

Protected Areas Programme

# Protected Areas of the World

A review of national systems

Nearctic and Neotropical

Volume 4



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Compiled by The World Conservation Monitoring Centre




IVth World Congress on National Parks and Protected Areas,  
Caracas, Venezuela



The World Conservation Union

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**Volume 4: Nearctic and Neotropical**

## **IUCN – THE WORLD CONSERVATION UNION**

IUCN – The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organisations in a unique world partnership: some 650 members in all, spread across 120 countries.

As a union, IUCN exists to serve its members – to represent their views on the world stage and to provide them with the concepts, strategies and technical support they need to achieve their goals. Through its six Commissions, IUCN draws together over 5000 expert volunteers in project teams and action groups. A central secretariat coordinates the IUCN Programme and leads initiatives on the conservation and sustainable use of the world's biological diversity and the management of habitats and natural resources, as well as providing a range of services. The Union has helped many countries to prepare National Conservation Strategies, and demonstrates the application of its knowledge through the field projects it supervises. Operations are increasingly decentralised and are carried forward by an expanding network of regional and country offices, located principally in developing countries.

IUCN – The World Conservation Union seeks above all to work with its members to achieve development that is sustainable and that provides a lasting improvement in the quality of life for people all over the world.

## **WCMC – THE WORLD CONSERVATION MONITORING CENTRE**

The World Conservation Monitoring Centre (WCMC) is a joint venture between the three partners who developed the *World Conservation Strategy* and its successor *Caring for the Earth*: IUCN – The World Conservation Union, UNEP – United Nations Environment Programme, and WWF – World Wide Fund For Nature (formerly World Wildlife Fund). Its mission is to support conservation and sustainable development through the provision of information on the world's biological diversity.

WCMC has developed a global overview database that includes threatened plant and animal species, habitats of conservation concern, critical sites, protected areas of the world, and the utilisation and trade in wildlife species and products. Drawing on this database, WCMC provides an information service to the conservation and development communities, governments and United Nations agencies, scientific institutions, the business and commercial sector, and the media. WCMC produces a wide variety of specialist outputs and reports based on analyses of its data.

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# **Protected Areas of the World**

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**A review of national systems**

**Volume 4: Nearctic and Neotropical**

**Compiled by the World Conservation Monitoring Centre**

in collaboration with

**The IUCN Commission on National Parks and Protected Areas**

for the

**IVth World Congress on National Parks and Protected Areas,  
Caracas, Venezuela, 10-21 February 1992**

with the support of

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WORLD CONSERVATION  
MONITORING CENTRE



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# TABLE OF CONTENTS

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	Page
Foreword . . . . .	vii
Introduction . . . . .	viii
Acknowledgements . . . . .	ix
<b>Managing information on protected areas at WCMC . . . . .</b>	<b>xi</b>
Country accents and guidelines to their contents . . . . .	xiii
Maps and Lists (explanation of) . . . . .	xiv
Internationally-designated sites . . . . .	xv
Western Hemisphere Convention . . . . .	xx
<b>NEARCTIC</b>	
Canada . . . . .	1
Greenland - Denmark . . . . .	45
Mexico . . . . .	51
St Pierre & Miquelon - France . . . . .	61
United States of America . . . . .	63
<b>NEOTROPICAL - Central America</b>	
Belize . . . . .	119
Costa Rica . . . . .	127
El Salvador . . . . .	137
Guatemala . . . . .	143
Honduras . . . . .	153
Nicaragua . . . . .	161
Panama . . . . .	167
<b>NEOTROPICAL - South America</b>	
Argentina . . . . .	175
Bolivia . . . . .	187
Brazil . . . . .	197
Chile . . . . .	219
Colombia . . . . .	231
Ecuador . . . . .	247
French Guiana - France . . . . .	259
Guyana . . . . .	265
Paraguay . . . . .	271
Peru . . . . .	277
Suriname . . . . .	289
Uruguay . . . . .	297
Venezuela . . . . .	303
<b>NEOTROPICAL - Caribbean</b>	
Aruba - Netherlands . . . . .	317
Anguilla - United Kingdom . . . . .	319
Antigua and Barbuda . . . . .	321

	<b>Page</b>
Bahamas . . . . .	327
Barbados . . . . .	331
Bermuda - United Kingdom . . . . .	335
British Virgin Islands - United Kingdom . . . . .	341
Cayman Islands - United Kingdom . . . . .	347
Cuba . . . . .	351
Dominica . . . . .	359
Dominican Republic . . . . .	367
Grenada . . . . .	373
Guadeloupe - France . . . . .	379
Haiti . . . . .	385
Jamaica . . . . .	391
Martinique - France . . . . .	399
Montserrat - United Kingdom . . . . .	405
Netherlands Antilles - Netherlands . . . . .	407
Puerto Rico - USA . . . . .	411
St Kitts and Nevis . . . . .	417
St Vincent . . . . .	421
St Lucia . . . . .	427
Trinidad and Tobago . . . . .	435
Turks and Caicos - United Kingdom . . . . .	441
Virgin Islands - USA . . . . .	447

#### **SOUTHERN OCEAN ISLANDS**

South Georgia . . . . .	451
South Sandwich Islands . . . . .	455
Tristan da Cunha and Gough Island . . . . .	457



# FOREWORD

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The inspirational and aesthetic values of fine examples of the beauty and bounty of nature lay behind the establishment of many national parks and other types of protected areas. More recently there has been increasing recognition of the range of the value of protected areas and of their contribution to meet the needs of society by conserving the world's natural and physical resources. These values range from protection of representative samples of natural regions and the preservation of biological diversity, to the maintenance of environmental stability in surrounding country. Protected areas can also facilitate complementary rural development and rational use of marginal lands, and provide opportunities for research and monitoring, conservation education, and recreation and tourism.

Over the past thirty years, since the *First World Conference on National Parks* was held in Seattle, Washington (1962), our view of the world, and our impact on the world, has changed significantly. Throughout this time, and despite the mounting pressures of expanding human populations, the number of protected areas established has continued to rise. Since the centennial of national parks was commemorated at the time of the *Second World Conference on National Parks* at Yellowstone and Grand Teton, Wyoming in 1972, the "human" element of protected areas has come more and more into focus. They are no longer seen as being "locked up" or "set apart". Rather, they are seen as being integral to strategic approaches to resource management, a concept enshrined in the *World Conservation Strategy* (1980) based on managing natural areas to support development in a sustainable way.

The fundamental contribution of protected areas to sustainable management was reaffirmed by participants at the *World Congress on National Parks* held in Bali, Indonesia (1982), and for the last decade the *Bali Action Plan* has focused attention on a range of actions necessary for promoting and supporting protected areas. These actions were further focused in regional action plans subsequently developed by members of the IUCN Commission on National Parks and Protected Areas, covering the Afrotropical, Indomalayan, Neotropical and Oceanian regions.

More recently, two significant, and widely accepted documents have stressed the very vital roles that protected areas play. The report of the *World Commission on Environment and Development* was published in 1987, and more recently a new strategy *Caring for the World* was launched in 1991. This latter strategy, which has its roots in the *World Conservation Strategy*, clearly identifies the functions and benefits of protected area systems, what they safeguard, and why they are important for development opportunities.

Many countries have declared extensive systems of protected areas, and are continuing to develop and expand them. The systems and the sites they contain vary considerably from one country to another, depending on national needs and priorities, and on differences in legislative, institutional and financial support. Consequently, protected areas have been established under many different national designations to provide for a spectrum of management objectives, ranging from total protection to sustainable use: from strict nature reserves to lived-in landscapes.

IUCN – The World Conservation Union has been involved in protected areas issues for many years, and has published a significant body of information on the subject. The IUCN Commission on National Parks and Protected Areas was set up both to ensure that the appropriate expertise was available to advise the Union, and to bring together professionals to share information and experience. IUCN and CNPPA have together had a very strong hand in developing the programme for the *IV World Congress on National Parks and Protected Areas* in Caracas, Venezuela (1992).

For more than 10 years, IUCN and CNPPA have worked closely with what is now the World Conservation Monitoring Centre, to help in building an information resource on protected areas. The information is of value to the Commission in developing its own programmes, in identifying priorities, and for a wide range of other purposes such as supporting international initiatives in World Heritage, wetlands and biosphere reserves. It is also important to both IUCN and the Commission that such information is made available to others, so that the roles and values of protected areas are more widely recognised, appreciated and respected.

The four volume *Protected Areas of the World: A review of national systems* is being published for the World Parks Congress by WCMC and IUCN in cooperation with British Petroleum, and aims to provide a standard format "overview" of the world's protected area systems. While this product has gaps, and no doubt inaccuracies, it does illustrate very clearly the range of protected areas activities around the world, and gives an indication of the protected areas estate under the stewardship of our managers. This product, in combination with the protected areas reviews being prepared for the Congress by the CNPPA Regional Vice-Chairs, will also provide a benchmark against which to measure our achievements over the next decade.

P.H.C. (Bing) Lucas  
Chair

IUCN Commission on National Parks and Protected Areas



# INTRODUCTION

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Participants at the *Third World National Parks Congress* held in Bali, Indonesia, in 1982, clearly recognised that the availability of comprehensive, good-quality information on the world's protected areas was essential to a wide range of international organisations, governments, protected area managers, voluntary bodies and individuals. Such information is a prerequisite for assessing the coverage and status of protected areas from regional and global perspectives, and is key to the development of regional and global priorities and strategies. Monitoring protected areas is vital to ensure that those areas allocated to conserve the world's natural resources meet the needs of society.

The World Conservation Monitoring Centre (WCMC) is expanding its capabilities as an international centre for information on the conservation of biological diversity. Working closely with the IUCN Commission on National Parks and Protected Areas (CNPPA), WCMC continues to compile an extensive database on the world's protected areas, which is being used more and more frequently as a source of information.

One result of WCMC's work as an information centre is the ability to draw material together into publications which provide background information on protected areas and protected area systems. At the previous Congress in 1982, two publications from the protected areas database were available, the *1982 UN List*, and the *IUCN Directory of Neotropical Protected Areas*. Since then, the Centre has collaborated with CNPPA and others on a wide range of publications, including two subsequent *UN Lists* in 1985 and 1990, directories of protected areas for Africa, Oceania, South Asia, and the mountains of central Asia, and various publications on eastern Europe. A full list of publications on protected areas (including those published by others with information provided by WCMC) is available from the Centre.

The present work, *Protected Areas of the world: A review of national systems*, is the first attempt by WCMC to compile a world-wide survey of protected area systems. The book is organised into national (or occasionally sub-national) accounts, each comprising a description of the national protected areas system, accompanied by a summary list and map of protected areas. The book is divided into four volumes, with volume one covering the Indomalayan, Oceanian, Australian and Antarctic realms, volume two the Palaearctic realm, volume three the Afrotropical realm, and volume four the Nearctic and Neotropical realms. The first three volumes were released at the *IV World Congress on National Parks and Protected Areas*, held at Caracas during February 1992, whilst the fourth volume was presented as a draft. This enabled WCMC staff, who attended the Congress, to obtain comments, corrections and additions from the numerous experts from the Neotropic and Nearctic regions who were present in Caracas. This volume therefore, drawing on this new source of information, completes the series.

Publication of such a book serves two purposes. First, it provided extensive background information on the protected area systems of the world, relevant to several plenary sessions and workshops at the *IV World Congress on National Parks and Protected Areas*. In particular, it was a contribution to the third plenary session *The Contributions of Protected Areas to Sustaining Society: A Global Review*. Secondly, and perhaps more significantly, it is also part of the process of information collection and verification. Feedback from protected areas professionals, and others familiar with protected areas, is therefore both welcomed and encouraged, because only by a continual process of review and update can we present a true picture.

Jeremy Harrison  
World Conservation Monitoring Centre

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## ACKNOWLEDGEMENTS

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Preparation of a directory of this magnitude is only achieved through a tremendous amount of effort and cooperation. Over the years, protected areas professionals throughout the world have reviewed or compiled material for us, or provided new information. Quite simply, without their cooperation this book could not have been completed, and we greatly appreciate their support.

This assistance has been facilitated in part by the IUCN Commission on National Parks and Protected Areas, and the support of the Commission and its past and present officers is gratefully acknowledged. In particular we would like to thank the present chair P.H.C. (Bing) Lucas of New Zealand, and his predecessor Harold Eidsvik of Canada. Work has also been supported by the staff of the IUCN Protected Areas Unit, and in particular James Thorsell and Jeffrey McNeely.

This particular publication is the product of two projects. The *British Petroleum Company plc* has provided support for the preparation of part of the text and maps (for those areas not covered by the second mentioned project), and has provided funds for both publishing and distributing the book. At the same time, the *British Overseas Development Administration* has supported review of information on tropical and sub-tropical countries, as part of a project contributing to the FAO Forest Resources Assessment 1990. Thanks are due to both organisations for their support.

A number of past and present staff of WCMC have been involved in preparing this directory, which includes material published in several earlier directories. Compilation of country accounts has been the responsibility of: Patricia Almada-Villela, Daphne Clark, Graham Drucker, Harriet Gillett, Donald Gordon, Sara Oldfield, James Paine, Chris Sharpe and Mark Spalding. Assistance with the preparation of maps has been provided by Ian Barnes, Clare Billington, Simon Blythe and Gillian Bunting and Joel Smith. Secretarial support was provided by Deborah Rothera.

Notwithstanding the significant contributions of the many individuals who have provided information to WCMC and CNPPA, errors and omissions must remain the responsibility of the compilers.

This directory is not intended to be a final statement but a review of the world's protected area systems. If WCMC is to continue to carry out its mission, there is a continual need to maintain and update this information as national protected areas systems change and as more information becomes available. Therefore, with this directory goes a plea for corrections, comments and additional material to help WCMC carry out its mission as effectively as possible. By the same token, the information that WCMC collects and manages is available to others to support their work and programmes.

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# MANAGING INFORMATION ON PROTECTED AREAS AT WCMC

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Many individuals and organisations need basic information on protected areas systems, lists of protected areas with certain features, or analyses of protected areas statistics, yet it is unlikely that they will have the time or resources to collect, compile and analyse all of the information for themselves. Such information also needs to be kept up-to-date, as properties are added or extended, and as legislation or administrative regimes change. Users may also require details about the major protected areas within national systems, such as physical features, vegetation and fauna, or on other aspects such as management status and constraints.

It is to meet these needs that the WCMC Protected Areas Data Unit (PADU) was founded. This service enables users to obtain quickly information on protected areas from a single source, be it for purposes of analysis and assessment, or as briefing material. It is not intended that this service should by-pass any need for users to contact or visit the relevant national authorities for such information, but use of PADU's resources enables users to be well informed prior to making such approaches and in a better position to ask the right questions when so doing.

## **Institutional background**

IUCN – The World Conservation Union has been closely involved in protected areas issues for many years. As early as 1960, it established a Commission on National Parks and Protected Areas (CNPPA) to serve as the "leading international, scientific and technical body concerned with the selection, establishment and management of national parks and other protected areas". CNPPA has always emphasised the need for information on which to base effective conservation planning and management, and has been very active in collecting and disseminating information on protected areas.

As the world's network of protected areas has expanded and its management improved, information on national protected areas systems and individual protected areas has proliferated. This led CNPPA to set up PADU in 1981 to manage this increasing volume of information. Establishment of this Unit was supported by the United Nations Environment Programme (UNEP), as part of its Global Environment Monitoring System (GEMS). Originally part of the IUCN Conservation Monitoring Centre, PADU is now a unit within the World Conservation Monitoring Centre (WCMC), restructured in July 1988 and jointly managed by IUCN, the World Wide Fund for Nature (WWF) and UNEP.

## **Objectives**

WCMC aims to provide accurate up-to-date information on protected area systems of the world for use by its partners (IUCN, WWF and UNEP) in the support and development of their programmes, and by other international bodies, governmental and non-governmental organisations, scientists and the general public. Such information covers the entire spectrum of protected areas, from national parks and sanctuaries established under protected areas legislation or customary regimes to forest reserves created under forestry legislation. It also includes privately-owned reserves in which nature is protected.

Specific objectives are to:

- maintain a comprehensive and up-to-date database of the world's protected areas;
- compile definitive, standard-format accounts summarising national protected areas systems;
- hold maps of protected areas systems and digitise them;
- compile definitive, standard-format accounts covering individual protected areas, particularly the major properties in tropical countries and those of international importance;
- accumulate current and historical information on protected areas; and
- provide support to regional and international activities, programmes and conventions relating to protected areas.

## **Information capture, management and compilation**

Information is collected from official sources, namely national agencies responsible for administering protected areas, and other sources through a global network of contacts ranging in profession from policy-makers and administrators to land managers and scientists. It is also obtained from published and unpublished literature. Regional CNPPA meetings and other relevant scientific and technical meetings provide valuable opportunities for making new contacts and collecting fresh information. This material in itself is a major asset of the Centre.

Information, ranging from books, reports, management plans, scientific papers, maps and correspondence, is stored as hard copy in manual files. Basic data on individual protected areas are extracted and, after verification, entered in a protected areas database, which currently holds some 32,000 records. This computerised database can be used for generating lists of protected areas meeting pre-defined criteria, together with summary statistics, as well as performing more complex



tasks. In addition, maps of protected areas are being digitised, using a Geographic Information System, in order to generate computerised mapped output and to allow other datasets, for example on habitats, to be overlain for analysis.

The information is also used to produce accounts of protected areas systems and individual protected areas. These accounts are compiled according to standard formats developed over the years by WCMC in collaboration with CNPPA.

### **Dissemination of information**

In keeping with its primary objective, WCMC aims to make available good quality information on protected areas to a wide range of users, including international organisations, governments, protected area managers, conservation organisations, commercial companies involved in natural resource exploitation, scientists, and the media and general public. Information may be provided or consulted by arrangement.

Material may be prepared under contract: for example, WCMC regularly provides UNEP with summary data on protected areas for its biennial *Environmental Data Report*. WCMC is experimenting with providing outside users with direct access to its protected areas database. Trials have been ongoing with the US National Park Service since 1986 and it is hoped to be able to extend this service to other users shortly.

Compiled information is periodically published in the form of regional or thematic directories and lists. Directories comprise sections on individual countries, each with a protected areas system information sheet, a list of protected areas and accompanying location map, and a series of site information sheets covering at least the more important properties. Prior to releasing or publishing documents, draft material is circulated for review by relevant government agencies and experts to help ensure that compiled information is accurate and comprehensive.

Major lists and directories published to date are as follows:

- *United Nations List of National Parks and Protected Areas* (1982, 1985, 1990)
- *IUCN Directory of Neotropical Protected Areas* (1982)
- *IUCN Directory of Afrotropical Protected Areas* (1987)
- *IUCN Directory of South Asian Protected Areas* (1990)
- *Protected Areas in Eastern and Central Europe and the USSR* (1990)
- *IUCN Directory of Protected Areas in Oceania* (1991)
- *Nature Reserves of the Himalaya and the Mountains of Central Asia* (1992)

- *Information System: Biosphere Reserves: Compilation 4* (1986)
- *Biosphere Reserves: Compilation 5* (1990)
- *Directory of Wetlands of International Importance* (1987, 1990)
- *Protected Landscapes: Experience around the World* (1987)

In addition, numerous draft directories, reports, papers and reviews have been produced. A list of these is available from WCMC.

