salamanca, and a Peace Corps volunteer stationed in Purace is in the process of producing a second film. Excellent opportunities also exist for public education concerning such issues as the Tayrona controversy or the colono problem in the Macarena.

In Costa Rica yet another means of utilizing natural scenery through films has proven to have increased general knowledge and support of national parks. The park section has been encouraging the use of a park as a filming site in which to advertise a particular product. In mentioning this rather unique method of obtaining free publicity in theaters and television, Boza wrote "that although it is quite clear that parks have no connection with the product advertised, the advertisement is promoting the idea that they are essentially symbolic of Costa Rica" (Boza, 1972:191).

Other forms of publicity can include the use of visiting scientists to the fullest advantage by encouraging them to meet with the press for interviews and films right in the park, in publishing gener- conservation information and photos in popular magazines, and involving the public in the planning process. This last method claims Ross Vincent is the "only method which holds any real hope of developing significant and sustained public support for the parks" (Vincent, 1972:432).

Lastly, sympathetic political figures can be of the utmost importance in either direct assistance to the national park system, by sponsoring park legislation, or in soliciting support for them in a

public address by encouraging their constituencies to defend parks for reasons of national pride. Two examples help explain: First, it is largely through the personal efforts of Senator Mariano Ospina Hernandez that Colombia has Las Orquideas National Park. This very important political figure has presented speeches and published several articles in international symposia regarding the importance of orchid preservation in Colombia and Latin America. Second, using an example from Costa Rica, it has become tradition for the president's wife to personally inaugurate new national parks in that country. This has resulted in much publicity which is viewed not only by the general public but also has resulted directly in the growth of the system. Boza underlined this last point by stating that "...it was only after Dona Karen (de Figueres) began to help us that our parks programme began to make rapid progress" (Boza, 1972:190).

However notwithstanding the importance of all these publicity measures, one of the most important defenses of national parks must understandably be derived from the scientific community. During the process of assembling the necessary technical resource data, not only can much scientific interest be generated, but with the assistance of such agencies as the United Nations Food and Agriculture Organization, the International Union for the Conservation of Nature and Natural Resources, the Organization of American States and the World Wildlife Fund, etc., a substantial argument based on undeniable ecological principles may result.

This, in turn, can attract international attention. This fact,

even considering the notable nationalism which is present in South America, can have a tremendous influence on the preservation of a resource with worldwide significance, and in gaining the necessary financial assistance with which to begin a program.

Lack of Trained Personnel

It has been very widely documented that one of the most commonly shared problems, particularly in relatively young park systems, is a lack of an adequately trained staff, at all levels (Durate de Barros and Strang, 1970; Sutton, 1971; Miller, 1972; Boza, 1972; IUCN, 1972a). It is simply not sufficient any longer to declare a national park on paper only and expect that the areas will be either protected or that the public will be satisfied with this type of government management. As Dr. Kenton Miller wrote in a report dealing with the specific skills required of different park personnel and the importance of their being properly trained:

> National parks have become more complicated. Whereas formerly the problem consisted of protecting wild areas and providing services for extensive forms of recreation, it is now obvious that mass recreation, research, land-use competition, and environmental pollution influence park management. Many variables must now be related, skills learned, and questions asked (Miller, 1972:326).

Colombia's conservation program has evolved much more rapidly than most in Latin America and is probalby now among the most sophisticated in all of the developing world. Commensurate with this tremendous expansion, the park system has experienced the traditional growing pains of inadequate budget, equipment, political force, and

of course trained personnel; particularly those who are professionally committed to the national park ideal.

The present study revealed that the persistence of this last problem is still one of the most serious concerns believed to exist by park personnel in Colombia. National office respondents stated that the lack of trained staff was particularly acute on the inspector level. However the Division's director felt the problem to be one which was not exclusive of any personnel level and particularly noticeable in the "special aspects of environmental planning, landscape architecture, natural history, archaeology and interpretation" (Franky, 1970:6).

Every regional office interviewee and each park director, having an inspector staff also ranked the lack of an adequately trained staff in the top five management problems. Significantly, the inspectors in four parks, Los Guacharos, Purace, Los Orquideas and Los Nevados, noted their own lack of preparation as an important concern. Two Purace inspectors explained their concern in this manner:

> We understand, from our former boss, that the ecology of this volcanic region, its hot springs, and algae and mineral deposits is very complex; but that is really all we know. We have learned some from the volunteer (Peace Corps) assigned here, but still we do not feel capable of responding to 80 to 90 per cent of the visitors' questions. All we can do is relate folklore and while that is interesting, it is not the type of answer we want to give (general comments, Colombian park inspectors, Purace, January 27, 1975).

The majority of the Division's management level personnel are forest engineers, biologists or lawyers. Initially, when INDERENA was formed, most of the Division's staff were transfers from the CVM

program or from the Ministry of Agriculture. But during the last several years, young graduates with no former government affiliation have filled vacancies. No one, however, including the park directors possesses a university degree in park administration or multiple-use resource management. This situation is extremely common in Latin America since only recently have universities initiated areas of emphasis in national parks and wildlife. These are usually allied to the forestry degree curriculum. Even considering all of Latin America, these programs are still few in number and Miller (1972:337) identified the following programs located at: Viscosa, Brazil; Valdivia, Chile; La Molina, Peru; Montevideo, Uruguay; and Merida, Venezuela. In early 1974 a similar option was started on a very minor scale in Colombia (one or two park seminars during the student's last year) at the Universidad Distrital, located in Bogota. These seminars are being offered by INDERENA personnel on a visiting professor basis and the first group of ten forest engineers who opted for the park seminars will graduate in early 1975.[23]

Park inspectors are, in general, very much undereducated and, while the majority may possess a grade school education, very few have had any formal exposure to ecological fields. There are of course exceptions, and four of the inspectors interviewed by the author were not only high school graduates but were competent

23. More detailed information can be obtained from Pedro Rodriguez, Chief of the Wildlife Management Program, Division of National Parks and Wildlife, INDERENA.

naturalists because of several years of being observant students of the park director and visiting scientists. Additionally, most of the field staff were well acquainted with local history and folklore, park trails and the flora and fauna in the vicinity of the park and therefore an indispensable aid to the administration.

Several alternatives to help solve this problem are possible and being tried in various parts of the world. Any single alternative will contribute to the over-all solution but, due to the problem's complexity, the final remedy may necessitate using a combination of the alternatives mentioned below.

One of the most obvious possibilities for the training of upper and middle level management personnel is to offer park management courses at the college or university level. As was mentioned above, Colombia has recently joined the list of Latin American countries offering some course work in park related matters within the existing forestry curriculum. This is a beginning but the rate at which public interest in and demand for national park recreational opportunities is expanding, justifies a more comprehensive effort by the universities to meet the professional gap existing in INDERENA. Faculty could be drawn from the Division of National Parks and Wildlife, from noted Colombian naturalists and from international agencies. Additionally, administrative personnel from INDERENA and graduating students should be encouraged to participate in the graduate park option which is conducted at the Inter-American Institute of Agricultural Sciences (IICA - Instituto Interamericano

de Ciencias Agricolas) at Turrialba, Costa Rica.

The programs sponsored through the Colombian Institute for Educational Credit and Technical Foreign Studies (ICETEX - Instituto Colombiano de Credito Educativo y Estudios Tecnicos en el Exterior) should also be utilized by INDERENA employees. Each year many Colombian students, at either the baccalaureate or graduate level receive scholarships to attend foreign universities. According to this agency's administration, no one has ever applied for a grant to study in a park or wildlife management program. They are anxious to receive such applicants.

A second alternative is that of involving INDERENA personnel in special training sessions or workshops. These may be geared to whatever management level desired or even to park rangers or laborers, although to date in Colombia none have involved the latter two groups. Workshops have proven to be extremely successful particularly because of the practical problem-solving approach.

INDERENA conducted a two day workshop-seminar for its upper and middle level management parks and wildlife personnel in February of 1972. The effectiveness of this meeting was greatly enhanced because specific problems were previously outlined and teams worked on alternative solutions before the entire group gathered. Thirty Division personnel participated and each regional office and national park was represented. An action plan was drafted and included 36 recommendations for improvement of divisional communication, administration, wildlife research, park management, personnel relations, and a

priority listing of specific park projects. While not all of the seminar's recommendations have been carried out within the proposed time schedule, the meeting was felt to be extremely valuable in the opinion of nearly all participants. Unfortunately the follow-up working meetings which were suggested have not been convened.

Since its formation in 1965, the Latin American Committee on National Parks (CLAPN) has also conducted several specialized programs in addition to its annual meeting. In October of 1971 for example, a workshop on national park management problems was held in Medellin, Colombia. Prior to that meeting, in 1969 a CLAPN staff training session was aimed at analyzing the problems related to and possible benefits resulting from joint natural areas and tourism program efforts.

FAO, with the support of the Rockefeller Brothers Fund, and in conjunction with forestry and agronomy schools in Latin America, conducted the first in a series of specialized workshops in park and wildland administration. Professors from Argentina, Brazil, Chile, Paraguay and Uruguay participated in the first seminar convened in Payehue National Park, Chile, in January-March of 1972. Although this program is primarily aimed at university professors, the benefits of their participation have been realized not only by their students who will be future administrators, but also directly by several national parks offices where they serve as consultants or board members. Money is also available through this program to the participating universities to support faculty and graduate research.