WCMC also disseminates information through the *CNPPA Newsletter* and *Parks* magazine. In the case of the latter, WCMC has assumed responsibility for compiling *Clipboard* in which world news on protected areas is featured.

### **Special services**

WCMC has a very close working relationship with CNPPA. While the Commission provides expert advice and support through its network of members, WCMC supports many of the Commission's activities through provision of technical information. WCMC has a particular responsibility for managing information on natural properties designated under international conventions and programmes, namely the *Convention concerning the Protection of the World Cultural and Natural Heritage* (World Heritage Convention), *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (Ramsar Convention), and the *Unesco Man and the Biosphere Programme*. Thus, WCMC cooperates closely with the Division of Ecological Sciences, Unesco, in maintaining information on biosphere reserves and World Heritage sites accorded by the MAB Secretariat and World Heritage Committee, respectively. Likewise, it works closely with the Ramsar Bureau with respect to managing information on Ramsar wetlands.

### **The rest of the World Conservation Monitoring Centre**

Information on protected areas is only one aspect of the programme of the World Conservation Monitoring Centre, which also covers information on plant and animal species of conservation concern, important natural habitats and sites of high biological diversity, wildlife utilisation, and the international trade in wildlife.

To monitor the impact of man on nature is a major task. This requires close collaboration between agencies, and between agencies and individuals, and the development and exchange of information. WCMC acts both as an information centre, and as a facilitator of information management and exchange. WCMC has now embarked on an ambitious programme to promote improvements in the availability of information, and to develop its database capabilities and information services. Information on the distribution and status of the world's protected areas is an essential component of this programme.

## COUNTRY ACCOUNTS: GUIDELINES TO THEIR CONTENTS

In general, there is an account for each country, divided up into a series of sections with standard headings. The following notes summarise the type of information included in each section where it is available. In certain cases, accounts have been prepared for areas which are parts of countries, usually where the area concerned is geographically separate from the "parent" country.

### Country

Full name of country or political unit, as used by the United Nations (United Nations *Terminology Bulletin* on Names of Countries and Adjectives of Nationality).

### Area

Total according to the latest volume of the *FAO Production Yearbook* prepared by the Statistics Division of the Economic and Social Policy Department, FAO, unless otherwise stated (with full reference). Terrestrial and marine components are distinguished, if appropriate.

### Population

Total population and its mean annual rate of growth according to the latest issue of *World Population Prospects*, published by the United Nations Population Division. Year of census or estimate is indicated in parentheses. If another source has had to be used, it is cited.

### Economic indicators

Gross domestic product and gross national product per capita in US dollars (or net material product in the case of centrally planned economies), with year in parentheses, according to the latest issue of *National Accounts Statistics: Analysis of Main Aggregates* (prepared by the United Nations Statistical Office) and *The World Bank Atlas*.

### Policy and legislation

Information on aspects of the constitution that are relevant to nature conservation and protected areas.

Summary of national policies that relate to nature conservation, particularly with respect to the protection of ecosystems. This may include reference to policies relating to environmental impact assessments, and national/regional conservation strategies.

Brief chronological account of past and present national legislation and traditions that relate to the establishment of the protected areas system, with names (in English), dates and numbers of acts, decrees and ordinances. Legislation covering forestry and other resource sectors is included, in so far as it provides for protected areas establishment. Procedures for the notification and declassification of protected areas are summarised.

Outline of legal provisions for administering protected areas

National designations of protected areas are cited and their range of provisions outlined. Their legal definitions, together with the names of the authorities legally responsible for their administration, are summarised in an Annex (see below).

Reviews of protected areas policy and legislation are noted, with any identified deficiencies in prevailing provisions highlighted.

### International activities

Participation in international conventions and programmes (World Heritage and Ramsar conventions, MAB Programme, UNEP Regional Seas Programme) and regional conventions and agreements (such as the African, ASEAN and Berne conventions, the FAO Latin American/Caribbean Technical Cooperation Network, South Asian Cooperative Environmental Programme and the South Pacific Regional Environment Programme) relevant to habitat protection is summarised.

Outline of any international, multilateral and bilateral cooperative programmes or transfrontier cooperative agreements relevant to protected areas, including mention of any transfrontier protected areas.

### Administration and management

All authorities responsible for the administration and management of protected areas are named and described, with a brief history of their establishment, administrative organisation, staff structure, budget and any training programmes. Authorities responsible for different types of protected areas are clearly distinguished.

Outline of the role of any advisory boards

Cooperative agreements between management authorities and national or foreign universities and institutes, with details of any research underway or completed

Names and brief details of non-governmental organisations concerned with protected areas. Reference to any national directories of voluntary conservation bodies is included.

Effectiveness of protected areas management is noted where information has been provided. Attention is drawn to any sites registered as threatened under the World Heritage Convention, or by the IUCN Commission on National Parks and Protected Areas.



### Systems reviews

– Short account of physical features, biological resources, and land use patterns (with percentages if available), including the extent and integrity of major ecosystems.

– Brief review of the development of nature conservation programmes, so far as it relates to the establishment and expansion of the national protected areas network. Emphasis is given to any systems reviews or comprehensive surveys of biological resources, with details of major recommendations arising from such studies.

– Threats to the protected areas system beyond the control of the management agencies are outlined.

### Other relevant information

– Tourism and other economic benefits of the protected areas system, if applicable

– Other items, as appropriate

### Addresses

– Names and addresses (with telephone, telex and fax numbers, and cable) of authorities responsible for administering protected areas. Names are given in the original language or transliterated, with English translation in brackets as appropriate, and followed by the title of the post of the chief executive.

– Names and addresses (with telephone, telex and fax numbers, and cable) of non-governmental organisations actively involved in protected areas issues. Names are given in the original language or transliterated, with English translation in brackets as appropriate, and followed by the title of the post of the chief executive,

### References

– Key references (including all cited works) to the protected areas system, in particular, and nature conservation, in general, are listed.

### ANNEX

**Definitions of protected area designations, as legislated, together with authorities responsible for their administration. The annex includes the following sections:**

**Title:** Name and number of law in the original language or transliterated, with the English translation underneath, as appropriate.

**Date:** Day, month and year of enactment, followed by dates of subsequent major amendments

**Brief description:** Summary of main provisions (often this is stated at the beginning of the legislation)

**Administrative authority:** Name of authority responsible for administering the law, given in the original language or transliterated, with the English translation underneath as appropriate. This is followed by the title of the post of the chief executive.

**Designations:** National designation of protected area in the original language or transliterated, followed in brackets by the English translation as appropriate. For each designation this would be followed by: definition of designation (if given in legislation), summary of activities permitted or prohibited, outline of penalties for offences, and, where relevant, reference to subsequent legislation relating to the original law.

**Source:** This may be "original legislation", "translation of original legislation" or a referenced secondary source.

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## MAPS and LISTS

The descriptive sections are followed by lists of protected areas, and maps showing their location. In most cases, the lists comprise all of those areas qualifying for inclusion in IUCN management categories I-VIII, which have an area of over 1,000 hectares. However, forest and hunting reserves qualifying for IUCN Management Category VIII have been omitted, largely because our information is not comprehensive. Also, size restrictions have been ignored for island nations. Note that in certain cases, nationally designated areas (such as some national parks) will not appear in the lists, as they do not meet the criteria. World Heritage sites, biosphere reserves and Ramsar sites are also listed.

### Categories and management objectives of protected areas

I **Scientific Reserve/Strict Nature Reserve:** to protect nature and maintain natural processes in an undisturbed state in order to have ecologically representative examples of the natural environment available for scientific study, environmental monitoring, education, and for the maintenance of genetic resources in a dynamic and evolutionary state.

II **National Park:** to protect natural and scenic areas of national or international significance for scientific, educational and recreational use.



- III **Natural Monument/Natural Landmark:** to protect and preserve nationally significant natural features because of their special interest or unique characteristics.
- IV **Managed Nature Reserve/Wildlife Sanctuary:** to assure the natural conditions necessary to protect nationally significant species, groups of species, biotic communities, or physical features of the environment where these require specific human manipulation for their perpetuation.
- V **Protected Landscape or Seascape:** to maintain nationally significant natural landscapes which are characteristic of the harmonious interaction of man and land while providing opportunities for public enjoyment through recreation and tourism within the normal life style and economic activity of these areas.
- VI **Resource Reserve:** to protect the natural resources of the area for future use and prevent or contain development activities that could affect the resource pending the establishment of objectives which are based upon appropriate knowledge and planning.
- VII **Natural Biotic Area/Anthropological Reserve:** to allow the way of life of societies living in harmony with the environment to continue undisturbed by modern technology.
- VIII **Multiple-Use Management Area/Managed Resource Area:** to provide for the sustained production of water, timber, wildlife, pasture, and outdoor recreation, with the conservation of nature primarily oriented to the support of economic activities (although specific zones may also be designed within these areas to achieve specific conservation objectives).

Abridged from IUCN (1984). Categories and criteria for protected areas. In: McNeely, J.A. and Miller, K.R. (Eds), *National parks, conservation, and development. The role of protected areas in sustaining society.* Smithsonian Institution Press, Washington. Pp. 47-53.

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## INTERNATIONALLY DESIGNATED SITES

In the field of nature conservation there are two international conventions and one international programme that include provision for designation of internationally important sites in *any* region of the world. These are the World Heritage Convention, the Ramsar (Wetlands) Convention, and the Unesco Man and the Biosphere (MAB) Programme. While there is a wide range of other international conventions and programmes, these cover only regions, or small groups of countries.

Both World Heritage sites and Ramsar sites must be nominated by a State that is party to the relevant convention. While there is an established review procedure for World Heritage sites (and nomination is no guarantee of listing), all nominated Ramsar sites are placed on the List of Wetlands of International Importance. Biosphere reserves are nominated by the national MAB committee of the country concerned, and are only designated following review and acceptance by the MAB Bureau.

Each Contracting Party to the Ramsar (Wetlands) Convention is obliged to nominate at least one wetland of international importance. However, a country can be party to the World Heritage Convention without having a natural site inscribed on the List, and may participate in the MAB programme without designating a biosphere reserve.

### World Heritage Sites

The Convention Concerning the Protection of the World Cultural and Natural Heritage was adopted in Paris in 1972, and came into force in December 1975. The Convention provides for the designation of areas of "outstanding universal value" as World Heritage sites, with the principal aim of fostering international cooperation in safeguarding these important areas. Sites, which must be nominated by the signatory nation responsible, are evaluated for their World Heritage quality before being inscribed by the international World Heritage Committee. Only natural sites, and those with mixed natural and cultural aspects, are considered in this publication.

Article 2 of the World Heritage Convention considers as natural heritage: natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; geological or physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; and natural sites or precisely delineated areas of outstanding universal value from the point of view of science, conservation or natural beauty. Criteria for inclusion in the list are published by Unesco.

The following States Party to the Convention lie at least partially within the regions covered by this volume:

*Antigua and Barbuda*  
*Argentina*  
*Belize*  
*Bolivia*  
*Brazil*  
*Canada*  
*Chile*  
*Colombia*  
*Costa Rica*  
*Cuba*  
*Denmark*  
*(Greenland)*  
*Dominican Republic*  
*Ecuador*  
*El Salvador*  
*France*  
*(Guadeloupe)*  
*(French Guiana)*  
*(Martinique)*  
*(St Pierre & Miquelon)*  
*Guatemala*  
*Guyana*  
*Haiti*  
*Honduras*  
*Jamaica*  
*Mexico*  
*Nicaragua*  
*Panama*  
*Paraguay*  
*Peru*  
*St Kitts and Nevis*  
*St Lucia*  
*United Kingdom*  
*(Anguilla)*  
*(Bermuda)*  
*(British Virgin Islands)*  
*(Cayman Islands)*  
*(Montserrat)*  
*(Turks and Caicos)*  
*United States of America*  
*(Puerto Rico)*  
*(Navassa Island)*  
*(Virgin Islands)*  
*Venezuela*

The following natural World Heritage sites lie within the regions covered by this volume:

*Argentina*  
Iguazu National Park  
Los Glaciares National Park  
*Brazil*  
Iguacu National Park  
*Canada*  
Canadian Rocky Mountain Parks  
Dinosaur Provincial Park  
Gros Morne National Park

Kluane-Wrangell/St Elias (with USA)  
Nahanni National Park  
Wood Buffalo National park

*Costa Rica*  
Talamanca Range-La Amistad Reserves

*Ecuador*  
Galapagos Islands  
Sangay National Park

*Guatemala*  
Tikal National Park

*Honduras*  
Rio Platano

*Mexico*  
Sian Ka'an Biosphere Reserve

*Panama*  
Darien National Park  
La Amistad International Park

*Peru*  
Huascaran National Park  
Manu National Park  
Rio Abiseo National Park  
Sanctuario Historico de Macchu Picchu

*United States of America*  
Everglades National Park  
Grand Canyon National Park  
Great Smoky Mountains National Park  
(Hawaii Volcanoes National Park)  
Kluane-Wrangell/St Elias National Park (with Canada)  
Mammoth Cave National Park  
Olympic National Park  
Redwood National park  
Yellowstone National Park  
Yosemite National Park

## **Ramsar Sites**

The Convention on Wetlands of International Importance Especially as Waterfowl Habitat was signed in Ramsar (Iran) in 1971, and also came into force in December 1975. This Convention provides a framework for international cooperation for the conservation of wetland habitats. The Convention places general obligations on contracting party states relating to the conservation of wetlands throughout their territory, with special obligations pertaining to those wetlands which have been designated to the "List of Wetlands of International Importance".

Each State Party is obliged to list at least one site. Wetlands are defined by the convention as: areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas

of marine waters, the depth of which at low tide does not exceed six metres.

The following States Party to the Convention lie at least partially within the regions covered by this volume:

*Argentina*  
*Bolivia*  
*Canada*  
*Chile*  
*Costa Rica*  
*Denmark*  
 (Greenland)  
*Ecuador*  
*France*  
 (Guadeloupe)  
 (French Guiana)  
 (Martinique)  
 (St Pierre & Miquelon)  
*Guatemala*  
*Mexico*  
*Netherlands*  
 (Aruba)  
 (Netherlands Antilles)  
*Panama*  
*Peru*  
*Suriname*  
*United Kingdom*  
 (Anguilla)  
 (Bermuda)  
 (British Virgin Islands)  
 (Cayman Islands)  
 (Montserrat)  
 (Turks and Caicos)  
*United States of America*  
 (Puerto Rico)  
 (Navassa Island)  
 (Virgin Islands)  
*Uruguay*  
*Venezuela*

The following wetlands which lie within the region have been included in the List of Wetlands of International Importance:

*Argentina*  
 Laguna de Pozuelos  
 Laguna Blanca  
 Rio Pilcomayo  
*Bolivia*  
 Laguna Colorada  
*Canada*  
 Alaksen  
 Baie de l'Île Verte  
 Beaverhill Lake  
 Cap Tourmente  
 Chignecto  
 Delta Marsh  
 Dewey Soper

Grand Codroy Estuary  
 Hay-Zama Lakes  
 Lac Saint-François  
 Last Mountain Lake (northern part)  
 Long Point  
 Malpeque Bay  
 Mary's Point  
 McConnell River  
 Musquodoboit Harbour Outer Estuary  
 Oak-Hammock Marsh  
 Old Crow Flats  
 Peace-Athabasca Delta  
 Point Pelee  
 Polar Bear Provincial Park  
 Polar Bear Pass  
 Queen Maud Gulf  
 Quill Lakes  
 Rasmussen Lowlands  
 Shepody Bay  
 Southern James Bay Sanctuaries  
 Southern Bight-Minas Basin  
 St Clair  
 Whooping Crane Summer Range

*Chile*  
 Carlos Anwandter Sanctuary

*Costa Rica*  
 Caño Negro  
 Palo Verde

*Denmark - Greenland*  
 Aqajarua-Sullorsuag  
 Eqalummiut Nunaat-Nassuttuup Nunaa  
 Hochstetter Forland  
 Ikkatoq  
 Kilen  
 Kitsissunnguit  
 Kuannersuit Kuussuat  
 Naternaq  
 Qinguata Marraa-Kuussuaq  
 Ydre Kitsissut

*Ecuador*  
 Machalilla  
 Manglares-Churute

*Guatemala*  
 Laguna del Tigre

*Mexico*  
 Ría Lagartos, Yucatán

*Netherlands Antilles*  
 De Slagbaai  
 Het Gotomeer  
 Het Lac  
 Het Pekelmeer  
 Het Spaans Lagoen  
 Klein Bonaire Island and adjacent sea

*Panama*

Golfo de Montijo

*Peru*

Reserva Nacional de Paracas  
Reserva Nacional Pacaya-Samiria  
Santuario Nacional Lagunas de Mejía

*Suriname*

Coppename Rivermouth

*United Kingdom*

(Turks and Caicos)  
North, Middle & East Caicos Islands

*Uruguay*

Bañados del Este y Franja Costera

*Venezuela*

Cuare

**Biosphere Reserves**

The designation of biosphere reserves differs somewhat from that of either of the previous designations in that it is not made under a specific convention, but as part of an international scientific programme, the Unesco Man and the Biosphere Programme. The objectives of a network of biosphere reserves, and the characteristics which biosphere reserves might display, are identified in various documents, including the Action Plan for Biosphere Reserves (Unesco, 1984).

Biosphere reserves differ from World Heritage and Ramsar sites in that they are designated not exclusively for protection of unique areas or significant wetlands, but for a range of objectives which include research, monitoring, training and demonstration, as well as conservation. In most cases the human component is vital to the functioning of the biosphere reserve, something which is not always true for either World Heritage or Ramsar sites.