Lastly, the "International Seminar on Administration of National Parks and Equivalent Reserves" has proven to be one of the most well respected park courses in existence. Unique in that it is internationally sponsored by the U. S. National Park Service, the park services of both Canada and Mexico, the Universities of Michigan and Washington, and the Conservation Foundation, the seminar has attracted 295 participants from 79 nations since its inception in 1965. Colombians, both from INDERENA and other agencies, have participated in this program. The course is conducted in English and includes classroom material from a wide variety of countries covering all aspects of park administration. A practical, in-field, portion includes visits to both public and private park and recreation areas. The 1974 field session visited areas in Canada, the United States and Mexico.

A temporary solution until adequately trained nationals are available is that of volunteer assistance. Members of the British Volunteer Service Organization, the Canadian Volunteer Assistance Organization and the U. S. Peace Corps have all worked in Colombia for various agencies. Specifically INDERENA has employed highly trained Peace Corps volunteers in its national parks, forestry, fisheries, wildlife management and soils, and water conservation programs. One can attribute a part of this program's success to the fact that each volunteer was specifically requested by INDERENA for a particular job at a predetermined site. In the area of parks, volunteers with planning, interpretation, communication and photography, and management skills have proven to be a very satisfactory

method for the Division to supplement the temporary lack of park skills and at the same time continue progress toward its stated goals.

Colombia might also explore the possibility of initiating a similar program to that which is presently being conducted in the U. S. National Park Service with the Volunteers in the Parks (VIP) program, and in Costa Rica with the National Youth Movement Organization. Since 1970 the VIP program has been very well received and has accomplished one of its major goals; that of increasing the Park Service's capacity to meet the visitor on a more personal basis (Gilbert, 1972). Boza (1972) estimated that the labor contributed by the National Youth Movement Organization for park, road and housing construction plus painting projects has resulted in a savings of over $8,000 U. S. during the first two years of the park system's existence.

Short term technical assistance or financial aid can be obtained from a variety of international organizations including among others the U. N. Food and Agriculture Organization (FAO), the U. N. Educational, Scientific and Cultural Organization (UNESCO), the World Wildlife Fund (WWF), the International Union for the Conservation of Nature and Natural Resources (IUCN), U. S. Aid to International Development (USAID), the Organization of American States (OAS) and the International Division of the U. S. National Park Service. Each of the programs has specific funding and time requirements but in nearly all cases, the personnel obtained are experts. The Division

of National Parks and Wildlife has utilized the services of several of these agencies and their over-all experience has been very positive.

The last alternative which will be mentioned in this section is that of instituting technical park training centers. Centers offering courses aimed at various level park personnel have been instituted in various countries around the world. Since it is often times not possible nor desirable, because of economic considerations, to institute a national park training center in each country, several centers with a regional scope have been developed, particularly in the third world. The two existing schools on the African continent have been very well supported and attended. Since its founding in 1963, the "College of African Wildlife Management" in Tanzania has trained over 350 english-speaking students from 15 countries including representatives from Africa, Asia and Latin America. A second french-speaking wildlife school was founded in 1972 at Cameroun. Miller indicated its main emphasis to be that of training "medium, ranger-level staff, to enable governments to protect and manage Africa's wildlands as quickly and carefully as possible" (Miller, 1972:337).

The U. S. National Park Service operates three training schools and foreign park professionals have participated in courses at each center. The Steven T. Mather Training Center located at Harper's Ferry, West Virginia, offers specialized ranger-level training in natural area and historical interpretation. The Horace Albright

Training Center in Washington, D. C., instructs rangers and National Park police in law enforcement matters.

The move towards training centers in Latin America has been justifiably slow. Not only is great expense involved in the establishment of a complete training facility, but until recently sufficiently qualified staff with experience in park management were simply not available.[24] However the Argentine National Park Service has operated a training school at Nahuel Huapi National Park since 1968. Students from several other Latin American nations have participated in this program but these have not included Colombians.

Colombia has had various proposals for national park field-level personnel training schools dating from the mid-1960's. Both the Minister of Agriculture and the CVM conceived of such facilities but neither became a reality. INDERENA has also suggested the creation of an "Inspector's Orientation and Training Institute," a program of four to six months in duration, but the financial problems which have plagued the Division since its creation have prohibited the realization of these plans.

Colombian park administrators will continue to participate in internationally sponsored training sessions due to the lack of such

24. While upper-level, bi-lingual Latin American park professionals have been very active in international workshops and conferences, there have been a lack of adequately trained, Spanish-speaking park personnel needed to staff a full-time training center. Also language has been a barrier to utilizing foreign, non-Spanish-speaking professionals in the training of middle or lower level park personnel in Latin America.

facilities in their own country. This method combined with an increasing commitment by the universities to train future park professionals will insure top quality management level personnel for INDERENA. However, in addition to satisfying this need, field staff standards must be upgraded. The inspectors are perhaps the most important public relations ambassadors that the Division could have. They are literally the source of the first impressions for park visitors and therefore of tremendous importance to the promotion of the national park ideal. When visitors witness inspectors showing disrespect or a lack of concern for nature, how can the cause of public support for parks possibly be advanced?

Dr. Miller summarized the approximate needs for the various levels of park personnel during the next decade in the third world. He stated:

> ...it can be estimated that a minimum of approximately 1,000 managers, 600 designers, interpreters, and planners, 800 support specialists in associated fields, 10,000 guards and guides, and 5,000 foremen, construction, and maintenance crewmen will be required (Miller, 1972:340).

With these future demands, who will deny the need for training and development at all levels? A park system is an integrated and complex approach to the management of natural resources for a variety of values and benefits. All levels of personnel forming a part of this system must, as Max Nicholson of the United Kingdom said, have as a basis "some knowledge of ecology, for conservation or the best national use of natural resources is nothing more than practical ecology" (Nicholson, 1972:427).

VI. VALUES OF COLOMBIAN NATIONAL PARKS

Introduction

The previous chapter analyzed the major management problems facing the Division of National Parks and Wildlife. It focused on selected concerns and possible alternatives for their solution. This chapter will examine the values, benefits or rationales for the establishment and continued management of an area as a national park.

The development of a national park system is no small task for any nation. It involves removing many economically developable resources forever from potential markets for values other than those of a simple economic nature. In Latin America it many times involves usurping private property and relocating colonos for such seemingly intangible reasons as the "benefit of future generations," or the "preservation of representative flora and fauna habitats." These concepts although familiar and rational to the professional park employee, are completely foreign to the thoughts of poverty stricken farmers. A successful program must eventually involve educating the general public about the benefits of conservation to insure the grass roots support so necessary to any dynamic preservation effort. It should however not be surprising when a nation decides to concentrate efforts on achieving social and economic justice for its populace before the establishment of national parks.

Fortunately, this has not been the worldwide trend for, in the long run, this may mean a loss of broad social benefits derived from

parks. Sites worthy of national park designation are rapidly disappearing and this problem is most apparent in nations which have no preservation policy. According to the latest IUCN statistics (IUCN, 1974), more than 135 nations have set aside 2,000 areas as national parks or equivalent reserves. They include such culturally, technologically and politically different countries as Dahomey in Africa which has voted to dedicate 8 per cent of its total land surface to national parks, Botswana, of the same continent with 17 per cent and Switzerland with nearly 41 per cent of its land dedicated to preservation goals. The United States has 3 per cent, Japan 5.3 per cent including many submarine areas of its continental waters, and both Colombia and Argentina 1.2 per cent.[25]

What overriding values or benefits from the setting aside of lands are compelling enough so that a majority of the world's nations have done so? An overwhelming abundance of literature, much beyond the scope of this study has addressed itself to this very problem.

A lecture by Dr. Kai Curry-Lindahl at the University of California, Berkeley, and a report by Freed and Harmon to the Seventh World Congress on Forestry in Buenos Aires, Argentina, are examples of a multiple value approach. The latter identified 12 values thought to exist in natural area management that "...can be found in no other