The following biosphere reserves are located within the region:

*Argentina*

Parque Costero del Sur  
Reserva de la Biosfera de Pozuelos  
Reserva Ecológica de Ñacuñán  
Reserva de la Biosfera San Guillermo  
Reserva Natural de Vida Silvestre Laguna Blanca

*Bolivia*

Estación Biológica Beni  
Parque Nacional Pilon-Lajas  
Reserva Nacional de Fauna Ulla Ulla

*Brazil*

Tijuca-Tingua-Orgãos  
Vale do Ribeira-Serra do Graciosa

*Canada*

Long Point Biosphere Reserve  
Mont St Hilaire  
Niagara Escarpment Biosphere Reserve  
Réserve de la biosphère de Charlevoix  
Riding Mountain Biosphere Reserve  
Waterton Lakes National Park

*Chile*

Parque Nacional Lauca  
Parque Nacional Fray Jorge  
Parque Nacional Laguna San Rafael  
Parque Nacional Torres del Paine  
Parque Nacional Juan Fernández  
Reserva de la Biosfera La Campana-Peñuelas  
Reserva de la Biosfera Araucarias

*Colombia*

Cinturón Andino Cluster Biosphere Reserve  
El Tuparro Nature Reserve  
Sierra Nevada de Santa Marta  
(inc. Tayrona NP)

*Costa Rica*

Cordillera Volcánica Central  
Reserva de la Biosfera de la Amistad

*Cuba*

Baconao  
Cuchillas del Toa  
Península de Guanahacabibes  
Sierra del Rosario

*Denmark - Greenland*

North-east Greenland National Park

*Ecuador*

Archipiélago de Colón (Galápagos)  
Reserva de la Biosfera de Yasuni

*Guatemala*

Maya

*Honduras*

Río Plátano Biosphere Reserve

*Mexico*

Montes Azules  
Reserva de la Biosfera Sierra de Manantlán  
Reserva de la Biosfera de Sian Ka'an  
Reserva de Mapimí  
Reserva de la Michilía  
Reserva de la Biosfera "El Cielo"

*Panama*

Parque Nacional Fronterizo Darién

*Peru*

Reserva de Huascarán  
Reserva del Manu  
Reserva del Noroeste



*United States of America*

Aleutian Islands National Wildlife Refuge  
Beaver Creek Experimental Watershed  
Big Bend National Park  
Big Thicket National Preserve  
California Coast Ranges Biosphere Reserve  
Carolinian-South Atlantic Biosphere Reserve  
Cascade Head Experimental Forest  
Central California Coast Biosphere Reserve  
Central Gulf Coastal Plain Biosphere Reserve  
Central Plains Experimental Range (CPER)  
Champlain-Adirondak Biosphere Reserve  
Channel Islands Biosphere Reserve  
Coram Experimental Forest (incl. Coram NA)  
Denali National Park and Biosphere Reserve  
Desert Experimental Range  
Everglades National Park  
(incl. Ft. Jefferson NM)  
Fraser Experimental Forest  
Glacier Bay-Admiralty Is. Biosphere Reserve  
Glacier National Park  
Guanica Commonwealth Forest Reserve  
H.J. Andrews Experimental Forest  
(Hawaii Islands Biosphere Reserve)  
Hubbard Brook Experimental Forest  
Isle Royale National Park  
Jornada Experimental Range  
Konza Prairie Research Natural Area  
Land between The Lakes  
Mammoth Cave Area

Mojave and Colorado Deserts Biosphere Reserve  
New Jersey Pinelands Biosphere Reserve  
Niwot Ridge Biosphere Reserve  
Noatak National Arctic Range  
Olympic National Park  
Organ Pipe Cactus National Monument  
Rocky Mountain National Park  
San Dimas Experimental Forest  
San Joaquin Experimental Range  
Scenic Research Area  
Sequoia-Kings Canyon National Parks  
South Atlantic Coastal Plain BR  
Southern Appalachian Biosphere Reserve  
Stanislaus-Tuolumne Experimental Forest  
The Virginia Coast Reserve  
The University of Michigan Biological Station  
Three Sisters Wilderness  
Yellowstone National Park

*Puerto Rico - USA*

Guanica Commonwealth Forest Reserve  
Luquillo Experimental Forest (Caribbean NF)

*Uruguay*

Bañados del Este

*Virgin Islands - USA*

Virgin Islands National Park & Biosphere Reserve

## WESTERN HEMISPHERE CONVENTION

### Title: Convention On Nature Protection and Wildlife Preservation in The Western Hemisphere

Date: 12 October 1940

#### Brief description:

The governments of the American Republics wish to protect and conserve in their natural habitat representatives of all species of native flora and fauna, including migratory birds, in sufficient numbers and over areas extensive enough to prevent them from becoming extinct through man's intervention. Protection will also be given to outstanding scenery and specific regions or objects of importance. To these means, the Convention provides the following conservation measures which the governments of the American Republic agree to put into effect.

#### Designations:

**National park** An area set aside for the protection and preservation of exceptional scenery, flora and fauna of national significance for the benefit of the general public.

Access by the general public is allowed under official regulations and supervision as park is placed under public control. Facilities will be provided for public recreation and education

Park boundaries are not be altered. Commercial exploitation of resources within the area is prohibited. The hunting and capture of fauna and the destruction and collection of flora are also prohibited, except by officially authorised scientific investigations or under the direction of the park authorities.

**National reserve** An area under government control, established for the conservation and utilization of natural resources

Plant and animal life will be protected as far as possible while complying with the objectives of the designation

**Nature monument** An area, object or living species of flora and fauna of aesthetic, historic or scientific interest to be given total protection. The area or object is set aside, or the species named, as inviolable

The only activities permitted are government inspections or scientific research by officially authorized personnel.

**Strict wilderness reserve** An area under public control characterised by the presence of primitive conditions of flora, fauna and habitation, where there is no provision for the passage of motorised vehicles. All commercial developments and exploitation are prohibited.

Protection will remain inviolate as far as practicable. The only activities permitted are government inspections consistent with the purpose for which the area was established or officially authorised scientific investigations.

**Migratory bird species** Those species of birds in which all or some of its members may cross the boundaries between American countries at any season. Some species are named as examples: Charadriidae, Scolopacidae, Caprimulgidae, Hirundinidae

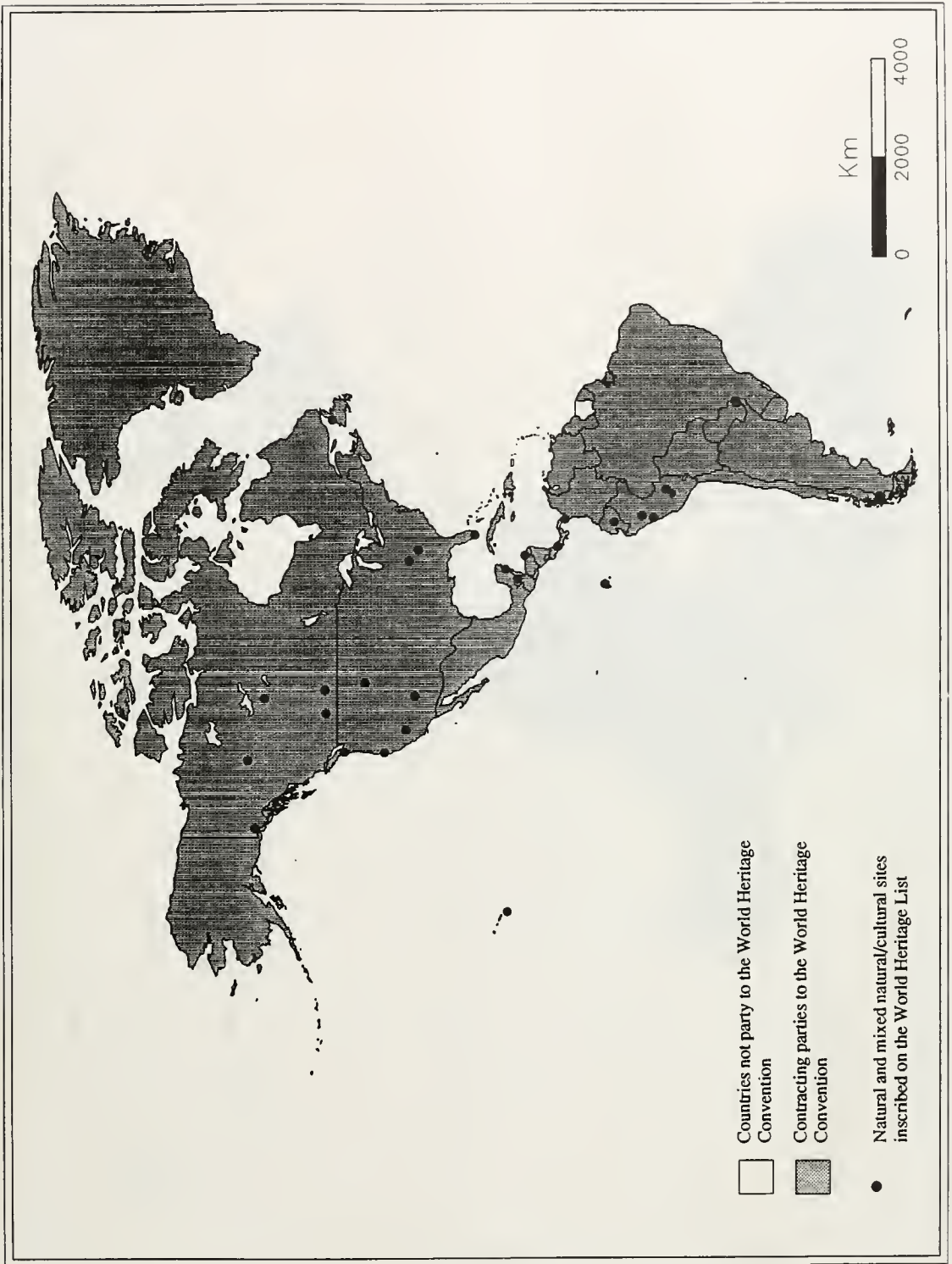
Suitable measures shall be taken to provide protection for migratory birds

A list of plant and animal species in urgent need of protection is provided in the Annex to the Convention. Hunting, capture or collection of these species shall be permitted only under official authorisation and subject to strict regulation. The contracting governments shall take suitable measures to regulate the import and export of flora and fauna.

The contracting governments will endeavour to establish areas in their territories under the designations described above, as soon as possible following the signing of the Convention. If establishment of such areas is not feasible immediately areas, objects or species shall be selected for later designation. The contracting governments agree to cooperate among themselves in promoting the objectives of the Convention and will provide and receive assistance for scientific research to increase the effectiveness of the provisions of the Convention.

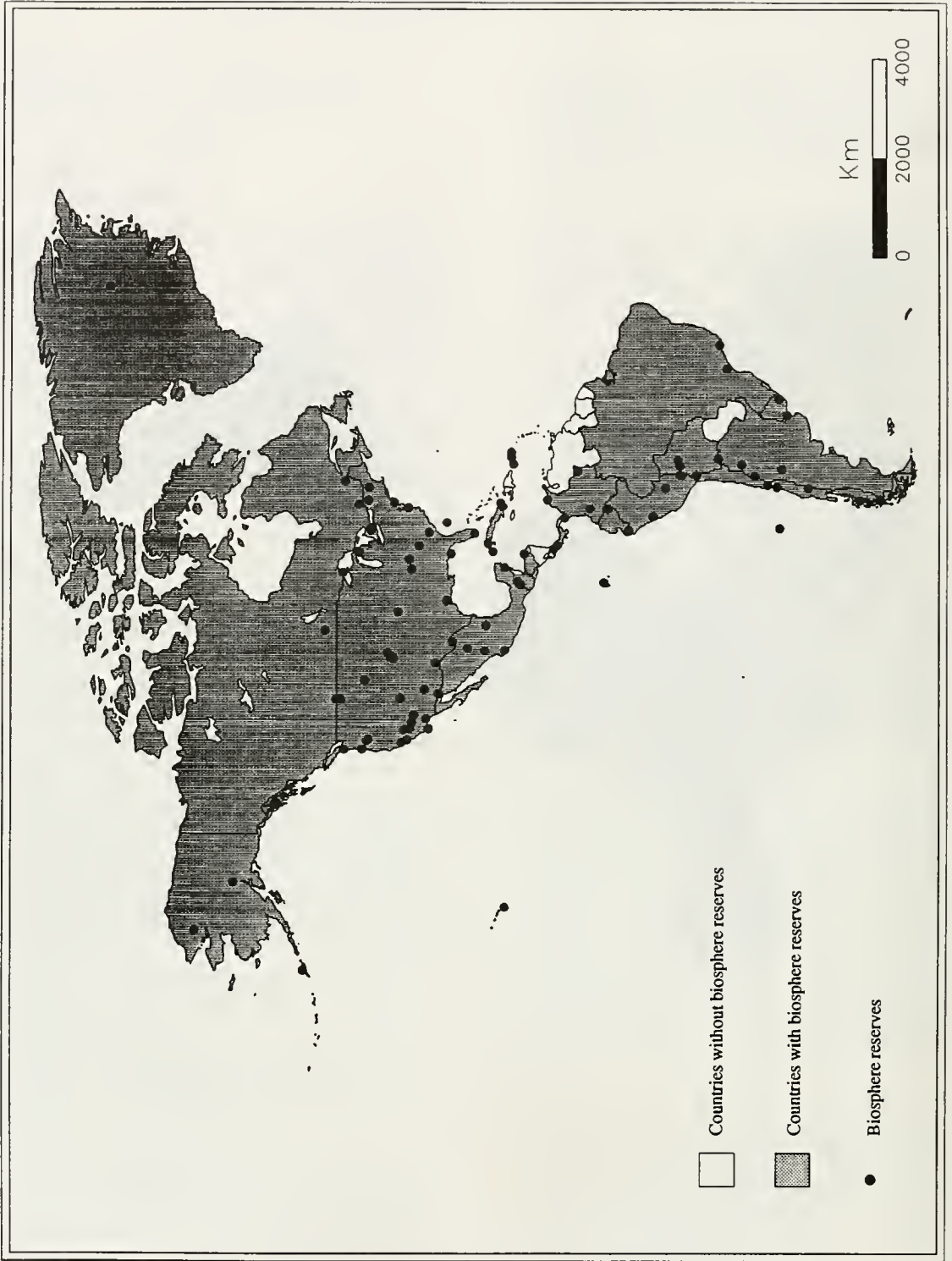
Establishment of protected areas shall be reported to the Pan American Union which will notify the contracting governments of any information from national or international scientific or other sources, relevant to the purposes of the Convention. The Convention remains open for signature by other American governments at any time.

Source: Lyster, S. (1985). *International Wildlife Law*. Grotius Publications Ltd. 470 pp.



Internationally Designated Sites – World Heritage Sites





Internationally Designated Sites – Biosphere Reserves



Internationally Designated Sites – Ramsar (Wetlands) Convention



# CANADA

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**Area** 9,916,140 sq. km

**Population** 26.5 million (1990) (Hunter, 1991)

Natural increase: 0.77% (1990)

## **Economic Indicators**

GDP: US\$ 16,200 per capita (1987)

GNP: US\$ 15,080 per capita (1987)

**Policy and Legislation** Canada, with all its dependencies, was formally ceded from Great Britain in 1763, although the various colonies were not united until the Act of the Imperial Parliament, the British North America Act, 1867. The Act provided that the constitution of the Dominion of Canada should be "similar in principle to that of the United Kingdom". In November 1981, a provisional constitution was agreed by the Canadian government (Constitutional Act, 1982) to replace the Act of 1867 and the proposals were enacted by the United Kingdom Parliament as the Canada Act, 1982. This Act gave to Canada the power to amend its own constitution, although executive authority continues to be invested in the Sovereign. The Constitutional Act, 1982 strengthened provincial ownership of natural resources, and affirmed the existing rights of native peoples. Legislative authority is vested in the federal government and the ten provincial governments, with many constitutional powers being delegated to the provinces. More than 90% of Canada is held as public lands (WWF, 1992).

Following subsequent revisions to the Constitution, a subject of federal/provincial negotiations, it is likely that provincial control over natural resources will increase, and the recognised rights of native peoples will become further entrenched (A. Hackman, C. Stewart and G. Francis, pers. comm., 1992). Current proposals recognise the inherent right to aboriginal self-government as a kind of third order of government in the country.

In Northern Canada (north of 60), land claim settlements between the federal government and aboriginal peoples are at various stages of completion. The 1984 Inuvialuit Final Agreement covering the western Arctic, the 1991 Agreement-in-Principal to establish Nunavut, an Inuit governed region for the whole of the Eastern Arctic, and a 1990 agreement reached with the Council of Yukon Indians (and subsequently ratified by the various groups in 1991) are major developments in governance for the Territories, traditionally administered by federal authorities. Further, negotiations are still continuing with, and among the Dene and Metis groups in the Mackenzie Valley region. These agreements are prerequisites for the mutual recognition and management of protected areas in these Territories (G. Francis, pers. comm., 1992). Further, initiatives such as the Arctic Marine Conservation Strategy, the Inuit Regional Conservation Strategy, and the Task Force on

Northern Conservation are aimed at improving arctic conservation, and giving local communities a larger role in making decisions regarding the use of land and wildlife (Anon, 1990). Similar issues and problems with native land claims exist and are being addressed in most of the western provinces (C. Stewart, pers. comm., 1992).

The first national parks were established on federal Crown land in the west, prior to the transfer of resources in 1930 which gave the western provinces control of Crown land. Thereafter, provincial protected areas were also established. In the east, where provinces had control of their natural resources, as set out in the British North America Act, provincial parks were created, beginning around the turn of the century, in addition to the early establishment of national parks (Eidsvik, 1989; Kun, 1981). Today, the major protected area designations are ecological reserve, national and provincial park, managed wildlife area, cultural heritage site, internationally designated area, and protected landscape.

**Federal policy and legislation** Canada has a Federal Policy on Land Use, 1980 which is designed to guide federal policies and programmes as they affect land use, and to guide the management of federal lands. Statements within the Policy support the setting aside of protected areas and protection of significant values of lands, including fragile and critical habitats and natural heritage. Canada's Federal Policy on Wetland Conservation, 1991 promotes wetland conservation on government lands using a number of strategies, including the development of a system of protected wetlands of national significance. Both of these federal policies work primarily through existing programmes and regulatory and decision-making mechanisms to advance wise land use and wetland conservation within the context of efficient delivery of federal services (Government of Canada, 1991; E. Zurbrigg, pers. comm., 1992).

In 1986, the Minister of Environment approved Canada's first National Marine Parks Policy. The main goal of this policy is to protect and conserve representative examples of marine environments for the benefit, education and enjoyment of present and future generations.

In 1990, the Canadian Wildlife Service (CWS) published "A Wildlife Policy for Canada on behalf of the Wildlife Ministers" Council of Canada. This national policy, which emphasises ecosystems and biodiversity, provides a framework for federal, provincial, territorial, and non-governmental policies and programmes that affect wildlife. Included in the policy is reference to protection of habitats and ecosystems through comprehensive systems of protected areas and other supportive approaches. There also exists a 1990 Canadian Parks Service policy related to protected areas



and the built heritage. A proposed revision of this document is currently in discussion form (C. Stewart, pers. comm., 1992).

Relevant federal laws covering the whole of Canada include the National Parks Act, 1930 (amended to 1988); the Canada Wildlife Act, 1973; Fisheries Act; Endangered Species Act, 1989; and the Migratory Birds Convention Act, 1917 (amended to 1982) (see Annex). A Wild Animal and Plant Protection Act is currently (1992) before the federal parliament, and it has been recommended that a "federal" Ecological Reserves Act be passed. Currently, ecological reserves fall under provincial acts.

The National Parks Act, as amended in 1974 and 1988, provides for: the establishment of national parks and national historic parks throughout Canada on Crown land; the designation of ecological integrity as a prime mandate; mandatory management plan reviews; and increased protection for protected areas (see Annex) (C. Stewart, pers. comm., 1992). When support for the establishment of a new national park is demonstrated, a federal-provincial agreement sets out the terms and conditions for the transfer of land to the federal government (Finkelstein, 1992; Kun, 1981). An Order-in-Council reserves a park area, but the National Parks Act must be amended to officially create a national park. Where there are unresolved land claims, a national park reserve may be established. In these areas, the National Parks Act and Regulations apply, but traditional hunting, fishing and trapping may continue, and final boundaries remain open to negotiation. Auyuituq and Pacific Rim are two examples of national park reserves in the country. The Canada Wildlife Act, 1973 provides for the establishment of national wildlife areas through Order-in-Council (see Annex). The Migratory Birds Convention Act, 1917 provides for the designation of migratory bird sanctuaries. The federal government does not always own such areas; they can be designated by Order-in-Council on private lands with the consent of the landowner (see Annex).

Marine protected areas may be established under the National Parks Act, and under some provincial ecological reserve and park acts. For example, marine provincial parks may be created under the Parks Act of British Columbia.

Traditionally, the federal government has been responsible for the administration, management and control of most land in the Yukon and Northwest Territories, in a manner similar to that of the provinces. The Department of Indian Affairs and Northern Development Act is the basis of jurisdiction and land use control in both the Yukon and Northwest Territories through the Territorial Lands Act. Under this Act, land can be protected by simple withdrawal, although the Act only applies to Lands under the control, management and administration of the Minister. Neither the Land Use Regulations nor the Territorial Lands Act provides any

entrenchment for reserves or guidance to reserve administrators (Taschereau, 1985).

Since the mid-1980s, major land claim settlements (and proposed settlements), and an evolution towards local government, have moved management of the territories away from the federal government. For example, Yukon now has a comprehensive territorial park proposal, based on territorial, not federal legislation (C. Stewart, pers. comm., 1992).

**Provincial policy and legislation** Most provinces have policies in connection with wildlife conservation and protected areas, and at least six provinces have reworked their provincial park policies since the mid-1980s (C. Stewart, pers. comm., 1992). For example, in 1988, Ontario announced its new parks policy which has served to increase protection for wilderness and nature reserve parks, and has allowed for new parks to be added to the provincial system. This policy has recently been complimented by the release in 1991 of a wildlife strategy for Ontario, the goal of which is the provision of a diversity of healthy ecosystems and associated wildlife populations and habitats that will provide sustained social, cultural and economic benefits for all people (Ontario Wildlife Working Group, 1991). One of the tenets of this strategy is to ensure that Ontario has a system of protected areas which adequately represents ecosystems, landscapes and their associated wildlife populations. British Columbia, meanwhile, has entered into an agreement with Environment Canada to produce a provincial State of the Environment report. Further, the majority of provinces and territories have either completed or are in the process of drafting provincial conservation strategies (CSEB, 1987).

Wetlands are coming under increasing scrutiny in a number of provinces. Most provinces have inventoried and classified their remaining wetlands, and some have formulated policies to protect the most valuable examples. For example, Ontario adopted a wetlands policy in June 1992 which directs municipalities and planning authorities to identify and protect provincially significant wetlands.

A review of provincial legislation is given by Taschereau (1985). Further, key pieces of relevant protected areas legislation in each of the provinces are outlined in the Annex. Under these statutes, there are up to 75 legally defined designations of protected area, their titles and management varying from one province to the other, each with assorted meanings in terms of legal securement, function and management objectives (Turner, *et al.*, 1991). Even when the title is the same between provinces, the definitions and management may be completely contrasting, and range from strict nature reserve, multiple-use management area to recreational area and cultural site with no natural elements. Some legally gazetted titles include provincial park, wilderness area, provincial nature reserve, game bird sanctuary, and ecological reserve (see Annex). In addition, every province and territory in Canada has

historic or heritage sites which serve to protect not only cultural but also significant expanses of natural heritage. Each piece of legislation defines activities permitted in each protected area type, identifies the responsible managing authority, and sets out penalties associated with offences.

Existing protected areas legislation is highly variable from province to province. It varies in length from Saskatchewan's relatively simple two-page Act to Establish Ecological Reserves to the more detailed 15-page Wilderness and Ecological Reserves Act of Newfoundland. The legislation contrasts in dedication to public use, from the Quebec Act, which specifically excludes the public, to the Newfoundland Act, in which natural areas are set aside "for the benefit, education and enjoyment" of the public. Complementary to ecological reserves and other forms of provincial protected areas legislation are statutes for the protection of rare and endangered species through the protection of their habitats or natural ecosystems. For example, the Ontario Endangered Species Act recognises this by providing that: "no person shall wilfully destroy or interfere with the habitat of any species of fauna or flora declared in the regulations to be threatened with extinction" (Taschereau, 1985).

Various legislative constraints have been identified by Taschereau (1985). Most provinces lack any umbrella legislation that would integrate the efforts of different agencies involved in natural area protection. However, exceptions are Alberta and Newfoundland, where the statutes under which ecological reserves are established also serve to designate other categories of protected natural area such as wilderness reserve. Only two provinces, Ontario and Prince Edward Island, are without specific ecological reserves legislation, although numerous nature reserve zones (ecological reserve equivalent) are designated within Ontario provincial parks. An ecological reserves act has, however, been recently proposed for Ontario. Only four provinces have passed wilderness legislation: Newfoundland, Ontario, Alberta and British Columbia. In some provinces, such as British Columbia, there is no provision for the acquisition of private land for the establishment of protected areas (Taschereau, 1985). Federally, one deficiency of the National Parks Act is a lack of provision for legislation on wilderness areas, and park boundaries are rarely set in federal or provincial legislation (C. Stewart, pers. comm., 1992).

Although complex, the labyrinth of jurisdictions (federal, territorial, aboriginal) responsible for the North is rapidly evolving. For example, the recent Agreement-in-Principal for Nunavut, as well as the Western Arctic (Innuvialuit) Claims Settlement Act, 1984 provides for many new agencies with considerable authority over land and resource use (A. Hackman, pers. comm., 1992).

**International Activities** The Convention concerning the Protection of the World Cultural and Natural

Heritage (World Heritage Convention) was accepted on 23 July 1976, and six natural sites had been inscribed by 1991. Canada acceded to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 15 January 1981: one site was inscribed on ratification and a further 29 listed by 1991. Six sites have been accepted as biosphere reserves under the Unesco Man and the Biosphere (MAB) Programme.

The Boundary Waters Treaty was signed by the USA and Canada in 1909, leading to the establishment of the International Joint Commission, formed in 1912, to report on pollution of boundary waters in the Great Lakes. Despite such early initiatives, the Great Lakes region has developed into one of the world's great industrial and population centres, with levels of toxic chemical discharge reaching staggering proportions, threatening 43 major protected areas including seven national and provincial parks and one national marine park. It has been estimated that even given the situation of zero pollutant emissions into the Lakes, the time taken to flush out all polluted water would be in the order of 500 years for Lake Superior alone (IUCN East European Programme, 1989). Recent initiatives aimed at addressing this situation include the bringing together of at least 180 organisations in Canada and the USA to look at the environmental problems of the Great Lakes. This coalition, under an international umbrella body called Great Lakes United, had a collective membership exceeding half a million in 1989. One proposal which is currently being considered is to use the protected areas along the Great Lakes as reference areas or monitoring sites for assessing the "ecosystem health" of the Lakes, and using the biosphere reserve concept as a guide. Lake Superior could be the starting point for such work, and the establishment of a Great Lakes Heritage Data Network (linking databases from the eight states and two provinces bordering the Lakes) should enable the determination of conservation priorities from a Great Lakes-St Lawrence bioregional perspective, and allow for the identification of sites which could serve as monitors for ecosystem health (G. Francis, pers. comm., 1992).

The Migratory Birds Convention between Canada and the USA was signed in 1916. The North American Waterfowl Management Plan, 1986 is a joint project involving Canada, the USA and Mexico, approximately 200 conservation groups and many corporations in the planning of programmes conserving waterfowl and wetland habitats. In Canada, the goal is to secure and improve the quality of 1.5 million ha of priority waterfowl habitat. The Western Hemisphere Shorebird Reserve Network is a cooperative programme of government and private organisations recognising and protecting essential staging areas for migratory shorebirds. Two sites have been designated in Eastern Canada, and have been twinned with sites in Suriname, South America (Government of Canada, 1991; E. Zurbrigg, pers. comm., 1992).



Glacier National Park in Montana and Waterton National Park in Alberta, Canada, were combined in 1932 to form the first international peace park in the world. Further opportunities for similar initiatives exist between the Yukon and Alaska, British Columbia and Alaska, and New Brunswick and Maine.

**Administration and Management** Currently, there are over 120 different government and private programmes involved in acquiring and managing lands for conservation. Five bodies, including two agencies from Environment Canada, and the provinces of Quebec, Ontario and British Columbia, are responsible for about 80% of the total area protected. Combined, these agencies do, however, control 73% of the land mass (C. Stewart, pers. comm., 1992).

**Federal administration and management** A central administration for national parks was created in 1911, thereby enabling Canada to become the first country in the world to have a national parks service (Hummel, 1989). Today, responsibility for the National Parks Act is vested in the federal Department of the Environment (Environment Canada), and is undertaken by the Canadian Parks Service (CPS), formerly Parks Canada (and previously the National and Historic Parks Branch). The CPS is headed by an Assistant Deputy Minister. The Parks head office is responsible for policy direction and new park establishment, while five regional offices direct the planning and operations across the country. The oldest of the world's modern protected area agencies, CPS is responsible for both the cultural and the natural heritage of the nation at federal level. CPS has 3,500 staff and is responsible for 18,054,900ha, with jurisdiction for 24.4% of all protected areas (R. Maslin, pers. comm., 1992). CPS intends to undergo major growth over the coming decade, as the systems plan is developed and implemented (Taschereau, 1985; Waugh and Perez Gil, 1992).

Responsibility for the Canada Wildlife Act and the Migratory Birds Convention Act rests with the Canadian Wildlife Service (CWS) of Environment Canada, which has 323 staff nationally. Under these two acts, respectively, the CWS establishes national wildlife areas (of which there are 45 in Canada), and migratory bird sanctuaries (total of 101). Overall, CWS has responsibility for more than 11.4 million ha of protected areas, which is 15.5% of the total protected area.

The CWS administers the implementation in Canada of the North American Waterfowl Management Plan (NAWMP) (see International Activities). The NAWMP offers long-term protection to lands through acquisition or lease. Significant contributions to the conservation of wetlands/waterfowl habitat are being made through habitat joint ventures, involving governments, non-government organisations (NGOs), the private sector and landowners.

As well as national wildlife areas, the CWS jointly acquires and manages lands with the provinces, called

cooperative wildlife areas. Each wildlife area is managed individually for the purpose of preserving or increasing its value to wildlife. The CWS also promotes the interests of wildlife habitat conservation by providing a secretariat for the Canadian Council on Ecological Areas, and is responsible for leading the implementation of the Federal Policy on Wetlands Conservation (E. Zurbrigg, pers. comm., 1992). In 1991, the combined annual expenditure of CPS and the CWS totalled US\$ 282,992,000 (Waugh and Perez Gil, 1992).

Other agencies concerned with protected areas include Indian and Northern Affairs Canada (DIAND), owning 439,093ha for strict nature conservation. It is the only government department to have undertaken comprehensive conservation planning in the northern region. The Northern Land Use Planning Program was, however, abolished in 1992 (A. Hackman, pers. comm., 1992).

The Department of Fisheries and Oceans (DFO) has the primary mandate for marine mammals, and has jurisdiction over their marine habitat. Further, the DFO administers the Fisheries Act (Anon, 1990). Responsibility for the Canadian Heritage Rivers System (CHRS) lies with the Canadian Heritage Rivers Board, based in the offices of the CPS.

A national database on protected areas was created through the cooperation of several agencies, including CPS, CWS, and the State of the Environment Reporting Organization (SOER), all of Environment Canada, and the Canadian Council on Ecological Areas (CCEA) (Rubec *et al.*, 1990). The database, the National Conservation Areas Data Base (NCADB), has also received advice from WWF (Canada) and from many provincial and territorial agencies. Information has been amassed on 2,945 parks, ecological reserves, and other categories of conserved or heritage areas, and is the most comprehensive data set of protected areas in Canada (valid to 1990). SOER is currently in the process of working with other agencies to develop a commonly-accepted database on protected areas, and will include those sites managed by NGOs. NCADB will be the nucleus of this system (Turner, pers. comm., 1991). Project WILD (Wilderness is the Last Dream) of the Western Canada Wilderness Committee, is an initiative to map all remaining wild areas, both nationally and internationally (I. Parfitt, pers. comm., 1992).

The Federal Provincial/Territorial Parks Council includes representation from each of the thirteen senior governments in the country, and coordinates information exchange activities between the national, provincial and territorial park agencies. Further, a classification system has been devised for the over 2,000 parks listed by the Council. This classification system is separate from, but overlaps considerably with the National Conservation Areas Data Base (A.M. Turner, pers. comm., 1992).



The Canadian Council on Ecological Areas (CCEA) is an incorporated, nonprofit, independent national forum established in 1982 to encourage the selection, protection and stewardship of a comprehensive system of ecological areas. These areas are developed on the basis of representation and integrity, and are managed to the highest standard of ecological protection (CCEA, 1992). The CCEA, whose collective goal is the achievement of a nationwide network of ecological areas, is currently exploring ways to assess the extent to which the different ecoregions in Canada are represented by existing protected areas, to provide guidelines for the planning, management and research into ecological reserves, is looking into issues associated with marine protected areas, and recently completed a comprehensive document, the *National Registry of Ecological Areas in Canada* (Francis, 1991; Gray and Rubec, 1989). The CCEA is the successor to the earlier International Biological Programme (IBP-CT) in Canada. It draws its membership from federal, provincial and territorial governments, NGOs, universities and private citizens.

#### **Provincial administration and management**

Administration and management of areas designated under provincial legislation comes under the jurisdiction of the provincial governments themselves. Currently, the various provincial/territorial protected area administrations comprise the following:

**Alberta** Department of Tourism, Parks and Recreation, Ministry of Tourism, Parks and Recreation; Natural and Protected Areas Branch, Department of Forestry, Lands and Wildlife, Ministry of Forestry, Lands and Wildlife; Department of Culture and Multiculturalism;

**British Columbia** BC Parks, Ministry of Environment, Lands and Parks (formally Environment and Parks); Department of Forests, Ministry of Forests;

**Manitoba** Parks and Natural Areas Branch, Manitoba Natural Resources, Ministry of Natural Resources;

**New Brunswick** Department of Recreation and Environment, Ministry of Natural Resources and Energy;

**Newfoundland and Labrador** Parks Division, Department of Tourism and Culture;

**Northwest Territories** Department of Economic Development and Tourism, Ministry of Economic Development and Tourism; Department of Renewable Resources, Ministry of Renewable Resources;

**Nova Scotia** Parks and Recreation Division, Department of Natural Resources (formerly Lands and Forests), Ministry of Natural Resources; Department of Education, Ministry of Education;

**Ontario** Provincial Parks and Natural Heritage Policy Branch, Ministry of Natural Resources;

**Quebec** Direction générale des parcs et des territoires fauniques, Ministère Loisir, Chasse et Pêche; Direction générale de la conservation et du patrimoine écologique, Ministère de l'Environnement;

**Prince Edward Island** Parks Division, Department of Tourism, Parks and Recreation (formerly Transportation and Public Works), Ministry of Tourism, Parks and Recreation; Department of Conservation and Planning, Ministry of Environment;

**Saskatchewan** Parks Branch, Department of Natural Resources (formerly Parks, Recreation and Culture), Ministry of Saskatchewan Natural Resources; and

**Yukon Territories** Parks and Outdoor Recreation Branch, Department of Renewable Resources, Ministry of Renewable Resources (A. Hackman, pers. comm., 1992).

Further, nature reserves are managed by the Island Nature Trust in cooperation with the provincial government in Prince Edward Island (C.D.A. Rubec, pers. comm., 1992; A.M. Turner, pers. comm., 1992). Below the provincial level, the management of protected areas becomes complex in a number of provinces. In Ontario, for example, there are 38 Conservation Authorities which own more than 155,000ha of land and water, and administer a total of 303 conservation areas (Taschereau, 1985). In addition, advisory/wildlife committees have been provided for in most provincial legislation throughout the country. These committees make recommendations regarding the establishment of protected areas in the respective provinces and regulations for their management and use.

A breakdown of provincial ownership of protected areas includes: Quebec which is responsible for 16.0 million ha (21.7%); Ontario with 7.47 million ha (10.1%); British Columbia, 5.81 million ha (8.0%); Manitoba, 4.6 million ha (6.2%); Saskatchewan, 0.97 million ha (1.3%); Alberta, 0.80 million ha (1.1%); Newfoundland, 0.51 million ha (%); New Brunswick, 0.34 million ha; Nova Scotia, 0.15 million ha; Prince Edward Island, 0.027 million ha; Northwest Territories, 3.1 million ha; and the Yukon, 0.90 million ha (Turner, *et al.*, 1991; C. Stewart, pers. comm., 1992). In some cases, these figures include protected areas managed jointly by various governments, for example, in both the Northwest Territories and the Yukon. Other estimates of provincial ownership include: Ontario with 6.3 million ha (6% of total provincial area) contained within 261 provincial parks; Prince Edward Island with 6,000ha; New Brunswick with .023 million ha; Quebec with 0.5 million ha; British Columbia with 4.6 to 5.8 million ha; Alberta with around 0.7 million ha; Saskatchewan with 1.4 to 2.8 million ha; Manitoba with .06 to 6.6 million ha; and Nova Scotia with .005 to .16 million ha. These estimates vary depending on the definition of a protected area (MNR, 1992b; C. Stewart, pers. comm., 1992).

Non-government involvement in protected areas is of great significance. Currently, there are about 200 conservation groups, many of which are significant protected area landowners (Finkelstein, 1992). In the early 1990s, Ducks Unlimited (DU) was responsible for 3.9% of the total protected area coverage in Canada, with an estimated 2.9 million ha. The Nature Conservancy of Canada was responsible for 424 nature preserves protecting over 32,400ha, Wildlife Habitat Canada for over 15,000ha, the Nature Trust of British Columbia for 11,583ha, the Saskatchewan Wildlife Federation for 9,300 ha, the Manitoba Wildlife Federation for 8,000ha and the Federation of Ontario Naturalists for 530ha (Hilts, 1989; Turner, *et al.*, 1991; D. Thompson, pers. comm., 1992). Currently, data is being compiled for over 40 NGOs responsible for some 10,000 sites across the country (A.M. Turner, pers. comm., 1992).

The Nature Conservancy of Canada (NCC) is a private, non-profit organisation established in 1961, which is dedicated to preserving biological diversity through the protection of wildlife habitat, natural communities and ecosystems. The NCC has an independent board of trustees drawn from conservation-minded business and professional people and scientists, many of whom have been associated with other conservation organisations. It is funded by individuals, corporations, and foundation donations, and is the only national organisation dedicated to buying and preserving the best of Canada's natural land (NCC, 1991).

A long-term goal of the NCC has been to secure some form of protection for current priority sites (some of which may also have been identified during the International Biological Programme (IBP)) representing samples of significant ecosystems. Toward this end, the Conservancy is providing funds and legal assistance to help evaluate and purchase important sites identified on private land. The NCC maintains a short list of priority sites for each province, compiled in consultation with ecological reserves and provincial parks staff, academics, and others. Sites on Crown lands are not included because governments alone can presumably decide on their fate. Sites on the list are either entirely privately owned (often by many individual owners), or have a substantial component of private ownership. The NCC can often move reasonably quickly to purchase properties when they become available on the market (G. Francis, pers. comm., 1992). Traditionally, the Conservancy's principal operating technique has been direct or indirect outright land acquisition with subsequent transfer of sites to public ownership for maintenance and preservation as a part of Canada's natural heritage (in the form of nature preserves, parks, conservation areas and ecological reserves). In recent times, however, the Conservancy has itself acquired, maintained and operated a number of specific sites, and increasingly, land is being donated to the NCC (NCC, 1991; C. Stewart, pers. comm., 1992). Conservation of Canada's great swamps is currently one of NCC's top

priorities, and the organisation publishes the newsletter *The Ark* twice yearly.