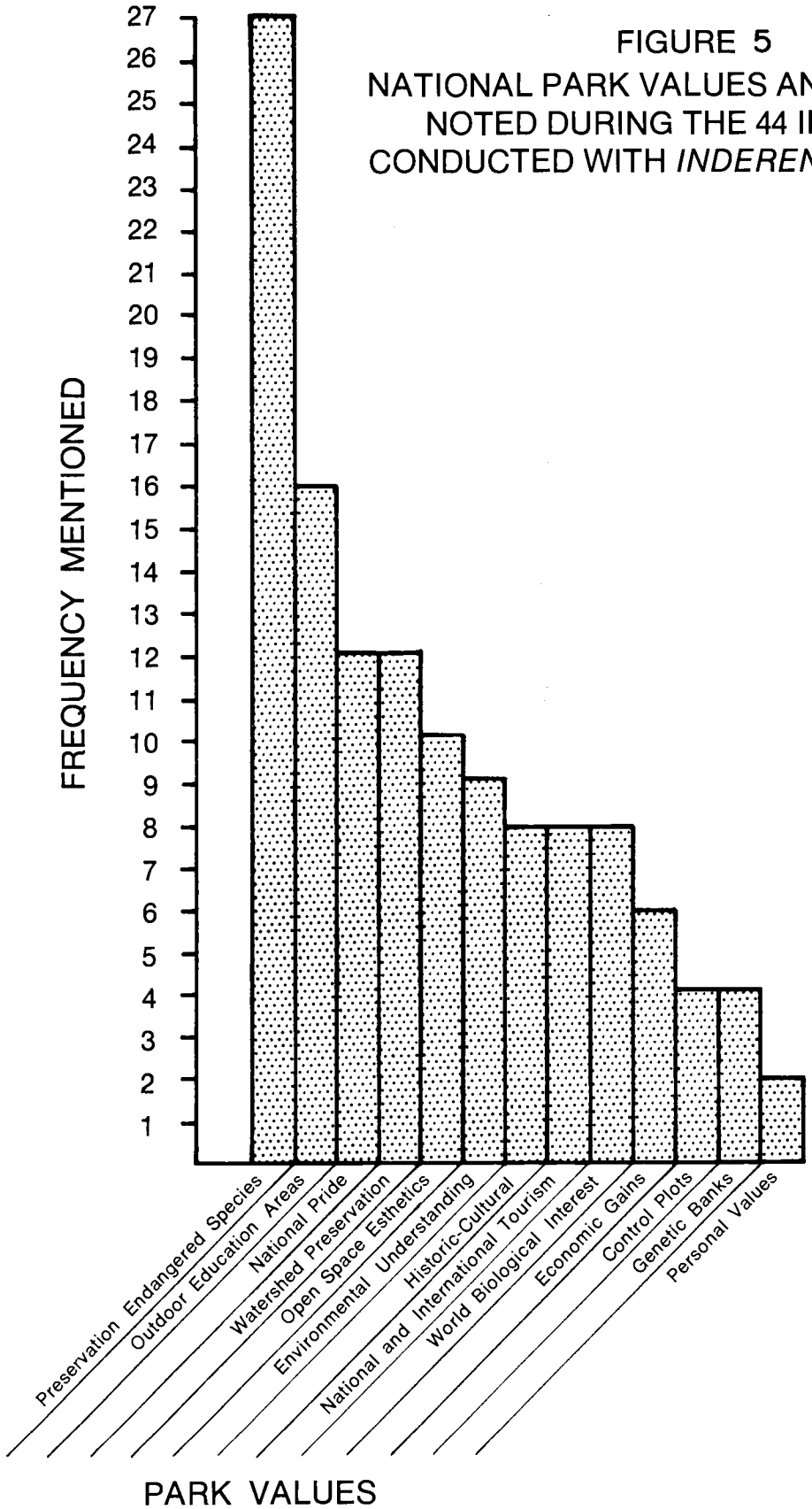
25. These figures were obtained from a seminar entitled "International Park and Recreation Resources" offered by Dr. Myron Sutton, Assistant Chief, Division of International Affairs, U. S. National Park Service. The seminar was held in July of 1974 at Oregon State University, Department of Resource Recreation Management.

setting. They are a unique set of values, irretrievable once they are lost" (Freed and Harmon, 1972:6). Others have mainly defended the benefits which can be derived from the management of an area for a particular outcome; such as scientific values, economic-tourism benefits, recreational or cultural opportunities, etc. (Bourliere, 1962; Buchinger, 1962b; Nicholson, 1962; UNESCO, 1973; Mason, 1962; Franky y Rodriguez, 1973; Mathews, 1962; Lekagul, 1962; Fuller, 1972; Macaulay, 1962; Swanson, 1969; Knobel, 1962).

Colombian Parks and Values

The interviews conducted with INDERENA employees contained the question "What values are there in Colombian national parks? (What was the purpose(s) of the establishment of 'x' area as a national park?)" Figure 5 presents 13 values identified by park personnel and the frequency with which they were mentioned during the course of the 44 interviews. Because they were not requested to exclusively identify the most important values of a particular area or to rank them in order of importance, the majority of the respondents noted more than one value believed to exist in national parks. Simply because the preservation of endangered animal and plant species was mentioned with the most frequency, does not imply with any degree of certainty that it is more important than, for example, personal values which was recorded only twice during the interview process. The fact is that all of the persons who mentioned the former value may have identified it as being one of several, while the latter could have been mentioned

FIGURE 5
NATIONAL PARK VALUES AND FREQUENCY NOTED DURING THE 44 INTERVIEWS CONDUCTED WITH *INDERENA* PERSONNEL

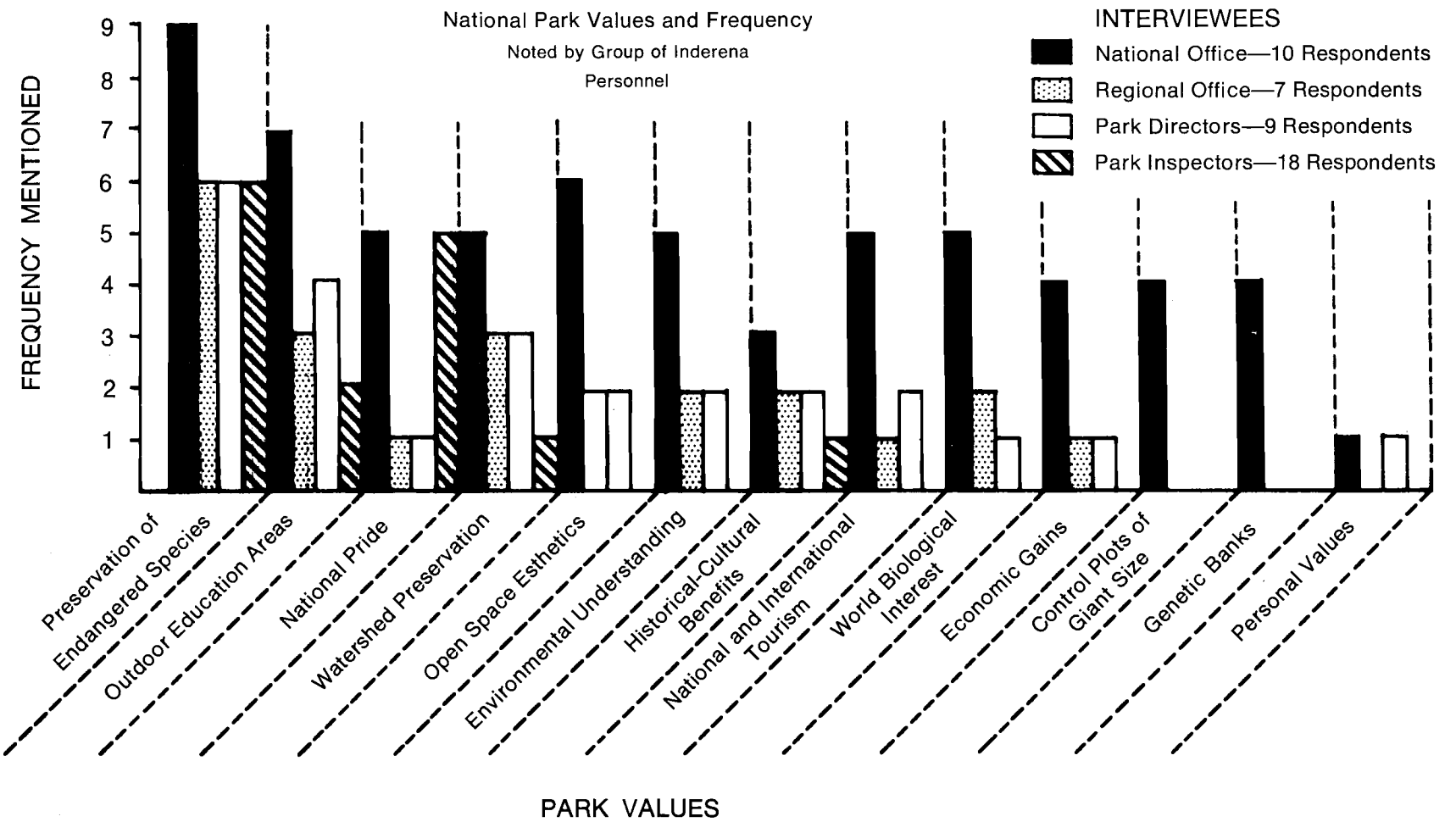


exclusively and therefore have been of more importance to that respondent. The values therefore are not ranked.

Undoubtedly, the most important over-all result was that Division employees recognized the multiple benefits which exist within national parks. This is particularly noteworthy in a country like Colombia which possesses a relatively young and developing park system and where the majority of administrators and field managers are from strict biological or forestry engineering backgrounds. Even though they have received little exposure to the social sciences in their formal education, the values of open space esthetics, environmental understanding, the preservation of historical-cultural relics and national and international tourism development were mentioned regularly during the interviews.

Figure 6 permits a more detailed examination of the existing values of Colombian national parks by providing insights into how each group of interviewees approached this issue. It is readily apparent that national office respondents tended to be the most vocal. They identified, at least once, every benefit mentioned by one of the other groups interviewed. This is believed to be partially explained by their exposure to other park systems, discussions with foreign park administrators and access to much more of the body of literature concerned with, among other things, park values. The national office interviewees noted two park values exclusively: Control plots of giant size, and genetic banks. In all but two cases, those of personal values and national pride, they volunteered more responses than the

Figure 6


National Park Values and Frequency
Noted by Group of Inderena
Personnel
INTERVIEWEES
National Office—10 Respondents
Regional Office—7 Respondents
Park Directors—9 Respondents
Park Inspectors—18 Respondents
FREQUENCY MENTIONED
9
8
7
6
5
4
3
2
1
Preservation of Endangered Species
Outdoor Education Areas
National Pride
Watershed Preservation
Open Space Esthetics
Environmental Understanding
Historical-Cultural Benefits
National and International Tourism
World Biological Interest
Economic Gains
Control Plots of Giant Size
Genetic Banks
Personal Values
PARK VALUES

other groups interviewed.

Both the regional office administrators and the individual park directors also had a comprehensive grasp of what values existed in national parks and, in fact, were remarkably consistent in their responses. Only in the cases of control plots and genetic banks did an interviewee from either of these two subject groups not mention an issue noted by national office respondents. Every interviewee in these three professional groups offered a minimum of two park values.

The inspectors tended to be doubtful of a proper response to this question and except in two individual cases offered only a single potential value. A total of five different values were noted by the 18 persons interviewed. Six inspectors admitted that they did not realize what the specific benefits of national park establishment were and therefore did not respond to the question. An interesting observation is provided in the cases of national pride and personal values. The former value was noted with more frequency by national office administrators and inspectors than by the other two groups. Also the latter value was mentioned exclusively by the same respondents.

Discussion of Colombian National Park Values

In order to facilitate discussion, the 13 distinct values which were noted by the investigator during the course of the interview sessions, were grouped into the three categories indicated in Table XXXI. It should once again be reiterated however that because one

TABLE XXXI. NATIONAL PARK VALUES BY GROUP AND FREQUENCY.

Value Group	Individual Values	Frequency Noted
Scientific benefits	Preservation of endangered species Watershed systems preservation Areas of worldwide biological interest Control plots of giant size Genetic banks	55
Recreation-tourism benefits	National pride Open space National-international tourism National economic gains	36
Educational benefits	Outdoor education study areas Environmental understanding public support Historical and cultural benefits Personal values	35

group was mentioned with more frequency, that does not indicate it to be more important than another. Referring back to Figure 5 verifies that individual values of all three of these discussion categories were noted to be among the most frequently mentioned.

Scientific Values

That national parks possess scientific values or benefits has long been recognized and is amply documented in conservation literature. What has more recently become apparent however, is the fact that these reserves may be immensely more important to the general survival of mankind than previously imagined by the scientific community. Nathaniel Reed, Assistant Secretary of the Interior for Fish, Wildlife and Parks, stressed this point when addressing the opening session of the Second World Conference on National Parks. He stated:

> ...our parks have values far in excess of their recreational or esthetic values. Their relatively intact ecosystems may provide the clues or the bases from which man might better understand and maintain the biosphere. Of all the values which the national parks of the world possess, perhaps none are of greater significance than this (Reed, 1972:39).

One of the most frequently mentioned scientific benefits of national parks by Colombian national park personnel was that they assist in providing habitat for and protection of endangered plant and animal species. The IUCN Red Data Book lists some 922 species of animals which are to varying degrees threatened with extinction on a worldwide basis: 269 mammals, 186 reptiles and 467 bird forms (IUCN, 1972c). It has also been estimated by the same organization that

approximately 20,000 plant species are threatened with extinction mainly as a result of habitat destruction. Of the animal totals, Colombia possesses a minimum of 19 mammals, 19 reptiles and 13 bird species which are noted in the IUCN listing. Table XXXII identifies these animals.

While all of the respondents may not have been certain of the exact number or types of endangered species found within Colombian reservations, the important point is that these reserves are recognized as the main sanctuaries for wild fauna in the country. The direct eradication of habitat and resultant loss of species diversity is depriving them as well as all future generations of an invaluable genetic resource base. This base once lost through extinction can never be rejuvenated. As Professor Francois Bouliere of the IUCN stated, the insurance of species diversity is one of the most important scientific roles of parks:

> The thousands of problems facing biology today, and those which will arise tomorrow, cannot be solved by studying a few hundred cultivated plants; a score or two of domestic animals; a white rat and man himself....Moreover, most of the plants and wild animals living in specialized habitats (polar zones, deserts, and steppes, high plateaus and rain forests) exhibit physiological adaptations we need to know about with greater exactitude (Bouliere, 1972:10).

The famous conservationist Dr. Kai Curry-Lindahl of the U. N. Environmental Program in Nairobi, concurs and claims that the preservation of endangered species is the most important justification for expansion of the national park concept. "National parks and equivalent reserves constitute the most direct and rational way to protect endangered and rare species of plants and animals through habitat

TABLE XXXII. SELECTED LIST OF ANIMALS THREATENED WITH EXTINCTION IN COLOMBIA.*

Mammals

Scientific Name	Common Name
Atelocynus microtis	Short-eared fox
Cacajau melanocephalus	Black headed uakari
Callimico goeldii	Goeldis marmoset
Leontocebus oeadipus	Cotton-top marmoset
Felis concolor	Cougar
F. onca	Jaguar
F. wiedii	Margay cat
F. pardalis	Ocelot
Myrmecophaga tridactyla	Giant anteater
Odocoileus virginianus goudoti	Colombian white tailed deer
Priodontes maximus	Giant armadillo
Pteronura brasiliensis	Giant river otter
Manachus tropicalis	Caribbean seal
Speothos venaticus	Bush dog
Tapirus bairdii	Central American tapir
T. pinchaque	Mountain tapir
Tremarctos ornatus	Spectacled bear
Trichechus inunguis	Amazonian manatee
T. manatus	Caribbean manatee

*Compiled with the assistance of Dr. Jorge Hernandez Camacho, Biologist, INDERENA, Division of National Parks and Wildlife.

TABLE XXXII (continued).

Reptiles

Scientific Name	Common Name
Caiman crocodilus	Spectacled caiman
C. crocodilus apaporiensis	Rio Apaporis caiman
C. crocodilus fuscus	Magdalena caiman
Caretta caretta	Loggerhead turtle
Chelonia mydas	Green turtle
Crocodylus acutus	American crocodile
C. intermedius	Orinoco crocodile
Dermochelys coriacea	Leathery turtle
Eretmochelys imbricata	Hawksbill turtle
Lepidochelys olivacea	Olive turtle
L. kempii	Atlantic ridley turtle
Melanosuchus niger	Black caiman
Paleosuchus palpebrosus	Dwarf caiman
P. trigonatus	Smooth fronted caiman
Podocnemis expansa	Amazon turtle
P. lewyana	Madalena River turtle
P. unifilis	Terecay turtle
P. vogli	Orinoco greaved turtle
Pseudemys ornata callirostris	South American red lined turtle

TABLE XXXII (continued).

Birds

Scientific Name	Common Name
Amazilia castaneiventris	Hummingbird
A. cyaneotincta	Hummingbird
Crypturellas casiquiare	Barred tinamou
Micropanyptila furcata	Pigmy swift
Molothrus armenti	Colombian red-eyed cow bird
Trogoncidae	Quetzals
Anas georgica niceforei spp.	Brother Niceforo's pintail
A. cyanoptera borroi	Borreo cinnamon tail
Galliago imperialis	Imperial snipe
Vultur gryphus	Andean condor
Mimus magnirostris	San Andres mockingbird
Podiceps andinus	Andean eared grebe
Rupicola peruviana	Cock of the rock

and ecosystem conservation" (Curry-Lindahl, 1974:24).

National parks also constitute one of the few remaining areas of the world where long-term scientific investigations can be undertaken with relatively little human intervention. They serve as giant control plots against which to assess man's impact on his environment.

It was also noted, in relation to the snow capped peaks of the Sierra Nevada and Los Nevados National Parks, that these areas play an important role in helping to protect the country's fresh water supply. Both of these parks in addition to Purace contain complete upper watersheds and are the source for the major rivers which supply Colombia's population centers. Lastly, it was felt by the respondents that national parks are at times created because of their world-wide biological significance. This was mentioned with particular reference to both La Macarena and Los Katios National Parks. The former is unique because it contains representative flora and fauna from the Orinoco basin, the Amazon drainage and the Andes system. Los Katios is distinct because it is situated in the major north-south route for species migration between North and Central America with South America.

In relation to this last point, the basis for a World Heritage Trust has been formed under United Nations auspices through which historic, cultural and natural sites of international significance may be protected. Russell Train reported the basic concepts of the idea to the Second World Conference on National Parks' delegates.

> The basic concept of a World Heritage Trust is disarmingly simple. It is merely an international extension of the

> concept of national parks...With our broader international viewpoint, we now recognize that there are certain areas of such universal...interest that they belong to the heritage of the entire world (Train, 1972:378).

The idea which grew out of the 1965 White House Conference on International Cooperation, listed several examples of areas which may qualify for World Heritage status. These include: The Grand Canyon of the Colorado River, the Serengeti Plains of East Africa, Venezuela's Angel Falls, the Inca, Aztec and Mayan Civilization ruins, the Egyptian pyramids and the Acropolis in Greece (U. S. White House, 1965:17-19). La Macarena National Park was suggested as a possible addition to this list by several national and regional INDERENA personnel interviewed by the author.

As of June 1974, the United States and Egypt were the first two countries to sign the Convention which was officially presented at the 1972 UNESCO General Conference (Oryx, 1974:418). Twenty nations must become signatories to the document before its policies enter into force. With its adoption the World Heritage Trust Fund, which will help finance protection and management of these areas, will also be activated.

Recreation-Tourism Benefits

In recent years the demand for outdoor recreation has increased in probably every country of the world. This increase has not only been dependent upon the growth in international tourism but also has been stimulated greatly by increased use from nationals. The tremendous recreation-tourism benefits which have been derived from

increased park development were also noted to the author by Colombian park employees. However while is it encouraging that Colombian park use is on the increase, "we should not," as Dr. Jack Knetsch stated, make the common mistake of "equating number of visitors to value" (Knetsch, 1968:352). These number and demand values form only a portion of the justification for park creation. Too heavy a reliance on them may result in a planning bias in favor of active recreation areas catering to tourists while other significant scientific and educational values are overlooked and even harmed.