In 1988, the Nature Conservancy of Canada and The Nature Conservancy (TNC US) formed a partnership for the introduction of Conservation Data Centres in Canada, using the software design and protocols for the databases developed by TNC for each of the states in the US (Taschereau, 1985; D. Thompson and G. Francis, pers. comm., 1992). Conservation Data Centres have now been established in Québec, Saskatchewan and British Columbia, while discussions are at the contract stage in Ontario. These databases offer many advantages, including data exchange capabilities, and the provision of information on the status and distribution of rare and endangered species, natural communities, and other special ecological features.

Wildlife Habitat Canada plays a similar role to that of the Nature Conservancy of Canada, although it emphasises direct private-stewardship programmes rather than acquisition projects (Hummel, 1989). These programmes arrange some form of protective conservation agreement with landowners, while leaving the natural habitat itself in private ownership.

The Canadian Nature Federation (CNF) is a national, non-profit organisation representing provincial naturalists' federations, local societies and individuals. Evolving out of the Canadian Audubon Society in 1971, it speaks for approximately 20,000 members through its Ottawa office and executive representatives across the country.

The Federation has long been concerned with the establishment of national and provincial parks and ecological reserves, and their long-term management. Its national magazine, *Nature Canada*, has successfully drawn national attention over the years to the need to preserve such critical areas as South Moresby Wilderness Archipelago, Grasslands National Park, the muskoxen of Banks Island, and the north slope of the Yukon, home to one of the world's largest caribou herds. Federation priorities for parks and protected areas are set through its Environmental Advisory Committee. The Federation is currently working to accelerate action by the federal government to complete the national parks system by the year 2000, and the national marine parks system by 2010. CNF is also promoting government action to expand its national wildlife areas and migratory bird sanctuaries. Its particular focus is on the need to establish new national parks in the Northwest Territories, British Columbia and Québec. It is also involved in an international campaign to protect the Tatshenshini-Alsek Rivers in north-western British Columbia. The Federation is working to promote an ecosystem management approach through revisions to the government's national parks policy, and in specific parks such as Wood Buffalo, Pacific Rim, Fundy and Pukaskwa (K. McNamee, pers. comm., 1992).



The Canadian Institute of Forestry has established a Natural Areas Committee. In 1972, the Committee set forth a policy for selection, protection and management of natural areas. It recommended that representative examples of significant forest types across the country be protected in a network of reserves. These reserves would serve for non-destructive observational research, and would help to conserve the genetic stock of commercially valuable forest trees and their related vegetation and animals. The Committee serves only in an advisory capacity, but has greatly assisted the movement to establish ecological reserves. The Committee maintains a registry of forested natural areas which are legally protected and advocates the development of a national system of reserves (Taschereau, 1985).

The Canadian Parks and Wilderness Society (CPAWS), formerly the National and Provincial Parks Association of Canada (NPPAC), is a national, non-profit, 14,000 member/supporter organisation established in 1963. Its purpose is the protection of natural ecosystems in parks, wilderness and similar natural areas to preserve the full diversity of habitats and their species. Through its nine chapters across Canada, it promotes awareness of ecological principles, and the inherent values of wilderness through education, appreciation and experience. Whether working cooperatively or encouraging individual action, the Society envisages a healthy ecosystem where people experience and respect natural ecosystems. The Society publishes *Borealis* (called *Park News* prior to 1988), a full colour quarterly magazine that examines nature, environmental and ecological issues in the Canadian context. The Society regularly holds public meetings, and lectures, and it publishes books. Members and trustees regularly attend environmental hearings, meet with government and elected officials and parks officials across Canada. Currently, the Society is involved nationally in promoting the Endangered Spaces Campaign that seeks the protection of 12% of Canada to protect representative ecosystems in every region. In recent years, the Society has worked for and secured the creation of national parks on South Moresby Island, in Northern Yukon, the Grasslands, Bruce Peninsula and many other areas. A new focus is the development of programmes that seek cooperation in protecting core wilderness areas by protecting or simply better managing lands surrounding important sites such as the Waterton/Glacier International Peace Parks in southern Alberta (D. Dodge, pers. comm., 1992).

In 1989, the World Wildlife Fund (WWF-Canada) launched the Endangered Spaces Campaign, 'to conserve Canada's biological diversity by protecting a representative sample of each of the country's 350 natural regions by the year 2000', adding up to at least 12% of Canada's lands and waters (WWF, 1991). It has targeted priority areas for the establishment of additional protected areas. More than 250 groups are now cooperating in the Endangered Spaces

Campaign, and the *Canadian Wilderness Charter* has been signed by more than 500,000 individuals (WWF, 1992; A. Hackman, pers. comm., 1992). WWF-Canada is also involved in numerous regional conservation programmes made up of many sub-projects. Examples include the "Carolinian Canada program", initiated in 1984, which focuses on the endangered flora and fauna of the most southerly areas of Ontario, and consists of over 30 projects supervised by a steering committee made up of representatives of federal and provincial governments, foresters, naturalists, academics and citizens groups. WWF-Canada has also created the Prairie Conservation Action Plan. One objective of this plan is to establish protected areas that represent each of the four distinctive prairie grassland ecosystems (WWF, 1989).

Ducks Unlimited (Canada) is a private, nonprofit conservation organisation dedicated to perpetuating and increasing North America's waterfowl by preserving, restoring and creating breeding habitats. Founded in 1938, it now has offices in eastern, western and central Canada, and board members representing all regions. It employs about 400 regular personnel and about 150 additional individuals during the summer, including university students working on research projects. Ducks Unlimited (Canada) is the single largest conservation organisation in the country in terms of on-the-ground habitat programmes, and over 60% of its members are non-hunters dedicated to these programmes (C.D.A. Rubec, pers. comm., 1992). Contributions come mainly from the United States (C\$ 24 million in 1981), but also partly from Canada (about C\$ 1 million was raised in 1981). During the past few years, Ducks Unlimited has expanded its staff of biologists, and broadened its mandate to include a larger concern for habitat preservation rather than merely waterfowl production.

One of the most notable developments has been the growth in public awareness of environmental issues, including those of the North. Evidence of this can be seen in the interest and involvement of people in the Polar Bear Pass issue, and in the formation of public interest groups such as the Canadian Arctic Resources Committee (CARC). Organisations such as CARC not only keep the public informed about northern developments, but also keep the responsible government officials alert.

Training in protected areas is generally available at universities in field-oriented natural sciences relevant to park management, if not in park management as a separate discipline.

Management constraints are centred around pressures to keep land open for alternate resource development, actions which have damaged existing protected areas and restricted and slowed further reserve and park establishment. For example, of 1,349 provincial/territorial parks only a small percentage are reserved, with no logging, mining or hydro development (WWF, 1992). Management of renewable resources has

been, and continues to be, the most controversial issue in many areas, most notably in the west and north. To assist management, there is a need for active long-range management and monitoring programmes, greater cooperation with agencies involved in land management beyond protected area boundaries, and the establishment of buffer zones between protected areas and adjacent unprotected lands (Bonnicksen, 1988). Research into natural ecosystems to assist protected areas management is also a priority.

The small size of so many existing reserves is also an area of concern (Taschereau, 1985). It has been estimated that over 80% of the most highly protected areas (IUCN categories I and II) are less than 1,000ha in size, and that of the total of 2,827 protected areas in IUCN categories I-V, about half are less than 100ha in size (Turner, *et al.*, 1991). About 61% (1,737) of protected areas are strictly protected (IUCN categories I and II) (Government of Canada, 1991). Another constraint is lack of funds and a cutting back, on the part of the Government, of support for regular operations which could have implications for implementation of Canada's Green Plan.

**Systems Reviews** Canada is bounded to the south by the USA, to the west by the Pacific Ocean and Alaska (USA), to the east by the Labrador Sea and Atlantic Ocean, to the northeast by Baffin Bay, to the northwest by the Beaufort Sea, and to the north by the Arctic Ocean. The climate ranges from polar conditions in the north to cool temperate in the south, but with considerable variation between east and west coasts and the interior. Mediterranean conditions are experienced on the east coast of Vancouver Island.

The 39 natural regions (terrestrial) defined by the Canadian Parks Service are broadly divided into: Western mountains; interior plains; Canadian shield; Hudson Bay lowlands; St Lawrence lowlands; Appalachians; Arctic lowlands; and High Arctic islands. Vegetation ranges from: Arctic tundra, north of the tree line; Alpine tundra on western mountains above the tree line (900-2500m); coniferous forest, covering about three-quarters of Canada, dominated by white spruce and black spruce extending from Newfoundland to Alaska; a complex assemblage of sub-Alpine, montane and coastal coniferous forest in British Columbia; grassland prairie of various types in a narrow band across central and western Canada; between the prairie and coniferous forest in the centre, a transition zone characterised by trembling aspen; between the coniferous forest and the tundra, transitional Taiga, characterised by open spruce woodlands with lichen ground cover; and in eastern Canada, around the Great Lakes region, mainly deciduous forest predominated by maple, oaks and conifers (Davis *et al.*, 1986; Skoggan, 1978/ 1979). Wetland ecosystems occupy about 14% of the country, but are disappearing rapidly in a number of locations. For example, it is estimated that more than 75% of the original wetlands of southern Ontario have already been lost (Government of Ontario, 1992).

There are about 3,269 native species of vascular plants and about 884 introduced species. Pleistocene refugia exist on northern Ellesmere Island, central and northern Yukon, the mountains of Labrador and the Gaspé Peninsula of Quebec, the eastern coastal plain, and the Queen Charlotte Islands of British Columbia. The most floristically diverse regions are southern British Columbia and southwestern Ontario. A rare plants project, conducted by Argus *et al.* (1990) from the National Museum of Nature in Ottawa, has provided lists and information on some 1,010 vascular plant taxa that are considered to be nationally rare in Canada. The project, which is nearing completion, provides provincial lists of rare plants and is available to the provincial Conservation Data Centres (Argus and Prior, 1990; G. Francis, pers. comm., 1992).

The first protected areas were based on recreational areas, including Point Pleasant Park, Halifax in 1866, Mount Royal Park, Montreal in 1872, and subsequently High Park, Toronto in 1873, Banff National Park, Alberta in 1885, and Stanley Park, Vancouver in 1888. Early national parks in both eastern and western Canada were established for a variety of reasons, including: their establishment as wilderness areas remote from population centres; to preserve outstanding scenic areas for outdoor recreation and tourism; for preserving outstanding geology, plant and animal populations; to protect wildlife habitat for hunting purposes; to preserve bison herds (western Canada); and, in the case of Banff (Rocky Mountain National Park), to keep a hot spring in public hands (Government of Canada, 1991). In addition, the location of national parks was influenced by economic conditions and political circumstances of the time. In the early period, grazing, lumbering and mining were allowed within national parks.

Within a decade of its establishment, Banff was enlarged and three other national units added (Waugh and Perez Gil, 1992). Between 1885 and 1929, 15 national parks were established (Hummel, 1989). Ontario's first national park (Point Pelee, 1906) was established to preserve duck habitat for hunters, and it was not until 1936 that the Maritimes' first national park was created. The first two national parks (La Maurice and Forillon) in Quebec were established in 1970 from provincial parks which had either been sold or leased to the federal government (C. Stewart, pers. comm., 1992).

In 1923, the first opposition to industrial development in parks took place, with the formation of the Canadian National Parks Association to oppose a dam in Banff National Park. The government approved the dam, and reduced the size of the park to exclude the reservoir from the park boundaries. In 1930, the government passed a National Parks Act prohibiting certain activities within national parks. Federal policy here diverged from that of provincial parks which often tried to meet the needs of both resource extraction and conservation (Environment Canada, 1991; Waugh and Perez Gil, 1992). By the 1960s, an organised set of principles was applied to park management, and a sense of a parks system emerged. In



1967, the policy was to eliminate as quickly as possible all exploitative human activities from new national parks, a policy sometimes proven to be unworkable or undesirable. By 1970, a total of 19 national parks had been established, and with the publication of the National Parks Systems Plan (1971), a long-term goal for national parks began to develop (Finkelstein, 1992). In the 1970s, public participation in planning was introduced, the traditional rights of aboriginal groups were recognised, and land was purchased directly for new parks. Growth of the national park system continued under the system plan of the 1980s, and innovative arrangements continue, especially in the establishment of parks under native land-claim agreements, and in the planning for a system of marine protected areas. Northern Yukon National Park (1984) represented the first national park in Canada to be negotiated through a native land claim settlement (Finkelstein, 1992).

In the Canadian north, reserves were established as early as 1894 to protect game for native hunters, and by 1938, 1.35 million sq. km or over one-third of the Northwest Territories had been reserved. From 1948, this was cut back to the present coverage (Kovacs, 1985). Last Mountain Lake (migratory bird sanctuary and national wildlife area), Saskatchewan, was created in 1887 and is North America's oldest wildlife refuge, while the first established provincial park was Algonquin (1893) in Ontario. The WWF-Canada publication *Endangered spaces: The future for Canada's wilderness* provides an excellent overview of the development of provincial/territorial protected area systems, and on areas of current priority concern, worthy of protected areas status (Hummel, 1989).

Overall, the growth of the protected areas system is such that between 1900 and 1930 an average of 1.7 protected areas were created per year, between 1930 and 1960, 13 sites were established per year, and since 1961, the yearly average has been 77 sites. Quebec, Yukon and Alberta all have 8% or more protected, while, in contrast, Newfoundland/Labrador, and Saskatchewan each have about 3% of their total respective areas protected (Turner, *et al.*, 1991).

As of 1991, there were a total of 2,945 conservation sites (IUCN categories I-V) owned or managed by various government levels, amounting to some 70.8 million ha, representing 7.1% of the country's area, or 12.5% of the world's protected areas. Added to this is another 3.2 million ha held by non-governmental organisations and private groups, bringing the total coverage to about 74 million ha or 7.4% of total area (Turner, *et al.*, 1991). About 4.6% of this is, however, "highly" protected according to WWF's standard (WWF, 1992). In 1991, major federal contributions included national parks and migratory bird sanctuaries accounting for some 42% (by area) of government managed sites. Provincial wildlife management areas occupied almost 30% of all protected areas, and provincial parks accounted for another 22%. There were 34 national parks covering 18,056,900ha, 101 migratory

bird sanctuaries covering 11,363,288ha, 45 national wildlife areas covering 106,159ha, 185 wildlife management areas covering 20,754,828ha, 56 wildlife protection areas covering 3,429,828ha, and 62 national capital commission areas totalling 52,165ha. In addition, there were 1,588 provincial parks with a total of 12,373,860ha, 204 ecological reserves totalling 286,500ha, 38 wilderness areas totalling 640,493ha and 10 nature trust areas totalling 698ha. Heritage areas of parks, and historic areas of parks, totalled 18 at 775ha and 55 at 15,479ha, respectively. In addition, there are more than 7,800 cultural heritage sites in the country (Carter, 1990).

Running between 1964 and 1974, the International Biological Program (IBP) was established to help countries promote long-term ecological research, and to establish a set of relatively undisturbed protected areas in which this kind of research could continue (Francis, 1991). Sponsored by the International Council of Scientific Unions (ICSU), with its headquarters in Paris, the IBP Canadian subcommittee (IBP-CT) identified and documented about 1,300 ecological sites in the country. The success of this subcommittee was due to the combined energy and enthusiasm of the regional panels, and, in some provinces, the provincial government's sympathetic reception of, and participation in the programme. The entire nationwide programme, however, was made possible by the federal government which provided funds through the National Research Council (Taschereau, 1985). Following the IBP-CT, and subsequent activities of the Canadian Council on Ecological Areas (CCEA), ecological reserves were, and continue to be, established across the country, with the objective of representing the major ecosystems. To date, about 200 ecological reserves and a total of 600 ecological or equivalent reserves (e.g. nature reserve zones in Ontario) have been created in Canada (Taschereau, 1985; C.D.A. Rubec, pers. comm., 1992).

The Canadian Heritage Rivers System (CHRS) is a cooperative programme established in 1984 by the federal government and the provinces. The objectives of the CHRS are to give national recognition to important rivers, and to ensure long-term management to conserve their natural, historical and recreational values. Although not afforded any special legal protection, many heritage rivers are protected by provincial park status (Government of Canada, 1991). The first river, French, was designated in February 1986, and today there are 25 heritage rivers in the system comprising about 536,900ha (R. Maslin, pers. comm., 1992).

There are no fewer than eight private-stewardship programmes in Canada, the objective being to arrange some form of protective conservation agreement with landowners while leaving natural habitat in private ownership (Hills, 1989). Examples include Manitoba's Habitat Enhancement Land-Use Program and Ontario's Nature Heritage Stewardship Program. Conservation land trusts are relatively new, but there is rapidly

growing interest in them among conservation groups (G. Francis, pers. comm., 1992).

The natural regions concept was first adopted in 1971 as a basis for the systematic planning of national parks, and was known as the National Parks System Plan. The principle of this plan, now superseded by the Environment Canada 1990 systems plan, was to protect outstanding representative samples of each of Canada's natural landscapes (Finkelstein, 1992). Of 48 "natural regions", the Canadian Parks Service defined 39 terrestrial and 29 marine regions, and, following the Endangered Spaces campaign of 1989, the goal is to represent at least one national park in each region by the year 2000 (Government of Canada, 1991; Kun, 1981). Currently, national parks are in 22 of 39 natural regions, although there is either a national park or other protected area type in 33 of the 39 natural regions (Government of Canada, 1991). Only two marine regions currently have federal parks within them, although others are soon to be established. Gaps in the national parks system are predominantly found in the Northwest Territories, Quebec, British Columbia, Manitoba and Labrador (Finkelstein, pers. comm., 1992). In order to complete the national park network, it is anticipated that by the end of 1993 potential park sites will have been selected in all of the unrepresented natural regions.

The most recent ecological classification, the Ecological Land Classification System, is based on identifying ecoregions and other levels of generalisation in a natural hierarchy: areas of the earth's surface characterised by distinctive ecological responses to climate, physiography and hydrology as expressed by the development of vegetation, soils and fauna. Nationally, about 177 ecoregions have been identified, and are divided into 15 less detailed "ecozones", 45 "ecoprovinces" and 5,400 more detailed "ecodistricts" (Rubec *et al.*, 1992; Wiken, 1986). Currently, 41 of the 177 ecoregions have more than 12% of their area protected, while 45 ecoregions have no protected areas. Up to 28% of Canada's ecoregions have at least 8% of their area protected, and 44% have less than 1% of their area protected (Turner, *et al.*, 1991). Using GIS technology, a model of ecological integrity for each ecoregion has been developed, with ecoregions being identified with the highest overall biodiversity risk. Rubec *et al.* (1992) have identified 14 ecoregions which are at greatest ecosystem risk to wildlife resource biodiversity. Another 120 ecoregions have moderate risk ratings, while 43 were identified as having low overall risk. These ecoregions have been adopted for national evaluation and generalised systems planning purposes including by the Canadian Council on Ecological Areas (CCEA) for a National Systems Plan, and most recently by the State of Environment Reporting Service of Environment Canada. Candidate sites with the highest degree of risk are to receive the greatest attention.