Implied along with the recreation-tourism benefits derived from parks was the idea that national pride was extremely important. The interviewees were rightfully proud that both national and international tourists and scientists are becoming familiar with Colombia's fabulous resources. Sutton also feels that wise use of national heritage can sustain national pride and through its development, "Each citizen knows what he and his country stand for; his appreciation of such things helps knit the country together, producing internal stability and leading to self reliance" (Sutton, 1972a:4).

INDERENA employees mentioned that the international recognition which Colombia received as a result of their conservation efforts was now a major justification used to defend national parks. Also noted was the important belief that a Colombian public informed on conservation matters was beginning to become a reality. As one national office interviewee told the author:

> No longer is it absolutely necessary to defend park creation on solely an economic basis. Both the

> scientific community and the public, including tourists, would hopefully now support us (INDERENA) if national parks were suddenly eliminated and put into a more productive use (personal interview, Division of National Parks and Wildlife, November 11, 1974).

This same type of sentiment has, according to Brockman and Merriam (1973), prompted several African nations to continue managing national parks established under former colonial governments. Even though the names have, in many cases, been changed to give a national identity to these reserves, the importance of continued management of these areas as parks has been repeatedly expressed by the new governments. Zaire's President Mobutu Sese Seko has made one of the most eloquent statements supporting this claim:

> ....We refuse to follow blindly the trend of "developed" countries which want production at any price....We declare that our ambition is to make our country, Zaire, a paradise of nature. We have no intention of speculating upon public curiosity by selling the skins of crocodiles for handbags. We want first to study how these animals grow because we do not wish these animals to disappear in our National Parks.... We desire only that when scientists will have transformed the world into an artificial one, that in Zaire an authentic nature will remain. Over the next few years, our National Parks will be expanded to over 12 to 15 per cent of the country (Nature Canada, 1973).

Another value of national parks that was mentioned consistently by the respondents was that of providing valuable open space for esthetic purposes. Man must be able to travel from the city and return to nature for intellectual and physical rejuvenation. Several of Colombia's parks serve this function well because they are located within a short distance of major population centers. They have recently begun to attract day-use visitors who leave the city for a change of pace.

In developing countries which demand that their renewable natural resources contribute to the national revenue, tourism is one alternative which may save parks from being displaced by the more traditional economic functions. The great success which some African nations have had in promoting parks as tourist enterprises while managing to protect the resource base was mentioned in Chapter V. These and similar programs in Latin America have resulted in broad economic benefits on a regional level including extensive development outside the park boundaries and securing the desired foreign exchange earnings. But these examples should not be interpreted to mean that every area be required to contribute to the national income. As Curry-Lindahl states, "Income from tourism is far from being the only asset a national park represents" (Curry-Lindahl, 1974:30). For example, high density tourism is simply not compatible with some areas reserved for scientific research, esthetic or outdoor education study.

While all of the above mentioned preservation values have economic worth, it is very difficult to place a total dollar value on natural, historical or cultural sites which, much more importantly, are irreplaceable assets themselves. Knetsch, in an article entitled "Providing for National Parks and Related Values," summed up the benefits of reserved areas and claimed them to have values just as goods that are regularly produced, purchased and consumed in the economy.

> The values attached to better environments--undisturbed bogs, mass recreation beaches, open spaces, pleasant agricultural and city landscapes--are related to demand and supply. It is the relative scarcity and demand which establishes values for these environmental products just as they do for other economic goods (Knetsch, 1968:351).

If present trends continue and the demand for recreation and related benefits expand, the values of national parks and equivalent reserves will also increase. A growing desire as a society to set aside areas for preservation goals while foregoing others will not only make their defense easier, but will also insure that future generations have the prospect of enjoying the diverse benefits provided from natural areas management.

Educational Benefits

The educational benefits which can be derived from the establishment and proper management of national parks and equivalent reserves have become increasingly important in recent years. Recommendation No. 20 of the Second World Conference on National Parks specifically noted the important role parks have in the development of an environmental conscience among citizens and suggested that facilities be made available for youth groups and schools to undertake environmental studies. Dr. Curry-Lindahl claims that the very success of our species may be dependent on how well these future decision makers understand man's role in the environment - particularly "man as a component of it" (Curry-Lindahl, 1974:28).

Ecological concepts can best be verified in a natural outdoor laboratory setting. A system of parks containing a wide variety of biomes offers some of the best areas existing for such studies. Also the educational-interpretive services discussed in the previous chapter can facilitate public understanding of the national park ideal

and therefore have a multiplier effect in widening the base of public support.

Vernon C. Gilbert of the U. S. National Park Service Office of Environmental Interpretation believes there to be no greater resource for education in the world than national parks. Stated Mr. Gilbert:

> ...they are exemplars of quality and instruments for implementing programs of social concern in environmental education, in love of our land, and in the fundamental values of life. Their proper management, and interpretation of the natural and cultural systems exemplified in these areas, can help man to understand his kinship with his environment, and, in turn, motivate him to build the kind of ethic necessary for responsible action on issues of environmental quality (Gilbert, 1972:359).

Likewise, sites of historic and cultural importance are reserved and can become an integral part of the total environmental interpretation program within a park system. Places such as Cades Cove in the Great Smokey Mountains which contains an old farming community, and Hopewell Village in Pennsylvania which is one of the finest examples of a 19th Century iron making town, are examples of "living history" areas within the U. S. Park System. Colombia has such potential sites in several of its national parks.

The last educational benefit, even though only mentioned by two respondents, is nonetheless gaining much support throughout the world park community: those of personal values. There is little that can surpass nature in an unspoiled state as a source of inspiration. The park visitor, by being allowed to commune with nature in relative wilderness, can become conscious of the "sense of place where people can feel they still have roots in their historical and natural

heritage" (UNESCO, 1973:15). As Rocco Knobel from the Republic of South Africa stated:

> The most important value of a national park...appears to be the re-creational value, not in the narrow sense of physical recreation but in the true sense of the word which includes spiritual, intellectual, and physical renewal (Knobel, 1962:162-163).

Summary

Multiple values were identified by the respondents in regard to Colombia's national parks. The 13 values were grouped into three categories: scientific, recreation-tourism and educational benefits. While most parks have not been developed to their fullest potential, the fact that Colombia's park personnel recognize their importance forms the base for a sound natural resources management program in the future; one which attempts to adapt these values to the cultural preferences of Colombians. In this way parks will play an important role in helping to expand Colombians' understanding of nature, their culture and role as one component of the total environment.

VII. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study is an investigation of the history and present status of the Colombian System of National Park Reservations and an analysis of park employee perceptions of the system's management problems and values. This research led the author to the following conclusions:

1. Twenty eight distinct management problems were identified in Colombia's park system. The five most important, as determined by national park employees are: problems associated with inholdings, a lack of adequately trained park personnel, the lack of public support for the park program, insufficient finances, and a lack of support from the national office to the field offices and employees.

2. The most important management problems which exist in the Colombian national park system are related to inholdings. The associated problems which result from inholdings are: roads, power lines, poaching, agriculture, burning, grazing, and mining. Only park inspectors did not mention inholdings specifically as a management problem.

3. The second most important management concern of Colombian park employees is that of a lack of sufficiently prepared field personnel. National office administrators noted this issue on both the park director and inspector levels. Both regional managers and park directors mentioned the lack of properly prepared inspectors. Four inspectors believed themselves to be underprepared for their

responsibilities. Five inspectors admitted not understanding the basic philosophy of national park management.

4. The third most frequently mentioned management issue was a lack of public support for the national park program. This issue was noted by all three professional levels of park employees. The inspectors, while not mentioning this concern specifically, did remark that not having any interpretive information to distribute to the public made them feel that the visitors' experience was greatly minimized.

5. Insufficient financial support was the fourth most important concern to park employees. The Division of National Parks and Wildlife has never received more than 12.6 percent of INDERENA's total budget, and the rate of its increases has consistently been the smallest in the Institute. Administrators on all levels believed this problem to be one of the underlying reasons for several other management problems.

6. The fifth most important concern was that national office administrators did not adequately consult regional offices or park directors. It was a common complaint of field personnel that they were not involved in the planning process, or consulted about future budgets or park development priorities.

7. National and regional administrators, and park directors generally agreed as to the system's management concerns. Of the 15 problems identified to be important by at least one of these groups, four were unanimously thought to be significant, and five concerns

were mentioned by members of two groups.

8. Park inspectors tended to misinterpret the interview focus and identified personal concerns rather than park management problems. They mentioned only two issues in common with another group: equipment and facilities deficiencies, and a lack of enforcement powers. This was not their fault however, but an inherent weakness in the study methodology resulting from the expectation that professionals and non-professionals respond to similar inquiries with the same base of understanding.

9. Thirteen values percieved to exist in national parks were identified in this study. The most commonly noted park values are: the preservation of endangered species and their habitat, providing areas for outdoor reducation study, national pride through international recognition of Colombia's parks, watershed protection, and open space esthetics. National office respondents tended to be most vocal. They identified, at least once, every benefit mentioned by one of the other groups interviewed. Regional office managers and national park directors also had a thorough grasp of what values existed in these areas, while park inspectors tended to be doubtful of an acceptable response.

10. Colombia's policy on natural areas management has evolved from a non-integrated, single area approach to a comprehensive renewable natural resource management policy. In the 26 years since La Macarena was designated as the country's first biological reserve, the system has matured to a comprehensive philosophy, predicated on

reserving a representative sample of each major biome found in the nation.

11. The administrative framework for natural areas management has also evolved from one which had neither central authority nor long range management goals, to one of the most sophisticated resource management agencies in South America. INDERENA presently manages Colombia's forests, fisheries, watersheds, soils, parks and wildlife. This contrasts with other Latin American nations where, in general, renewable natural resource management is not centralized but shared by diverse agencies.

12. The reasons for the establishment of national parks in Colombia have been expanded since the passage of the 1959 Natural Resources and Forestry Economy Act. Colombia's earliest parks were established for the benefits which could be derived from strict scientific preserves. Since 1964 additional benefits of recreation, tourism, environmental education, and research have been identified in the legislation establishing national parks and equivalent reserves. This finding suggests that these lands are not reserved exclusively for limited scientific study or special interest groups but rather that there are multiple values which accrue to the society as a whole.

13. Colombia has the potential and the enacted laws with which to develop an outstanding national park system. The task remains one of implementation of existing laws. This will require obtaining the necessary funds to properly train sufficient numbers of inspectors

and in educating the Colombian public as to the values of a comprehensive land management system.

14. The decision finally reached concerning the development of Tayrona National Park will serve as a landmark precedent for management of renewable natural resources in Colombia. Tayrona is possibly the cornerstone for the preservation of natural resources, and the genetic materials contained therein, on the entire north coast of South America. This issue has received much national and international attention and if CORTURISMO is allowed to intensively develop the park for tourism, the basic philosophy for natural areas management in Colombia will be in jeopardy.

Recommendations

The findings obtained in this study and their implications for future management decisions concerning Colombia's national parks require that recommendations be made. It is a very exciting but delicate position for a researcher to be suggesting changes about something so fundamental as a nation's national parks, particularly in this instance as a foreigner. Therefore, the following recommendations are respectfully forwarded for INDERENA's consideration. Ultimately, of course, Colombians must judge their applicability. Even if all of the following suggestions were adopted, park management problems would not be eliminated in Colombia. However, it is believed that planners and managers will be able to utilize this information when decisions are required concerning future management

issues and to thereby plan a better park system for all Colombians.

1. The protection of the existing park boundaries from further encroachment of colonos and by casual intruders for hunting, timber, fishing, etc. should be given the highest priority within the Division of National Parks and Wildlife. Presently none of Colombia's parks are adequately protected. Inspectors should be properly trained, and of sufficient numbers to guard the reservations. During the interim period, if necessary, the services of the military or national police should be seriously considered. This may be the only way to preserve the dignity of these resources and to insure that they will continue to be recognized by the International Union for the Conservation of Nature and Natural Resources. International financial assistance should be sought in order to realize this goal.

2. The Division of National Parks and Wildlife should be granted Direction status as soon as possible. As a result of the administrative reorganization of 1974, national parks and wildlife lost a substantial amount of influence within INDERENA and in its ability to deal with other government agencies. Forests, fisheries, watersheds and soils were all elevated to the Direction level. This reorganization has resulted in decreases in financial allocations and personnel appointments to the Division. Seven national office respondents noted this to be one of their most serious concerns.

3. The Division of National Parks and Wildlife should be granted eminent domain powers. While Colombian law provides that national park lands are part of the public domain, INDERENA has

never been granted the power to make this a reality. In several national parks, private land holders and illegal squatters own most of the land area. Only when an owner decides to sell can a price be negotiated and the property turned over to the State. Illegally claimed land holdings cannot be eliminated either, because INDERENA must also bargain on the basis of the land's fair market value or relocate the family at government expense. Budgetary problems make this impossible. Receiving eminent domain power and a sufficient budget with which to administer this program is the only way that Colombia's parks will ever become part of the public domain.

4. Park boundaries should not be arbitrarily altered without consideration of the impact to the ecology of these areas if Colombia's national parks and equivalent reserves are, as the Statute of National Park Reservations claims, ecologically self regulating areas. In the cases of La Macarena and the Sierra Nevada National Parks, boundaries were hastily redrawn in order to eliminate the sensitive and costly problems associated with inholdings and reduce the pressure on the park of undesirable uses. No mention of the ecological effects of such actions was mentioned. This is at best a temporary solution to both problems because the new boundaries cannot be strictly guarded from future encroachment. At worst, such actions undermine the dignity of Colombia's national park system in the eyes of the IUCN and the world's conservation leaders.

5. A definite policy should be established concerning commercial developments within Colombian national parks and equivalent reserves.

The present zoning scheme as developed by Accord No. 42 of 1971 implies, but does not directly state, that developments of a commercial nature are not permitted. Precisely because of this ambiguity, controversies, such as that occurring in Tayrona, threaten the existence of a park system which meets accepted international standards.

6. The responsibility for the management of national parks contained in Colombia's three autonomous corporations should be transferred to INDERENA. The sovereign agencies of the Autonomous Corporation of the Bogota Savannah and the Ubate and Chinquinquira Valleys, the Autonomous Corporation of the Cauca Valley, and National Corporation for the Development of the Choco, prevent INDERENA from managing all of the country's national parks.

7. INDERENA should seek immediate adoption of the Flamenco Fauna Sanctuary and the Curiche National Park projects in order to complete the initial stages in the plan to preserve a representative sample of each major biome found in the country. With the inclusion of these two areas into the Colombian System of National Park Reservations, a unique portion of the Guajira desert coastline (Flamenco), and the first portions of Colombia's vast Pacific Ocean shoreline (Curiche) would be reserved. It is imperative that these areas be designated, a minimum budget approved, and the boundaries marked as soon as possible.

8. Colombia should become a signator to the World Heritage

Convention. The United States and Egypt were the first two countries to sign the Convention officially adopted by the 1972 UNESCO General Conference. Colombia could serve as an example to all of Latin America by indicating its willingness to cooperate in the preservation of natural, historical and cultural sites of international significance.

9. Colombia should consider the possibility of submitting La Macarena National Park as a candidate for World Heritage status to the World Heritage Convention of UNESCO. If accepted, Colombia would qualify for funds to help protect and manage this area. This reserve is undoubtedly one of the most ecologically significant areas anywhere in the world. The area's geographical location makes it a biological transition zone, possessing representative habitat for both flora and fauna species from the Andes, the plains of the Orinoco River and the Amazon jungle. Over 450 species of birds, including more than 20 endemic forms, have already been identified even though there have been relatively few expeditions into the interior of the park. Also several species which are endangered worldwide are found in the area. These include the Spectacled bear (*Tremarctos ornatus*), Jaguar (*Felis onca*), White lipped peccary (*Tayassu pecari*), Giant armadillo (*Priodontes maximus*), Giant river otter (*Pteronura brasiliensis*), Orinoco crocodile (*Crododylus intermedius*), and several species of turtles.

10. A specific national park proposal for sections of the Amazon forest should be developed. Brazil, Ecuador, and Peru

are harvesting timber from extensive areas in the Amazon basin. The World Heritage Convention, or another appropriate international organization, should begin working with Colombia to preserve a representative sample of this environment. Presently Colombia is managing its entire Amazonian area as a strict forest reserve, permitting no timber harvesting or resource exploration, but this classification can be changed too easily under pressure from vested interest groups.

11. The last Paragraph of Article 13 of Decree 2420 of 1968, which created INDERENA, should be revised. As this Paragraph now reads, the general manager of INDERENA can agree with the Minister of Agriculture to allow other government agencies to exercise any or all of the Institute's functions for an unlimited period of time. Since the Minister of Agriculture, who is appointed by the President of the Republic, appoints INDERENA's general manager, Colombia's national parks could be effectively eliminated by transferring the management responsibility to a development minded government agency. This section should be revised to guarantee the integrity of the Colombian System of National Park Reservations.

12. Colombia should investigate the possibility of establishing international parks or additional border parks in order to preserve biologically significant areas with the cooperation of Venezuela, Brazil, Peru and Ecuador. Colombia has initiated the pattern with Panama where adjacent borders are being managed in the unique Darien Gap region. Colombia's natural areas inventory has identified 14 potential sites for this type of cooperation.

13. Lesiglation should be enacted to completely protect animals on the IUCN endangered species list or identified by INDERENA to be endangered or rare in Colombia, but not legally protected. These include: The Giant anteater (Myrmecophaga tridactyla), Caribbean seal (Manachus tropicalis), Central American tapir (Tapirus bairdii), Loggerhead turtle (Caretta caretta), Green sea turtle (Chelonia mydas), Leathery turtle (Dermochelys coriacea), Hawksbill turtle (Eretmochelys imbricata), Olive turtle (Lepidochelys olivacea), Atlantic ridley turtle (L. kempii), Orinoco turtle (Podocnemis vogli), Barred tinamou (Crypturellas casiquiare), Pigmy swift (Micropanyptila furcata), Colombian red-eyed cow bird (Molothrus armenti), Imperial snipe (Galliago imperialis) and the San Andres mockingbird (Mimus magnirostris).