Environment Canada has a *National parks system plan*, a systems review process in place, a "Draft Action Plan for Completing the National Parks System", and

anticipates completing the "National Marine Parks System Plan" by 1993. Further, the Canadian Environmental Advisory Council's (CEAC) *A protected areas vision for Canada* (1991) calls on Canadians to identify and protect the complete range of representative and unique natural areas, wilderness landscapes, wildlife habitat, and the like, as a prerequisite to sustainable development (CEAC, 1991; Provincial Parks and Natural Heritage Policy Branch, 1992). As part of CEAC's vision, Canada has initiated a 10-year programme to complete a network of national parks, and a 20-year programme for marine protected areas. WWF-Canada supports planning for an expanded protected area system through its Endangered Spaces Program, which facilitates public involvement in the implementation of the Green Plan at all levels. The Canadian Parks Services' *National parks system plan* (1990), and the government's environmental policy are described under the Green Plan.

The Green Plan (1990) calls for the government to: set aside 12% of the country in protected areas; establish at least five new national parks by 1996; negotiate agreements for the remaining 13 parks required to complete the terrestrial park system by 2000; establish three new marine national parks by 1996 and an additional three by 2000; officially designate 18 rivers or sections of rivers to the Canadian Heritage Rivers System; develop an enhanced resource management programme for national parks involving applied studies for ecological integrity and regional integration; work with the provincial governments to establish a network of forest ecological reserves to preserve in their natural state the genetic stock of forest ecosystems; establish a national wildlife habitat network, and act to protect and conserve additional lands that are of prime importance to the goal of preserving valuable wildlife habitat; release in 1991 a discussion paper on a Canadian Oceans Act, which will provide a legal basis for the designation of marine protected areas; and work with the provinces to develop a programme to transfer to farmers those agricultural practices compatible with wildlife habitat needs (Environment Canada, 1991). When completed, the national park system will cover about 3% of the country's area. As of 1989, the national park system, covering 182,000 sq. km, was considered to be about half complete (Hummel, 1989). What is still lacking and needed, however, is a comprehensive analysis of the ecological health of Canada's protected areas (Government of Canada, 1991).

Currently, the Canadian Wildlife Service (CWS) is proposing about 30 new migratory bird sanctuaries and national wildlife areas in the Northwest Territories and Yukon over the next six years, representing 3.7 million ha or an additional 0.4% of land area that would come under protected area status. Additional national wildlife areas will be negotiated in Southern Canada; for example, the Department of National Defence and Environment Canada have signed an agreement that will lead to formal designation of the Canadian Forces



Base Suffield as a National Wildlife Area by Order-in-Council, thus protecting an area of undisturbed natural prairie (E. Zurbrigg, pers. comm., 1992). These will complement national parks proposals for the 1990s.

Turner *et al.* (1991) have undertaken an initial analysis of a systems approach to conservation. In the discussion section, the analysis indicated that Canada still has some way to go in achieving an ecologically representative network of protected areas. Although 7.1% of land area may have some degree of government protected status, the ecological representation is widely disparate, as nearly 60% of the total areas conserved (IUCN categories I-V) are located in the Northwest Territories and Quebec. Recognised gaps in protected areas coverage include: *Western mountains* – Strait of Georgia lowlands; Interior dry plateau; Northern interior plateau and mountains; *Interior plains* – Manitoba lowlands; *Canadian Shield* – Tundra hills; Central tundra region; Northwestern boreal uplands; Laurentian boreal highlands; East coast boreal region; Boreal lake plateau; Whale river region; Northern Labrador mountains; Ungava tundra plateau; Southampton plain; Hudson Bay lowlands; Hudson-James lowlands; *Arctic lowlands* – Western Arctic lowlands; Eastern Arctic lowlands; *High Arctic islands* – Western High Arctic region (Environment Canada, 1991). It has been recognised that conservation efforts need to be focused on a broader range of participants to achieve ecological goals. For example, completion of the national parks system will only increase the national protected areas coverage by about 1.3%. Other agencies, therefore, including provincial administrations, must play a significant role to reach the national target of 12%.

At the provincial/territorial level, each and every jurisdiction today has one or more protected areas programme and agency, as well as a mandate to establish new sites. Further, eleven of the thirteen jurisdictions (one federal, 10 provincial, two territorial) are officially committed to completing their representative protected area systems by the year 2000, the Endangered Spaces goal (A. Hackman, pers. comm., 1992). For example, the Ministry of Natural Resources, Ontario, released a draft "Natural heritage areas strategy for Ontario: Responding to the endangered spaces challenge", as part of the government's commitment to completing the system of provincial parks and natural heritage areas by the year 2000 (MNR, 1992b). When completed, another 12% of Ontario's lands and waters will be designated as parks and protected areas.

Complementing this, system plans are in the process of being formulated for each jurisdiction. As of 1989, eight of twelve provinces and territories had park systems plans, but a number of these had yet to be completed (Hummel, 1989). For example, a systems plan for Nova Scotia is due to be released in March 1993, and there has been public discussion of systems plans in Saskatchewan and British Columbia, respectively, that identify candidate protected areas (CCEA, 1990). Further, the British Columbian government is committed to

developing a Protected Areas Strategy (C. Stewart, pers. comm., 1992). This Strategy is a single, integrated process for coordinating all of the province's protected area programmes and objectives. A component of this Strategy is "Parks and Wilderness for the 90s", which sets out to inventory study areas and establishes a timetable for evaluating sites for possible designation as provincial parks or wilderness areas. In Prince Edward Island, the Technical Advisory Committee (TAC), comprising representatives from each of the natural resource and land related branches of government and the Island Nature Trust (an NGO), was established in 1990 under the auspices of the Natural Resources Protection Act. This committee has prepared a Significant Environmental Areas Plan (SEAP), which was adopted by the government in 1991, and represents a major and systematic expansion of the province's protected areas network, framed by a provincial classification of habitat zones (A. Hackman, pers. comm., 1992). To date, 25 sites have been completely designated, most of which are owned either by government or the Island Nature Trust. The work of this committee is on-going in the designation of more sites, in approving management plans, and in advising on Canadian Heritage Rivers in the province (G.D. Murray, pers. comm., 1992). In New Brunswick, recommendations from the Premier's Round Table on Environment and Economy included the establishment of a system of protected areas by 1995, which will represent the important natural features of all the province's biogeographic regions (WWF, 1992).

Currently, all but two jurisdictions, New Brunswick and the Northwest Territories, have developed natural region classifications for their ecological area programmes (CCEA, 1992). When all 13 jurisdictional classifications are complete, WWF-Canada has estimated that there will be about 340 natural regions (including both terrestrial and marine) which will collectively define Canada's landscapes (Peterson and Peterson, 1991). These classifications, although slightly different (provincially/territorially-based) from the national ecoregion classification and still evolving, are already providing the basis for commitments to complete representative protected area systems in Ontario, Manitoba, Saskatchewan, Yukon, and by the federal government (CCEA, 1992). Currently, 87 of Canada's 340 natural regions are now represented by protected areas (25%), 104 natural regions are partially represented (30%), and 149 natural regions (45%) have as yet not been represented (WWF, 1992). WWF (1992) contains a summary for each of the 13 major jurisdictions in the country, indicating new protected areas established over the past year, progress on systems planning, actions planned for the forthcoming year, and an assessment, based on grades, of progress made in protecting natural regions within the respective jurisdictions.

Threats to protected areas and their surroundings are of critical concern, with factors ranging from degradation

of resources, continued resource exploitation, poaching, proposed hydroelectric developments, adverse visitor impacts, urban and agricultural encroachment, alteration of water flows or groundwater levels, lack of secure land rights, introduction of exotic plant species, and air and water pollution. Less than half of Canada's protected areas are free from industrial activity or motorised interference. Several parks, particularly in southern Ontario and the Maritimes, have suffered significant species losses. Wood Buffalo is threatened by changing water levels caused by dams, disease among the bison herd, pollution from upstream pulp mills, and, until recently, commercial timber harvesting in the park (B. Amos, pers. comm., 1992; A. Hackman, pers. comm., 1992; C.D.A. Rubec, pers. comm., 1992). Little remains of the Carolinian forest of southern Ontario, prairie grasslands, or the virgin Acadian forests of the Maritimes. Further, west coast rain forest is being quickly lost to clearcut logging, estimates varying from 15-50 years before no large ecologically viable or commercially valuable areas of forest are left (R. Maslin, pers. comm., 1992). Kejimikujik is on the IUCN List of Threatened Protected Areas because of the impacts of acid rain (Waugh and Perez Gil, 1992).

**Other Relevant Information** Tourism in national parks is monitored within reporting units. In June 1992, the national parks received 3.96 million person-entries, national historic sites 1.30 million person-entries, and historic canals 0.05 million (Environment Canada, 1992). Benefits produced in 1984/85 included an estimate of attributable visitor expenditures of Cnd\$ 308 million. A realistic figure for 1990 is about Cnd\$ 600 million (Mosquin BioInformation Ltd. and P.G. Whiting and Associates, 1992). Attendance figures and income accrued from provincial protected areas is also significant. In Ontario, for example, more than eight million people visited the provincial parks in 1991, contributing an estimated Cnd\$ 655 million to the provincial economy through the purchase of goods and services (MNR, 1992a).

A breakdown of annual park budgets (in Cnd\$ 000s) in 1992 for the 13 jurisdictions are as follows: Federal – 413,586; Northwest Territories – 2,749; Yukon – 2,824; British Columbia – 35,456; Alberta – 30,185; Saskatchewan – 12,419; Manitoba – 13,501; Ontario – 55,989; Quebec – 16,500; Nova Scotia – 5,138; New Brunswick – 7,232; Prince Edward Island – 3,573; Newfoundland – 4,798, giving a national total of 603,950 (WWF, 1992).

#### Addresses (Federal)

Canadian Parks Service (Director General), Environment Canada, Jules-Leger Building, OTTAWA, Ontario K1A 0H3 (Tel: 819 997 2800; FAX: 819 997 2443; Tlx:053 3608 parcs)  
Canadian Council on Ecological Areas (Secretariat), c/o Canadian Wildlife Service, Place Vincent Massey Bldg., 351 St Joseph Boulevard, HULL, Quebec K1A 0H3 (Tel: 819 953 1444)

Canadian Wildlife Service (Director General), Environment Canada, Place Vincent Massey Bldg., 351 St. Joseph Boulevard, HULL, Quebec K1A 0H3 (Tel: 819 953 1444/1421; FAX: 819 953 6283)  
State of the Environment Reporting, Environment Canada, OTTAWA, Ontario K1A 0H3

#### Non Government Organisations (national)

Canadian Nature Federation, 453 Sussex Drive, OTTAWA, Ontario K1N 6Z4 (Tel: 613 238 6154; FAX: 613 230 2054)  
Canadian Parks and Wilderness Society, Suite 1335, 160 Bloor Street East, TORONTO, Ontario M4W 1B9 (Tel: 416 972 0868)  
Canadian Wildlife Federation, 1673 Carling Avenue, OTTAWA, Ontario K2A 3Z1 (Tel: 613 725 2191)  
Ducks Unlimited Canada, 1190 Waverley Street, WINNIPEG, Manitoba R3T 2E2  
Nature Conservancy of Canada, 110 Eglinton Ave. West, TORONTO, Ontario M4R 1A3 (Tel: 416 469 1701; FAX: 416 469 1493)  
Western Canada Wilderness Committee (Project WILD), 20 Water Street, Vancouver, BC, V6B 1A4 (Tel: 604 683 8220; FAX: 604 683 8229)  
Wildlife Habitat Canada, Suite 301, 1704 Carling Avenue, OTTAWA, Ontario K2A 1C7 (Tel: 613 722 2090)  
World Wildlife Fund (Canada), 90 Eglinton Avenue E., Suite 504, TORONTO, Ontario M4P 2Z7 (Tel: 416 489 8800; FAX: 416 489 3611)

#### Provincial

Department of Tourism, Parks and Recreation (Director), Ministry of Tourism, Parks and Recreation, Standard Life Centre, 10405 Jasper Avenue, EDMONTON, Alberta T5J 3N4 (Tel: 403 427 6781; FAX: 403 427 5980)  
Natural and Protected Areas Branch (Manager), Department of Forestry, Lands and Wildlife, c/o Ministry of Forestry, Lands and Wildlife, 408 Legislative Building, EDMONTON, Alberta T5K 2B6 (Tel: 403 427 3674)  
Alberta Wilderness Association, Box 6398, Station D, CALGARY, Alberta T2P 2E1 (Tel: 403 283 2025)  
BC Parks (Director), Ministry of Environment, Lands and Parks, 2nd Floor, 800 Johnson Street, VICTORIA, BC V8V 1X4 (Tel: 604 387 5002; FAX: 604 387 5757)  
Recreation Branch (Director), Department of Forests, c/o Ministry of Forests, Rm 128, Parliament Buildings, VICTORIA, BC, V8V 1X4 (604 387 6240)  
Friends of Ecological Reserves, Box 1721, Station E, VICTORIA, BC V8W 2Y1 (Tel: 604 731 6716)  
Parks and Natural Areas Branch (Director), Manitoba Natural Resources, 258 Portage Street, 4th Floor, WINNIPEG, Manitoba R3C 1K2 (Tel: 204 945 4362)  
Manitoba Naturalists Society, 302128 James Avenue, WINNIPEG, Manitoba R3B 0N8



- Department of Recreation and Environment (Director), Ministry of Natural Resources and Energy, PO Box 6000, FREDERICTON, New Brunswick E3B 5H1 (Tel: 506 453 2510)
- Conservation Council of New Brunswick, 180 St John Street, FREDERICTON, New Brunswick E3B 4A9 (Tel: 506 458 8747)
- Parks Division (Director), Department of Tourism and Culture, PO Box 8700, ST JOHN'S, Newfoundland A1B 4J6 (Tel: 709 729 0657)
- Protected Areas Association (of Newfoundland and Labrador), PO Box 1027, Stn C, ST. JOHN'S, Newfoundland A1C 5M5
- Department of Economic Development and Tourism (Deputy Minister), Government of the Northwest Territories, PO Box 1320, YELLOWKNIFE, Northwest Territories X1A 2L9 (Tel: 403 873 7962)
- Department of Renewable Resources (Deputy Minister), PO Box 1320, Yellowknife, Northwest Territories X1A 2L9 (Tel: 403 873 7128)
- Parks and Recreation Division (Director), Department of Natural Resources, R.R. No. 1 Belmont, Colchester County, Nova Scotia B0M 1C0 (Tel: 902 662 3030; FAX: 902 662 2160)
- Department of Education (Director), Ministry of Education, PO Box 578, HALIFAX, Nova Scotia B3J 2S9 (Tel: 902 424 7343)
- Nova Scotia Museum (Curator of Special Places), c/o Department of Education, PO Box 578, HALIFAX, Nova Scotia B3J 2S9
- Federation of Nova Scotia Naturalists, c/o 1747 Summer Street, HALIFAX, Nova Scotia B3H 3A6 (Tel: 902 466 7168)
- Provincial Parks and Natural Heritage Policy Branch (Director), Ministry of Natural Resources, Whitney Block, Queens Park, 99 Wellesley Street West, TORONTO, Ontario M7A 1W3 (Tel: 416 314 2301)
- Federation of Ontario Naturalists, 385 Lesmill Rd., Don Mills, Ontario M3B 2W8 (Tel: 416 444 8411)
- Parks Division (Director), Department of Tourism, Parks and Recreation, PO Box 2000, CHARLOTTETOWN, Prince Edward Island C1A 7N8 (Tel: 902 368 5500/5511; FAX: 902 368 5737; Tlx: 01444154)
- Department of Conservation and Planning (Director), Ministry of Environment, PO Box 2000, CHARLOTTETOWN, Prince Edward Island C1A 7N8 (Tel: 902 368 5340)
- Island Nature Trust, PO Box 265, CHARLOTTETOWN, Prince Edward Island (Tel: 902 892 7513)
- Direction générale des parcs et des territoires fauniques (Directeur de l'aménagement), Ministère Loisir, Chasse et Pêche, 150 Boulevard StCyrille est, QUEBEC, Québec G1R 4Y1 (Tel: 418 643 6527)
- Direction générale de la conservation et du patrimoine écologique (Directeur), Ministère de l'Environnement, 3900 rue de Marly, 6 étage, SAINTFOY, Québec G1X 4E4 (Tel: 418 643 8259)
- Fondation pour la sauvegarde des espèces menacées (FOSEM), 8191 Avenue du Zoo, CHARLESBOURG, Quebec G1G 4G4 (Tel: 418 622 0313)
- Union québécoise pour la conservation de la nature, 160 76th Street East, CHARLESBOURG, Quebec G1W 2G5 (Tel: 418 628 9600)
- Parks Branch (Director), Department of Natural Resources, 3211 Albert Street, REGINA, Saskatchewan S4S 5W6 (Tel: 306 787 2854)
- Saskatchewan Natural History Society, PO Box 4348, REGINA, Saskatchewan S4P 3W6
- Parks and Outdoor Recreation Branch (Director), Department of Renewable Resources, Yukon Government Services, PO Box 2703, WHITEHORSE, Yukon Territory Y1A 2C6 (Tel: 403 667 5811/5802; FAX: 403 667 2958/3518; Tlx: 0368466)
- Yukon Conservation Society, Box 4163, WHITEHORSE, Yukon Y1A 3T3 (Tel: 403 668 5678)

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

#### Title: National Parks Act

**Date:** 1930; amended 1974 and 1988, with 1992 amendments to the schedules

**Brief description:** Provides for the establishment of national parks throughout Canada. Amendments to the National Parks Act in 1988 made ecological integrity of parks the principal management objective.

**Administrative authorities:** Canadian Parks Service (Parks Canada), Environment Canada

#### Designations:

**National Park** Act to preserve for all times, areas which contain significant geographical, geological, biological, historic, or scenic features as a national heritage. Areas also established to encourage public understanding, appreciation and enjoyment of this natural heritage so as to leave it unimpaired for future generations. Representative samples of natural landscapes, seascapes and ecosystems are acquired and maintained through the National Parks Act. National parks are established for: health through outdoor recreation and relaxation; heritage preservation through conservation of exceptional natural landscapes and their wildlife; and economic opportunity, through tourism, generating business enterprises in travel and other visitor services, as well as local employment in park management, amongst others. 1988 amendments included increased

firearms control; strengthened authority of park wardens; expanded protection clauses to cover soil, waters, rocks, fossils, minerals and air quality, as well as the flora and wild animals already protected under the act; and provision for the setting and amending of fees and charges for park use. Motorised navigation and commercial fishing are permitted in marine national parks. Industrial activities are prohibited in national parks.