14. A coordinated and regularly scheduled environmental interpretation program should be initiated in Tayrona, Isla de Salamanca, Los Nevados and Purace National Parks. Together, these four areas receive approximately 95 percent of the total Colombian park visitation. Even though a comprehensive interpretive program may take several years to develop, a beginning can be made utilizing volunteer assistance and requiring minimal investment. In these four areas a basic orientation slide program, guided nature walk and an interpretive pamphlet would assist in gaining public support for INDERENA conservation goals by educating park visitors.

15. Lower echelon professionals and inspectors should be included as an integral part of the resource planning process. In a

system as young as Colombia's, the majority of national level planners did not begin their park careers in the field, but because of prior administrative experience, were introduced to parks in the national office. Field personnel stated that they are not consulted during the planning process about facilities which they will eventually be required to administer. Field employees have valuable insights about management problems and can help avoid costly mistakes in facility design.

16. National and regional office administrators should be required to spend a certain portion of their time in the parks. One of the most frequently mentioned problems was that of a lack of cooperation and support between various administrative levels within INDERENA. Regional office managers and park directors complained about the insensitivity of the national office, and park inspectors noted that both the national and regional office personnel expressed very little interest in field problems.

17. An inspector training institute should be established under INDERENA's direction and in conjunction with the Department of Natural Sciences of the National University, and the School of Forestry of the District University in Bogota. The lack of trained personnel was the second most important problem identified in the system. The inspectors themselves noted that they are undertrained for the responsibilities of their jobs. This training should include an initial orientation course and regularly scheduled workshops. In this manner, inspectors can become an integral part of the Colombian

national park system. Faculty could be drawn from INDERENA, selected universities, and private organizations. A full time director should be appointed and his first task should be investigating the possibilities of receiving international funding to initiate this program.

18. Every effort should be made to provide inspectors with an adequate amount of field support. At a minimum, they should be paid regularly, receive new uniforms twice a year, and in isolated stations, receive sufficient food so they are not forced to poach in order to balance their diet. It is also suggested that since the immediate area surrounding an inspector station is already altered, that the existing policy prohibiting the cultivation of a small vegetable garden be revised, particularly in isolated sites. As the budget permits, a high priority should be to provide inspectors with the equipment needed to patrol the park boundaries. For emergencies, radio equipment should be supplied at remote inspector outposts.

19. INDERENA's plan for the management of Tayrona National Park should be adopted and CORTURISMO's proposal rejected. Tayrona contains unique biological conditions and habitats, and CORTURISMO plans to locate a major tourist complex in some of the most fragile areas of the park. Both national and international commissions have repeatedly stated that parks and developments which substantially alter the natural setting are incompatible. Studies which have been completed have not proven conclusively that the ecology of Tayrona will not be irreparably altered. Tayrona should be managed as

Colombian law intended "to be maintained in a pristine state for present and future generations" (Ruan y Franky, 1972:45). Commercial tourist developments should be located outside of the park.

20. A highway for through traffic should be constructed outside the park, south of the Cano Clarin Nuevo, because of the serious traffic problems on the Isla de Salamanca. The former director believed this to be the most serious management problem, affecting both the visitors' experience and wildlife in the park. The existing bridge across the Magdalena River could serve both the park and through highway traffic. During the interim construction period, guard stations should be installed at each end of the island and both the speed and volume of trans-park traffic strictly monitored.

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APPENDICES

Appendix A

GLOSSARY OF SPANISH WORDS

Aftosa	Hoof and mouth disease (ref: Los Katios National Park).
Agustin Codazzi	Famous Italian Colonel, explorer and geographer of Colombia and Venezuela. Also the name of the National Geographic Institute in Colombia (Instituto Agustin Codazzi).
Altiplano	High Peruvian plateau.
Campesino	A country dweller, farmer, local person.
Cano	Narrow channel or branch of a river or stream.
Canon	Canyon, gorge or ravine.
CAR	The Autonomous Regional Corporation of the Bogota Savannah and the Ubate and Chiquinquira Valleys (Corporacion Autonoma Regional de la Sabana de Bogota y los Valles de Ubate y Chiquinquira).
Cascada	Falls, cascade.
CLAPN	Latin American Committee on National Parks (Comite Latinoamericano de Parques Nacionales).
Colono	Squatter, inholding within a national park generally of an illegal nature.
Cordillera	Extensive mountain range (cordillera oriental-eastern range of the Andes; cordillera central-central range of the Andes; cordillera occidental-western range of the Andes).
CORTURISMO	National Tourist Corporation (Corporacion Nacional de Turismo).
Cueva	Cave (ref: Los Guacharos National Park).
CVC	The Autonomous Regional Corporation of the Cauca Valley (Corporacion Autonoma de Valle del Cauca).

CVM	Magdalena Valley Corporation (Corporacion Autonoma Regional de los Valles del Magdalena y del Sinu).
Departamento	Colombian political division with the equivalency of a state.
El Rancho	The Ranch (ref: tourist development at Los Nevados National Park).
El Refugio	The Refuge (ref: tourist development at Los Nevados National Park).
Fanega	Grain measurement; one fanega is equivalent to 1.58 bushels.
Guaquero	Grave robber (ref: Tayrona National Park).
Guacharos	Oil bird (Steatornis caripensis) (ref: Cueva de los Guacharos National Park).
Guanacos	A relative of the llama, (Lama guanicoe).
Guanay	A species of marine cormorant, (Phalacrocrax bougainvilli).
Guano	Bird dung.
INCORA	Colombian Agrarian Reform Institute (Instituto Colombiano de la Reforma Agraria).
INDERENA	Renewable Natural Resources Development Institute (Instituto de Desarrollo de los Recursos Naturales Renovables).
Inspector	Colombian national park ranger.
Isla	Island (ref: Isla de Salamanca National Park).
Laguna	Lake.
Llanos	Flat grasslands of eastern Colombia (Orinoco River drainage).
Los Cocos	The coconuts (ref: Isla de Salamanca National Park visitors center).
Mamas	Priests of the ancient Tayrona and present day inhabitants of the Sierra Nevada de Santa Marta mountain range.

Mestizo	An individual of mixed Spanish and Indian blood.
Milpa	Clearing, slash and burn agriculture.
Nacional	National.
Nevados	Permanently snow-capped mountain peaks.
Orquideas	Orchids (ref: Las Orquideas National Park).
Palanca	Political lever or influence.
Paramo	A geographic term referring to an area of approximately 3,000-3,800 m. in elevation to snowline with a mean annual temperature less than 10°C, dominance of grasses and sedges, dwarf shrubs, abundance of lichens, mosses, etc., and the characteristic Espeletia spp., soils of a peaty or boggy nature, sandy or skeletic types.
Parque	Park.
Pico	Peak of a mountain.
Praderas	Meadows, pastures (ref: sub-marine turtle grazing grounds, Tayrona National Park).
Pueblito	Little town (ref: archaeological site, Tayrona National Park).
Rio	River.
Sabana	Treeless plain, savannah.
Sierra	Mountain range.
Termales	Hot springs (ref: Los Nevados and Purace National Parks).
Valle	Valley.
Vicuna	Vicuna (Vicugna vicugna), South American ruminant.
Violencia	Violence, a ten year period of social uneasiness beginning in 1948 as a result of economic and social problems in Colombia. A battle for power took place between the liberals and the conservatives. A military dictatorship gained control of the country and all civil liberties were tightly controlled. The violencia ended in 1958 when the

	liberals and the conservatives agreed to a coalition in which they would assume power alternately each four-year period until 1974. At this time free elections would be held again.
Volcan	Volcano (ref: Purace National Park).

APPENDIX B. CHRONOLOGICAL TABULATION OF SOUTH AMERICAN NATIONAL PARKS AND EQUIVALENT RESERVES RECOGNIZED BY THE INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE AND NATURAL RESOURCES.

Establishment Date*	Country	Park Name	Size (hectares)	Source
1922	Argentina	Nahuel Huapi N. P. (National Park of the South)	785,000	Harroy, 1971:48
1926	Chile	Vincente Perez Rosales N. P.	135,175	IUCN, 1974:49
1927	Uruguay	Santa Teresa N. P.	2,700	Harroy, 1972a:102
		San Miguel N. P.	1,495	Harroy, 1972a:102
1929	Guyana	Kaieteur N. P.	11,250	Harroy, 1971:250
1934	Argentina	Iguazu N. P.	55,000	Harroy, 1971:51
	Ecuador	Galapagos Islands N. P.	10,000	Harroy, 1971:193
1935	Chile	Juan Fernandez N. P.	18,300	IUCN, 1974:49
		Tolhuaca N. P.	3,500	Harroy, 1971:167
1937	Argentina	Los Glaciares N. P.	600,000	Harroy, 1971:49
		Los Alerces N. P.	263,000	Harroy, 1971:50
		Perito Francisco P. Moreno N. P.	115,000	Harroy, 1971:51
		Lanin N. P.	395,000	Harroy, 1971:49

APPENDIX B (continued)