**Source:** Kun (1981); Waugh and Perez Gil (1992)

#### Title: Migratory Birds Convention Act

**Date:** 1917; August 1982

**Brief description:** This act provides for the establishment of migratory bird sanctuaries throughout Canada and for enacting regulations to control and administer such sanctuaries in order to protect the birds, their nests and eggs.

**Administrative authorities:** Canadian Wildlife Service, Environment Canada

#### Designations:

**Migratory Bird Sanctuary** Areas for the special protection of migratory birds and their habitat. The federal government does not always own such areas; they can be designated by order-in-council on private lands with the consent of the landowner. Such areas can be deregulated should consent be revoked on the

part of the landowner or if the area loses its value to migratory birds. Regulations prohibit hunting of migratory birds or the taking of their eggs or nests. Activities such as clearcutting or mining are not prohibited provided they do not interfere with the "object species".

Sources: Government of Canada (1991); C. Stewart, pers. comm. (1992)

## Title: Canadian Wildlife Act

Date: 1973

**Brief description:** Provides for national wildlife areas and sanctuaries throughout Canada

**Administrative authorities:** Canadian Wildlife Service, Environment Canada

### Designations:

**National Wildlife Area** Such areas are owned and managed by the Canadian Wildlife Service on behalf of the Canadian government, and all such areas are on federal lands. Some areas may be left unmanaged, although others may include various activities including: the construction of new ponds to create breeding sites for waterfowl; trees and shrubs may be planted as cover for birds and deer, or the natural plant cover may be altered in other ways to increase the food and shelter for wildlife; grain may be planted to draw migrating birds away from farmers' fields; haycutting and cattlegrazing may form part of the management programme; and hunting may be used to control populations. Such areas are also utilised for passive recreation and education, and many of them have interpretive facilities for this purpose. Limited human interference, including hunting and farming may be permitted. Originally established for wildlife conservation or interpretation in respect of migratory birds. Today, their scope includes the habitat of all wildlife.

Source: Mosquin Bio-Information Limited and P.G. Whiting and Associates (1992)

## PROVINCIAL LEGISLATION

### ALBERTA

**Titles:** Wilderness Areas, Ecological Reserves and Natural Areas Act (1980); Willmore Wilderness Park Act (1959); Wildlife Act (1980); Forest Act; Provincial Parks Act; Historic Resources Act; Order in Council

**Administrative authorities:** Department of Tourism, Parks and Recreation; Natural and

Protected Areas Branch, Department of Forestry, Lands and Wildlife; Department of Culture and Multiculturalism

### Designations:

**Ecological Reserve** Throughout the country, such areas are set aside for scientific, educational and conservation purposes. In Alberta, such an area is set aside where it is a representative example of a natural ecosystem, contains rare or endangered native plants or animals, is suitable for scientific research of natural ecosystems, serves as an example of a man-modified ecosystem that is recovering, or contains unique or rare examples of natural biological or physical features. In most provinces, existing leases for timber removal, mineral extraction and the like are allowed to expire or are cancelled forthwith, although in Alberta, oil and gas leases may be exempted. The Alberta Act is unique in that there is a special provision which allows for power to control land uses and activities in buffer zones surrounding or adjacent to reserves.

Prohibited activities include: the construction, maintenance, or operation of any public work, road, railway, landing strip, structure or installation; travel, except on foot; the hunting or trapping of animals, or fishing; littering; the collecting, destroying or removing of any plant, animal, fossil, or other object of geological, ethnological, historical or scientific interest; lighting or maintaining an open fire; and the pollution of any land, water, plant or animal life, except with the consent of the Minister.

**Controlled Buffer Zone** The Lieutenant Governor in council may designate any area of public land adjoining a wilderness area or ecological area as a controlled buffer zone. No person shall cause, allow or undertake any strip mining, quarrying, or any major water resource projects.

**Natural Area** Established to protect sensitive or scenic public land from disturbance, and to ensure the availability of public land in a natural state for use by the public for recreation, education or any other purpose.

**Wilderness Area** Provisions generally as for ecological reserves

**Provincial Park**

**Game Bird Sanctuary**

**Historic Site**

**Recreation Area**

Sources: Original legislation; Griffiths-Muecke Associates (1982); A. Landals, pers. comm. (1992)



## BRITISH COLUMBIA

**Titles:** Parks Act; Environmental Land Use Act; Ecological Reserve Act, 1971; Ministry of Lands, Parks and Housing Act; Park (Regional) Act (1979); Heritage Conservation Act; Forests Act; Wildlife Act; Order in Council

**Administrative authorities:** BC Parks, Ministry of Environment, Lands and Parks; Department of Forests; Nature Trust of British Columbia

**Designations:****Wildlife Management Area**

**Wilderness Conservancy** Roadless tracts in which ecological communities are preserved intact. No exploitation or development, except as may be necessary to preserve natural processes, is permissible.

**Ecological Reserve** Such areas are set aside for research, education, and serve to protect areas of genetic diversity. Casual, non-consumptive, non-motorised use of most reserves by the public is allowed without a permit, while uses which could significantly alter the natural processes are prohibited. Hunting and fishing are prohibited.

**Provincial Park** Free of all commercial resource tenures.

**Marine Provincial Park**

**Recreation Area** Represent transitions to parks where preexisting tenures are accommodated. In both provincial parks and recreation areas, it is possible to zone nature conservancies and wilderness.

**Wilderness Area** Free of commercial forest harvesting, but open to continuous mineral evaluation and development.

**Sources:** Thompson, D. (1987); D. Thompson, pers. comm. (1992)

## MANITOBA

**Titles:** Ecological Reserves Act (1981); Provincial Park Lands Act (1972); Crown Lands Act; Wildlife Act (1980); Conservation District Act (1976); Order in Council

**Administrative authorities:** Parks and Natural Areas Branch, Manitoba Natural Resources

**Designations:**

**PROVINCIAL PARK LAND** Dedicated to the people of Manitoba and visitors to Manitoba, and may be used by them for healthful enjoyment, and

for the cultural, educational and social benefits that may be derived therefrom. Developed for: the conservation and management of flora and fauna therein; for the preservation of specified areas and objects therein that are of geological, cultural, ecological or other scientific interest; to facilitate the use and enjoyment of outdoor recreation therein. Most of the major provincial parks accommodate commercial harvesting activities, including trapping, agriculture, logging, mining, and commercial fishing.

**Provincial Natural Park**  
**Provincial Wilderness Park**  
**Provincial Recreation Park**  
**Provincial Recreational Trailway**  
**Provincial Parkway**  
**Provincial Recreational Waterway**  
**Provincial Heritage Park**  
**Special Use Park**  
**Wayside Park**  
**Marine Park**

**Wildlife Management Area** Managed to conserve habitats and maintain wildlife populations primarily for harvest purposes.

**Ecological Reserve** Any area of Crown land in the province may be established as an ecological reserve. Scientific studies are encouraged but visits without an authorised permit are prohibited.

**Source:** Department of Natural Resources (1985)

## NEW BRUNSWICK

**Titles:** Parks Act, 1982; Ecological Reserves Act, 1976; Fish and Wildlife Act, 1980; Crown Lands and Forests Act, 1982; Order in Council

**Administrative authorities:** Department of Recreation and Environment, Ministry of Natural Resources and Energy

**Designations:**

**PROVINCIAL PARK** Such areas are divided into seven classes:

**Rest Area** Designated to meet the needs of the travelling public.

**Campground Park** Designed to meet the needs of resident and non-resident campers for overnight camping.

**Beach Park** Created to meet the need for suitable bathing and swimming areas.

**Recreation Park** Designed to provide a full range of activities, including picnic grounds, campgrounds and beaches in one park.

**Wildlife Park** Established primarily to provide a public display of animals and birds native to the province.

**Resource Park** A large, multiple-use park area, the primary function of which is to provide a large block of land for the enjoyment of outdoor recreation in a natural environment.

Fishing is allowed on a controlled basis, hunting and trapping are not permitted, and the harvesting of natural resources is allowed under controlled supervision.

**Marine Park** Designed to preserve the natural environment of marine and shore fauna and flora. Areas which will be reached primarily by boat and are to have no road access.

**Ecological Reserve** May be established on private or Crown land. Regulations require that a management plan be prepared detailing the natural and cultural resources of each reserve and outlining the terms of use.

No person shall hunt, fish, trap, conduct forestry, agriculture or mining operations, conduct exploration or boring, prospecting, levelling, or construction work; and in general, works of a nature that may alter any part of the terrain or of the vegetation, and any acts of a nature that may disturb the fauna or flora, are forbidden.

Research or any other activity carried out requires a permit.

#### **Wildlife Management Area**

**Wildlife Refuge** Tend to be small and are intended to be used in the interest of public education.

Sources: Original legislation; Beardmore (1985)

### **NEWFOUNDLAND AND LABRADOR**

**Titles:** Wilderness and Ecological Reserves Act, 1980; Provincial Parks Act, 1970; Wildlife Act Wildlife Reserve Regulations, 1963; Order in Council

**Administrative authorities:** Parks Division, Department of Tourism and Culture

**Designations:**

**Ecological Reserve** Established to protect living organisms in their natural habitats, and for the benefit, education, and enjoyment of present and future generations in the province. Road and facility construction, hydro development, mining, forestry, and motorised transport are prohibited. Hunting, fishing, trapping, canoeing and camping are permitted so long as they do not threaten the natural

resources. Some non-conforming uses may continue as long as they do not threaten the integrity of the reserve.

**PROVINCIAL PARK** Such areas are divided into three categories:

**Camping Park** Provides for a range of camping experiences.

**Day Use Park** Designed solely for those wishing to spend an enjoyable day in a natural setting. Camping is not permitted.

**Natural Scenic Attraction** Areas with special scenic qualities or natural significance. Picnicking is allowed but camping is not.

**Wilderness Reserve** Established largely because of their natural scenic beauty, and are intended to be used for recreation. Hunting and fishing are permitted.

#### **Seabird Sanctuary**

Source: Taschereau (1985)

### **NORTHWEST TERRITORIES**

**Titles:** Northwest Territories Wildlife Act, 1978; Territorial Lands Act; Territorial Parks Act, 1973; Land Use Regulations; Territorial Wildlife and/or Park Ordinances; Order in Council

**Administrative authorities:** Department of Renewable Resources; Department of Economic Development and Tourism

**Designations:**

**Ecological Areas  
Community Park  
Game Preserve  
Wildlife Sanctuary  
Territorial Park**

Source: Original legislation

## NOVA SCOTIA

**Titles:** Provincial Parks Act, 1988; Beaches Act, 1988; Wildlife Act, 1987; Conservation Easements Act, 1992; Special Places Protection Act, 1981; Museum Act

**Administrative authorities:** Parks and Recreation Division, Department of Natural Resources; Department of Education (Nova Scotia Museum)

**Designations:**

**Ecological Site** Can be designated on Crown land or on private land with permission of the owner. Consist of natural ecosystems, habitats of endangered plant or animal species, or other areas desirable for research and educational use. A management plan must be formulated before it is designated as a reserve.

**Heritage Site** May be designated on Crown or private land and potential sites are protected while being investigated. These are areas containing archaeological, historical, or palaeontological objects or remains.

**Wildlife Management Area** Private or public land where flexible regulations apply to the management and harvesting of wildlife. Established to protect wildlife and waterfowl habitat and to provide opportunities for natural history education and outdoor recreation.

**Game Sanctuary** Established to allow the increase of game species and provide a reserve of game for surrounding forests. Hunting or disturbance of wildlife is prohibited.

**Nature Reserve**

**Protected Beach** Allows for the protection of sand dunes and a large variety of coast. Applies to all 'beaches' below high tide, and to designated beaches (including those on private land), with the landowners permission.

**Provincial Park** Divided into the following general classes for statistical purposes: camping, picnic, beach, wildlife, and historic.

**Special Place** The province is considering a parks classification system which will include the following designations: wildland park, natural heritage reserve, historic park, natural environment parks, outdoor recreation park, wayside park, wildlife park, and park reserve.

**Sources:** Beardmore (1985); D. Smith, pers. comm. (1992)

## ONTARIO

**Titles:** Ontario Provincial Parks Act, 1980; Ontario Game and Fish Act, 1980; Wilderness Areas Act, 1980; Conservation Land Act; Conservation Authorities Act, 1980; Ontario Heritage Act, 1980; Endangered Species Act, 1971; Public Lands Act; Planning Act; Order in Council

**Administrative authorities:** Provincial Parks and Natural Heritage Policy Branch, Ministry of Natural Resources; Federation of Ontario Naturalists; Ontario Heritage League; Niagara Escarpment Commission

**Designations:**

**Ecological Area**  
**Conservation Area**  
**Wildlife Area**  
**Game Preserve**

**PROVINCIAL PARK** Areas which are set apart to protect special natural and historical features. They also provide outdoor recreation and education opportunities. Divided into six classes: natural environment, nature reserve, wilderness, historical, waterway, and recreation. There are also six zones within any particular class of park: nature reserve, wilderness, natural environment, historical, access, and development.

In all classes of park, mining activity, commercial hydroelectric development and logging (except in Algonquin) are prohibited. Eventually, commercial trapping, commercial wildrice harvesting and most commercial fishing will be eliminated. Hunting is not permitted in wilderness and nature reserve parks and zones.

**Wilderness Park** Substantial areas where the forces of nature are permitted to function freely and where visitors travel by non-mechanised means and experience expansive solitude, challenge and personal integration with nature.

**Nature Reserve** Areas selected to represent the distinctive natural habitats and landforms of Ontario, and are protected for educational purposes and as gene pools for research to benefit present and future generations. The closest equivalent to ecological reserves found in other provinces.

**Historic Park** Areas selected to represent the distinctive historical resources of the province in open-space settings, and are protected for interpretive, educational and research purposes.

**Natural Environment Park** Areas which incorporate outstanding recreational landscapes with representative natural features and historical



resources to provide high quality recreational and educational experiences.

**Waterway Park** Areas which incorporate outstanding recreational water routes with representative natural features and historical resources to provide high quality recreational and educational experiences.

**Recreation Park** Areas which support a wide variety of outdoor recreation opportunities for large numbers of people in attractive surroundings.

Sources: Taschereau (1985); MNR (1992a)

## PRINCE EDWARD ISLAND

Title: **Recreational Development Act, 1974; Natural Areas Protection Act, 1988; Planning Act, 1969; Provincial Parks Act, 1956; Fish and Game Protection Act, 1966; Order in Council**

**Administrative authorities:** Parks Division, Department of Tourism, Parks and Recreation; Department of Environment; Technical Advisory Committee; Prince Edward Island Nature Trust

**Designations:**

**Protected Area**  
**Protected Beach**  
**Ecological Reserve**  
**Wetland Area**

**Wildlife Management Area** Established to provide protected feeding and resting areas for waterfowl during migration. Also provide improved hunting opportunities around such areas, and provide opportunities for bird watchers, photographers and naturalist to observe, photograph and study waterfowl. Hunting, trapping or other disturbances of wildlife are prohibited.

**PROVINCIAL PARK** Such areas are divided into five classes:

**Nature Preserve** Intended to protect and perpetuate in an undisturbed state, individual features of unique natural significance, possessing natural conditions of scientific and/or educational value. Plant and animal harvesting is not allowed within parks of the province.

**Nature Environment Park** Natural lands set aside to educate and acquaint the user with the aesthetics and values of the natural landscape and to provide associated compatible forms of recreation.

**Recreation Park** Established to provide areas that are adaptable to heavy use and offer a wide range of outdoor recreation opportunities.

**Wayside/Beach Access Park** Created to promote a safe and pleasurable travel experience, and are set aside at reasonable intervals for motorists to stop and rest, or to provide access facilities for good beaches.

**Historic Park** Created to preserve, restore, and interpret buildings, sites, objects and related lands of historical, educational and cultural interest.

Sources: Beardmore (1985)

## QUEBEC

Titles: **Provincial Parks Act; Ecological Reserves Act, 1974; Cultural Property Act; Wildlife Conservation Act; Order in Council**

**Administrative authorities:** Direction générale des parcs et des territoires fauniques, Ministère Loisir, Chasse et Pêche; Direction générale de la conservation et du patrimoine écologique, Ministère de l'Environnement

**Designations:**

**Ecological Reserve** Access requires written authorisation from the Minister of the Environment and is only given for scientific or educational purposes.

## PARK

**Conservation Park** Established to permanently protect the representative areas of the province's natural regions, or of natural sites presenting exceptional features, while rendering them accessible to the public for the purposes of education and cross-country recreation. Open to the public for educational purposes, the recreational activities offered within these areas require simple equipment which is unlikely to affect the environment. In conservation and recreation parks, hunting is prohibited, whereas the carrying out of certain traditional activities such as the production of maple syrup is allowed under strict regulation. All forms of prospecting, and any utilisation, harvesting, or harnessing of resources related to logging, mining, or the production of energy, and the laying of oil or gas pipelines or powerlines are prohibited within park boundaries.

**Recreation Park** Intended to encourage outdoor activities, while contributing to environmental protection and education.

Source: Original legislation



## SASKATCHEWAN

**Titles:** Parks Act, 1986; Ecological Reserves Act, 1980; Saskatchewan Wildlife Act; Critical Wildlife Habitat Protection Act, 1984; Regional Parks Act, 1979; Heritage Property Act, 1980; Order in Council

**Administrative authorities:** Parks Branch, Department of Natural Resources; Saskatchewan Wildlife Federation

### Designations:

**Ecological Reserve** Provincially administered Crown land which sustains or is associated with unique or representative parts of the environment.

**Wildlife Area**

**Protected Area**

**Park Land Reserve**

**Recreation Site**

**PROVINCIAL PARK** Such areas are classified under four designations:

**Natural Environment Park** Includes a wide range of natural and man-made attractions. Large areas, representative of natural landscapes, providing high quality outdoor recreation opportunities.

**Recreation Park** Smaller areas which provide high quality recreation opportunities and facilities. Development occurs near urban population centres and travel routes.

**Wilderness Park** Large, pristine tracts of land containing significant natural features and

opportunities for activities such as canoeing, hiking, primitive camping and photography. Facility development is limited to basic comforts to ensure preservation of the environment.

**Historic Park** Such areas are set aside to preserve, reconstruct and interpret the provinces history for the public.

**Regional Park** A local, independent park authority is responsible for development and management of such areas, with maintenance and capital grants provided by the province.