Establishment Date*	Country	Park Name	Size (hectares)	Source
1937	Brazil	Itatiaia N. P.	11,943	Harroy, 1971:111
	Venezuela	Henri Pittier (or Rancho Grande) N. P.	90,000	Harroy, 1971:580
1939	Brazil	Iguacu N. P.	170,000	Harroy, 1971:109
		Serra Dos Orgaos N. P.	10,000	Harroy, 1971:112
	Chile	Nahuelbuta N. P.	5,415	Harroy, 1971:166
1940	Chile	Los Paraguas N. P.	18,000	IUCN, 1974:49
		Villarica N. P.	167,000	Harroy, 1972a:34
1941	Chile	Fray Jorge N. P.	9,960	Harroy, 1971:167
1943	Brazil	Sooretama Biological Reserve	24,000	Harroy, 1971:112
1944	Brazil	Rio Doce Forest Park	35,000	Harroy, 1972a:26
1945	Chile	Cabo de Hornos N. P.	63,093	Harroy, 1971:166
1948	Argentina	El Rey N. P.	44,162	Harroy, 1971:52
1949	Argentina	Laguna Blanca N. P.	11,250	Harroy, 1971:53
	Chile	Puyehue N. P.	117,000	IUCN, 1974:49
1950	Chile	Conguillio N. P.	40,000	IUCN, 1974:49

APPENDIX B (continued)

Establishment Date*	Country	Park Name	Size (hectares)	Source
1951	Argentina	Rio Pilcomayo N. P.	285,000	Harroy, 1971:50
1952	Venezuela	Sierra Nevada de Merida N. P.	190,000	Harroy, 1971:578
1954	Argentina	Chaco N. P.	15,000	Harroy, 1971:52
		Petrified Forest N. P.	10,000	Harroy, 1972a:10
1958	Chile	Laguna del Laju N. P.	11,600	IUCN, 1974:49
	Venezuela	Guatopo N. P.	92,640	Harroy, 1971:580
1959	Venezuela	El Avila N. P.	100,000	Harroy, 1971:581
	Brazil	Araguaia N. P.	460,000	Harroy, 1972a:25
		Ubajara N. P.	563	Harroy, 1972a:26
		Aparados da Serra N. P.	10,500	Harroy, 1971:110
1960	Argentina	Tierra del Fuego N. P.	63,000	Harroy, 1971:51
	Colombia	Cueva de los Guacharos N. P.	700	Harroy, 1972a:36
	Venezuela	Yurubi N. P.	4,000	Harroy, 1971:582
1961	Brazil	Chapada dos Veadeiros (Tocantins) N. P.	625,000	Harroy, 1972a:25
		Emas N. P.	100,000	Harroy, 1972a:25

APPENDIX B (continued)

Establishment Date*	Country	Park Name	Size (hectares)	Source
1961	Brazil	Monte Pascoal N. P.	22,500	Harroy, 1971:109
		Brasilia N. P.	28,000	Harroy, 1971:110
		Caparao N. P.	10,435	Harroy, 1971:115
		Sete Cidades N. P.	6,221	Harroy, 1971:114
		Tijuca N. P.	3,300	Harroy, 1971:114
	Peru	San Andres de Cutervo N. P.	2,500	IUCN, 1971:382
	Surinam	Coppename R. Voltzberg Natural Reserve	56,000	Harroy, 1971:475
1962	Venezuela	Canaima N. P.	1,000,000	Harroy, 1971:578
		Yacambu, N. P.	9,000	Harroy, 1971:581
1964	Colombia	Tayrona N. P.	11,600	Harroy, 1972a:36
		Isla de Salamanca N. P.	21,000	Harroy, 1972a:36
	Uruguay	Arequita N. P.	1,000	Harroy, 1972a:102
1965	Chile	Lauca N. P.	400,000	IUCN, 1974:49
		Alberto M. Agostini N. P.	800,000	IUCN, 1974:49
1966	Chile	Laguna del los Cisnes N. P. (Island)	25	IUCN, 1974:50

APPENDIX B (continued)

Establishment Date*	Country	Park Name	Size (hectares)	Source
1966	Chile	Los Pinguinos N. P. (Island)	97	IUCN, 1974:50
		Monte Balmaceda N. P.	7,900	IUCN, 1974:50
	Peru	Pampa de Galeras N. P.	6,500	Harroy, 1972a:77
	Surinam	Kaysergebergte Natural Reserve	160,000	Harroy, 1971:475
		Tafelberg Natural Reserve	40,000	Harroy, 1971:475
		Wia-Wia Natural Reserve	36,000	Harroy, 1971:476
		Coppename River-Mouth Natural Reserve	10,000	Harroy, 1971:476
		Brinckheuvel Natural Reserve	6,000	Harroy, 1971:476
	Uruguay	Cabo Palonio N. P.	14,250	Harroy, 1972a:102
1967	Chile	Huerguehue N. P.	3,900	IUCN, 1974:50
		Los Alerzales N. P.	1,230	IUCN, 1974:50
		El Guayaneco N. P.	30,498	IUCN, 1974:49
		Isla Guamblin N. P.	10,625	IUCN, 1974:49
		Bahia Erasmo N. P.	28,320	IUCN, 1974:49
		Laguna San Rafael N. P.	1,350,123	IUCN, 1974:49

APPENDIX B (continued)

Establishment Date*	Country	Park Name	Size (hectares)	Source
1967	Colombia	Sierra Nevada de Santa Marta N. P.	50,000	IUCN, 1974:50
	Uruguay	Andresito N. P.	239	Harroy, 1972a:102
1968	Chile	Isla de Pascua N. P.	4,589	IUCN, 1974:50
	Colombia	Purace N. P.	80,000	Harroy, 1972a:36
	Peru	Manu N. P.	1,400,000	Harroy, 1972a:77
		Pacaya N. P.	660,000	Harroy, 1972a:77
1969	Chile	Torres del Paine N. P.	24,530	Harroy, 1972a:34
	Surinam	Galibi Nature Reserve	4,000	Harroy, 1972a:86
	Venezuela	Cueva Quebrada del Toro N. P.	8,500	Harroy, 1972a:103
1970	Brazil	Serra Negra Biological Reserve	1,100	Harroy, 1972a:26
		Nova Lombardia Biological Reserve	4,350	Harroy, 1972a:26
		Corrego de Veado Biological Reserve	2,400	Harroy, 1972a:26
	Chile	Hernando de Magallanes N. P.	800,000	IUCN, 1974:49
		Bernardo O'Higgins N. P.	1,761,000	IUCN, 1974:49
		Paliaike N. P.	3,000	IUCN, 1974:50

APPENDIX B (continued)

Establishment Date*	Country	Park Name	Size (hectares)	Source
1970	Colombia	El Tuparro Faunistic Territory	380,000	Harroy, 1972a:36
	Surinam	Brownbera Nature Park	11,200	Harroy, 1972a:86
1971	Argentina	Palmar de Colon N. P.	8,500	Harroy, 1972a:10
	Brazil	Serra da Bocaina N. P.	134,000	Harroy, 1972a:25
		Cara Cara Biological Reserve	70,000	Harroy, 1972a:25
	Colombia	La Macarena N. P.	600,000	Harroy, 1972a:36
1972	Bolivia	Ulla Ulla National Reserve	215,125	Harroy, 1972a:23
	Colombia	Las Orquideas N. P.	30,566	IUCN, 1974:50
	Venezuela	Archipielago de los Roques N. P.	225,153	IUCN, 1974:69
1973	Paraguay	Ybyku'i N. P.	5,000	IUCN, 1974:59

*Uruguay has three additional parks recognized by the IUCN (Harroy, 1971:574) but for which no establishment date is given: F. D. Roosevelt National Park, Paso del Puerto National Park, and Meseta de Artigas National Park.

+This list includes all areas cited by Harroy (1971; 1972a) and IUCN (1973; 1974) and does not include any areas established after preparation of the 1974 IUCN list.

Appendix C

ADMINISTRATIVE ORGANIZATION OF SOUTH AMERICAN NATIONAL PARK SYSTEMS

Argentina	The National Park Service is administered by the Subsecretary of Renewable Natural Resources which is a semi-independent agency under the Minister of Agriculture and Livestock (Costantino, 1968:677; Wetterberg, 1974: 70).
Bolivia	Bolivia's national parks are administered by the Natural Resources Service which is directly responsible to the Minister of Agriculture (Wetterberg, 1974:72).
Brazil	Brazil's national parks are administered under the Minister of Agriculture's Forestry Development Institute (Strang, 1962:96; Wetterberg, 1974:73; Padua et al., 1974:452).
Chile	Chilean national parks are situated under the Forestry Services Division of the National Forestry Corporation which is responsible to the Minister of Economy and Agriculture (Wetterberg, 1974:75).
Ecuador	Ecuador's parks are administered by the Forestry Department which is located under the Ministry of Public Works (Wetterberg, 1974:79).
Guyana	The Commissioner of the Interior Department which is responsible to the Ministry of Mines and Forests administers Guyana's National Parks (Wetterberg, 1974:80).
Paraguay	Paraguay has a National Parks Coordinator who is responsible to the Tourist Office under the Minister of Public Works and Communications (Wetterberg, 1974:81).
Peru	The national parks of Peru are administered as a sub program of the National Forestry and Hunting Service which is directly responsible to the Ministry of Agriculture (Prado, 1973:14; Wetterberg, 1974:82).
Surinam	The nature reserves of Surinam are administered under the Forest Service which is subject to the Minister of Development (Wetterberg, 1974:83).
Uruguay	Uruguay's parks are administered by the Ministries of Livestock-Agriculture and National Defense (Wetterberg, 1974:85).

Venezuela Venezuela has a Director of Renewable Natural Resources which is a semi-autonomous agency under the Minister of Agriculture similar to INDERENA. National parks hold Division status equal with forestry, soils, wildlife, and the Botanic Institute (Venezuela, Ministerio de Agricultura y Cria, 1966:3; Wetterberg, 1974:86).