**Source:** Original legislation; Saskatchewan Parks, Recreation and Culture (n.d.); K. Lozinsky, pers. comm. (1992)

## YUKON

**Titles:** Territorial Wildlife Act; Land Use Regulations; Territorial Wildlife and/or Park Ordinances; Territorial Park Act; Order in Council

**Administrative authorities:** Parks and Outdoor Recreation Branch, Department of Renewable Resources

### Designations:

**Ecological Reserve**

**Territorial Park**

**Game Preserve**

**Wildlife Sanctuary**

**Source:** F. McRae, pers. comm. (1992)

**SUMMARY OF PROTECTED AREAS**  
**(Environment Canada, 1990)**  
**Federal Protected Areas**  
(National Map)

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>Alberta</i>				
<i>Migratory Bird Sanctuaries</i>				
1	Richardson Lake	V	12,700	1953
2	Saskatoon Lake	IV	1,140	1948
<i>National Parks</i>				
3	Banff	II	664,080	1885
4	Elk Island	II	19,430	1913
5	Jasper	II	1,087,800	1907
6	Waterton Lakes	II	50,500	1895
7	Wood Buffalo	II	3,136,490	1922
<i>British Columbia</i>				
<i>Migratory Bird Sanctuary</i>				
8	Victoria Harbour	IV	1,700	1923
<i>National Parks</i>				
9	Glacier	II	135,000	1886
10	Kootenay	II	140,600	1920
11	Mount Revelstoke	II	25,970	1914
12	Pacific Rim*	II	50,000	1970
13	South Moresby*	II	147,000	1988
14	Yoho	II	131,300	1886
<i>National Wildlife Area</i>				
15	Columbia	I	1,001	1978
<i>Manitoba</i>				
<i>National Park</i>				
16	Riding Mountain	II	297,590	1929
<i>New Brunswick</i>				
<i>National Parks</i>				
17	Fundy	II	20,590	1948
18	Kouchibouguac	II	23,880	1979
<i>National Wildlife Area</i>				
19	Tintamarre	IV	1,990	1978
<i>Newfoundland</i>				
<i>National Parks</i>				
20	Gros Morne	II	194,250	1973
21	Terra Nova	II	39,990	1957
<i>Northwest Territories</i>				
<i>Migratory Bird Sanctuaries</i>				
22	Akimiski Island	IV	336,700	1941
23	Anderson River Delta	IV	108,300	1961
24	Banks Island No.1	IV	2,051,800	1961
25	Banks Island No.2	IV	14,200	1961
26	Bylot Island	IV	1,087,800	1965
27	Cape Dorset	IV	25,900	1958
28	Dewey Soper-Res.	IV	815,900	1957

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
29	East Bay	IV	116,600	1959
30	Harry Gibbons	IV	148,900	1959
31	Kendall Island	IV	60,600	1961
32	Mcconnell River	IV	32,900	1960
33	Queen Maude Gulf	IV	6,278,200	1961
<i>National Parks</i>				
34	Auyuittuq*	II	2,147,110	1976
35	Ellesmere Island	II	3,777,500	1982
36	Nahanni*	II	476,560	1976
37	Wood Buffalo	II	1,344,210	1922
<i>National Wildlife Area</i>				
38	Polar Bear Pass Reserve	I	81,000	1982
<i>Nova Scotia</i>				
<i>Migratory Bird Sanctuary</i>				
39	Sable River	IV	2,350	1977
<i>National Parks</i>				
40	Cape Breton Highlands	II	95,050	1936
41	Kejimikujik	II	40,370	1974
<i>National Wildlife Area</i>				
42	Chignecto River	IV	1,020	1980
<i>Wildlife Management Areas</i>				
43	Musquodoboit Harbour Outer River Estuary	IV	1,200	1987
44	South Bight-Minas River Basin	IV	26,800	1987
<i>Ontario</i>				
<i>Migratory Bird Sanctuaries</i>				
45	Fielding	IV	1,300	1952
46	Hanna Bay	IV	29,800	1939
47	Moose River	IV	1,450	1958
48	Upper Canada	IV	2,660	1961
<i>National Capital Commission Areas</i>				
49	Carlsbad Springs	VIII	1,655	
50	Mer Bleue	VIII	1,086	
51	The Greenbelt	VIII	11,824	
<i>National Parks</i>				
52	Bruce Peninsula	II	26,630	1987
53	Georgian Bay Islands	II	2,530	1929
54	Point Pelee	II	1,550	1918
55	Pukaskwa	II	187,780	1978
<i>National Wildlife Area</i>				
56	Long Point	IV	3,250	1980
<i>Prince Edward Island</i>				
<i>National Park</i>				
57	Prince Edward Island	II	2,590	1937
<i>Quebec</i>				
<i>Migratory Bird Sanctuaries</i>				
58	Baie Des Loups	IV	4,000	1925
59	Boatswain Bay	IV	17,700	1941
60	Ile A La Brume	IV	4,450	1925



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
61	Ile Aux Basques	IV	1,000	
62	Ile Bonaventure And Perce Rock	IV	1,340	1919
63	Iles De La Paix	IV	1,100	1972
64	Iles Saint-marie	IV	4,500	1925
65	Nicolet	IV	2,850	
66	St. Augustin	IV	55,300	1925
67	Watshishou	IV	11,200	1925
<i>National Capital Commission Area</i>				
68	Gatineau Park	VIII	34,400	
<i>National Parks</i>				
69	Forillon	II	24,040	1974
70	La Maurice	II	54,390	1977
71	Mingan Archipelago Reserve	I	15,070	1984
<i>National Wildlife Areas</i>				
72	Cap Tourmente R.	IV	2,230	1978
73	Lac St-Francois	IV	1,335	1978
<i>Saskatchewan</i>				
<i>Migratory Bird Sanctuaries</i>				
74	Basin And Middle Lake	IV	8,702	1925
75	Duncairn Reservoir	IV	1,550	1948
76	Last Mountain Lake (Reserve)	IV	4,740	1887
77	Lenore Lake	IV	8,830	1925
78	Murray Lake	IV	1,170	1948
79	Old Wives Lake	IV	26,060	1925
80	Opuntia Lake	IV	1,400	1952
81	Redberry Lake	IV	6,400	1925
<i>National Parks</i>				
82	Grasslands*	II	90,650	1988
83	Prince Albert	II	387,460	1927
<i>National Wildlife Areas</i>				
84	Prairie	IV	2,933	1978
85	Stalwart	IV	1,460	1978
<i>Wildlife Management Area</i>				
86	Last Mountain Lake Coop	IV	15,602	1887
<i>Yukon Territory</i>				
<i>National Parks</i>				
87	Kluane*	II	2,201,500	1976
88	Northern Yukon*	II	1,016,840	1984

\* indicates a National Park Reserve

## SUMMARY OF PROTECTED AREAS

Provincial/Territorial Protected Areas and sites under multiple management agencies  
(provincial/territorial maps)

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>Alberta</i>				
<i>Ecological Reserves</i>				
1	Athabasca Dunes	I	3,774	1987
2	Hand Hills	I	2,229	1988
3	Kennedy Coulee	I	1,035	1987
4	Kootenay Plains	I	3,204	1987
5	Silver Valley	I	1,805	1987
6	Upper Bob Creek	I	2,601	1989
7	Wainwright Dunes	I	2,821	1988
<i>Game Bird Sanctuaries</i>				
8	Birch Lake	IV	2,902	
9	Lac La Biche	IV	23,897	
10	Many Island Lake	IV	3,387	
11	Ministik Lake	IV	7,335	
12	Miquelon Lake	IV	1,602	
13	Pakowki Lake	IV	11,469	
14	Richardson Lake	IV	11,662	
15	Sheep River	IV	5,785	
<i>Wilderness Areas</i>				
16	Ghost River	I	15,317	
17	Siffleur	I	41,215	
18	White Goat	I	44,457	
<i>Provincial Parks or Areas</i>				
19	Bow Valley	II	1,261	1959
20	Carson Pegasus	II	1,177	1982
21	Crimson Lake	II	3,443	1955
22	Cross Lake	II	2,076	1955
23	Cypress Hills	II	20,461	1951
24	Dillberry Lake	II	1,012	1957
25	Dinosaur	II	5,946	1955
26	Dry Island Buffalo Jump	II	1,180	1970
27	Hilliard's Bay	II	2,329	1978
28	Kananaskis	II	50,308	1977
29	Kootenay Plains	IV	3,378	1978
30	Lesser Slave Lake	II	7,292	1966
31	Notikewin	II	9,667	1979
32	Redwater	IV	1,813	1971
33	White Earth Valley	IV	2,055	1971
34	Whitney Lake	II	1,490	1982
35	William A. Switzer	II	2,686	1958
36	Willmore	II	459,673	
37	Winagami	II	1,211	1956
38	Young's Point	II	1,090	1971
<i>British Columbia</i>				
<i>Ecological Reserves</i>				
1	Black Tusk Nature Conservancy	I	17,819	1974
2	Byers/Conroy/Harvey/Sinnett Islands	I	12,205	1981
3	Checleset Bay	I	34,650	1981

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
4	Dewdney And Glide Islands	I	3,845	1971
5	East Redonda Island	I	6,212	1971
6	Gingiet Creek	I	2,873	1985
7	Gladys Lake	I	48,560	1975
8	Goosegrass Creek	I	2,185	1974
9	Ilgachuz Range	I	2,914	1975
10	Kingfisher Creek	I	1,441	1973
11	Mount Griffin	I	1,376	1972
12	Narcosli Lake	I	1,098	1973
13	Ningunsaw River	I	2,047	1975
14	Purcell Wilderness Conservatory	I	131,523	1974
15	Robson Bight	I	1,248	1982
16	Sikanni Chief	I	2,401	1973
17	V.J. Krajina	I	9,834	1973
<i>Provincial Parks or Areas</i>				
18	Akamina-Kishinena	II	10,915	1986
19	Atlin	II	38,445	1973
20	Atlin Cla	II	232,695	1973
21	Babine Mountains	II	32,400	1984
22	Birkenhead Lake	II	3,642	1963
23	Bowron Lake	II	123,117	1961
24	Boya Lake	II	4,597	1965
25	Brooks Peninsula	II	28,780	1986
26	Bugaboo Alpine	II	24,912	1969
27	Cape Scott	II	15,054	1973
28	Carp Lake	II	19,344	1973
29	Cascade	II	16,680	1987
30	Cathedral	II	33,272	1968
31	Champion Lakes	II	1,425	1955
32	Coquihalla Summit	II	5,750	1988
33	Crooked River	II	1,016	1963
34	Cypress	II	2,489	1975
35	Darke Lake	II	1,470	1943
36	Desolation Sound	II	2,550	1973
37	Desolation Sound	II	5,706	1973
38	E.C. Manning	II	71,400	1941
39	East Sooke	VIII	1,422	1970
40	Elk Falls	II	1,087	1940
41	Elk Lakes	II	11,620	1986
42	Elk Lakes	II	5,625	1973
43	Eneas Lakes	II	1,036	1968
44	Eskers	II	1,603	1988
45	Fiordland	II	91,000	1987
46	Garibaldi	II	195,083	1920
47	Gitnadoix	II	58,000	1986
48	Golden Ears	II	55,594	1967
49	Gwillim Lake	II	9,199	1971
50	Hakai	II	122,998	1987
51	Hamber	II	24,518	1941
52	International Ridge	II	1,905	1989
53	Joffre Lakes	II	1,460	1988
54	Kakwa	II	127,690	1987
55	Kinaskan Lake	II	1,800	1988
56	Kokanee Glacier Park	II	25,832	1989
57	Kokanee Glacier	II	25,900	1922
58	Kwadacha Wilderness	II	167,540	1973
59	Lake Lovely Water	II	1,300	1988



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
60	Monashee	II	7,513	1962
61	Monkman	II	32,000	1981
62	Mount Assiniboine	II	39,052	1922
63	Mount Edziza	II	228,698	1989
64	Mount Judge Howay	II	6,180	1967
65	Mount Robson	II	219,829	1913
66	Mount Seymour	II	3,508	1989
67	Mount Terry Fox	II	1,930	1982
68	Mt Edziza	II	96,770	1989
69	Mt Judge Howay	II	6,180	1989
70	Mt Seymour	II	3,508	1989
71	Muncho Lake	II	88,412	1957
72	Naikoon	II	72,641	1973
73	Nancy Green	II	8,086	1969
74	Okanagan Mountain	II	10,462	1973
75	Sasquatch	II	1,220	1968
76	Schoen Lake	II	8,170	1977
77	Silver Star	II	8,714	1989
78	Skagit Valley	II	32,508	1973
79	Spatsizi Plateau	II	659,650	1975
80	St. Mary's Alpine	II	9,146	1973
81	Stagleap	II	1,133	1964
82	Stikine River	II	217,000	1987
83	Stone Mountain	II	25,691	1957
84	Strathcona	II	10,250	1987
85	Strathcona	II	191,881	1987
86	Tatlatui	II	105,826	1973
87	Top Of The World	II	8,791	1973
88	Tweedsmuir	II	960,918	1987
89	Valhalla	II	49,600	1983
90	Wells Gray	II	527,789	1939
91	Wells Gray	II	13,479	1987
92	White Pelican	II	1,247	1971
93	Whiteswan Lake	II	1,994	1978
94	Wokpash	II	37,800	1986
95	Murtle Lake Wells	I	212,743	1968
<b>Manitoba</b>				
<i>Ecological Reserves</i>				
1	Baralzon Lake	I	39,000	1990
2	Long Point	I	1,600	1987
3	Reindeer Island	I	14,200	1976
<i>Wildlife Management Areas</i>				
4	Alonsa	VIII	10,559	1974
5	Assiniboine	VIII	2,207	1984
6	Basket Lake	VIII	7,190	1974
7	Broad Valley	VIII	3,692	1969
8	Cape Churchill	VIII	1,877,700	1978
9	Cape Tatnam	VIII	522,267	1973
10	Catfish Creek	VIII	6,281	
11	Cayer	VIII	1,522	
12	Clematis	VIII	6,828	1969
13	Dog Lake	VIII	32,389	1972
14	Grahamdale	VIII	1,489	1974
15	Gypsumville	VIII	2,465	1969
16	Hilbre	VIII	3,527	1969
17	Inwood	VIII	2,719	1969

Map ref.	<i>National/international designations</i> Name of area	IUCN management category	Area (ha)	Year notified
18	Lake Francis	VIII	6,416	1990
19	Langruth	VIII	1,781	1965
20	Lauder Sandhills	VIII	3,011	1971
21	Lee Lake	VIII	6,966	1969
22	Little Birch	VIII	22,802	1969
23	Lundar	VIII	1,101	1969
24	Mantagao Lake	VIII	50,339	1968
25	Marshy Point	VIII	1,490	1984
26	Moose Creek	VIII	78,917	
27	Narcisse	VIII	13,781	1969
28	Oak Hammock Marsh	VIII	3,488	1974
29	Pembina Valley	VIII	1,910	1976
30	Peonan Point	VIII	2,339	1969
31	Point River	VIII	3,370	1984
32	Portage Sandhills	VIII	1,328	1984
33	Proulx Lake	VIII	3,302	1974
34	Proven Lake	VIII	1,908	1984
35	Rembrandt	VIII	1,360	1974
36	Sandridge	VIII	1,879	1969
37	Saskeram	VIII	96,648	1963
38	Sharpewood	VIII	2,266	1969
39	Sleeve Lake	VIII	14,964	1969
40	Souris River Bend	VIII	2,073	1968
41	Steepprock	VIII	1,890	1966
42	Tom Lamb	VIII	217,960	1965
43	Washow Bay	VIII	1,392	
44	Watson P. Davidson	VIII	5,827	1961
45	Westlake	VIII	5,739	1984
46	Whitewater Lake	VIII	8,977	1974
<i>Provincial Parks or Areas</i>				
47	Assessipi	II	2,460	1964
48	Atikaki Wilderness	IV	466,841	1985
49	Birds Hill	II	3,521	1964
50	Clearwater Lake	II	59,570	1975
51	Duck Mountain	II	127,400	1962
52	Elk Island	II	1,000	1975
53	Grass River	II	228,960	1963
54	Grindstone	II	25,841	1969
55	Hecla	II	86,309	1969
56	Nopiming	II	143,740	1976
57	Paint Lake	II	22,660	1969
58	Spruce Woods	II	24,860	1964
59	Turtle Mountain	II	18,910	1962
60	Whiteshell	II	273,400	1961
<i>New Brunswick</i>				
<i>Wildlife Protection Areas</i>				
1	University of New Brunswick	IV	1,518	1949
2	Utopia Refuge	IV	3,109	1940
<i>Wildlife Management Areas</i>				
3	Bantalor	IV	15,287	1930
4	Becaguimec	IV	11,142	1929
5	Burpee	IV	18,177	1934
6	Canaan River	IV	22,543	1921
7	Kedgwick	IV	82,914	1923
8	King's Landing	IV	53,238	1980

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
9	Lepreau River	IV	24,356	1927
10	Plaster Rock-renous	IV	84,175	1939
11	Tracadie River	IV	3,915	1937
<i>Provincial Parks or Areas</i>				
12	Mount Carleton	II	17,427	
13	Sugar Loaf	II	1,150	1971
<i>Newfoundland</i>				
<i>Ecological Reserves</i>				
1	Cape St Mary's	I	1,260	1983
2	Funk Island	I	1,860	1983
3	The Grass	I	1,100	1987
4	Watt's Point	III	3,090	1986
<i>Seabird Sanctuary</i>				
5	Baccalieu Island	IV	1,210	
<i>Wilderness Reserves</i>				
6	Avalon	II	107,000	1986
7	Bay Du Nord	II	289,500	1989
8	Middle Ridge	VI	81,600	1989
<i>Provincial Parks or Areas</i>				
9	Barachois Pond	II	3,497	1961
10	Butter Pot	II	1,752	1964
11	Chance Cove	II	2,068	1974
12	La Manche	II	1,394	1966
13	Squires Memorial	II	1,574	1959
14	Stag Lake	II	1,278	1979
<i>Northwest Territories</i>				
<i>Wildlife Sanctuaries</i>				
1	Bowman Bay	IV	107,900	1957
2	Thelon	IV	2,396,000	1927
3	Twin Islands	IV	142,500	1939
<i>Game Preserve</i>				
4	Peel River	VIII	442,700	
<i>Territorial Parks or Areas</i>				
5	Blackstone	II	1,430	1982
6	Reid Lake	II	1,085	1975
<i>Nova Scotia</i>				
<i>Game Sanctuaries</i>				
1	Chignieto	IV	22,099	1937
2	Liscomb	IV	45,327	1928
3	Waverley	IV	5,698	1926
<i>Wildlife Management Areas</i>				
4	Eastern Shore Islands	IV	11,767	1976
5	Scatarie Island	IV	1,555	1976
6	Tobeatic	IV	49,213	1968
<i>Provincial Park or Area</i>				
7	Uniacke House Natural Setting	VII	4,938	
<i>Ontario</i>				
<i>Nature Reserves†</i>				
1	Agassiz Peatlands	I	2,315	1985



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
2	Black Duck River (Polar Bear PP)	I	100,000	1970
3	Brent Crater (Algonquin PP)	I	1,390	1893
4	Brule Harbour (Lake Superior PP)	I	1,274	1950
5	Cape Chaillon (Lake Superior PP)	I	1,948	1950
6	Centennial Lake	I	3,830	1989
7	Coldspring Lake Watershed (Algonquin PP)	I	5,396	1893
8	Gina Lake (Obatanga PP)	I	1,323	1967
9	Greenleaf Creek Watershed (Algonquin PP)	I	3,730	1893
10	Hailstorm Creek (Algonquin PP)	I	1,092	1893
11	Johnston Herb/Pine Tree Pt	I	2,008	1989
12	Knife Creek (Obatanga PP)	I	1,495	1967
13	Lower Agawa River (Lake Superior PP)	I	2,393	1950
14	Lower Sand River (Lake Superior PP)	I	1,150	1950
15	Minnitaki Kames	I	4,340	1989
16	Nadine Lake Hardwoods (Algonquin PP)	I	1,105	1893
17	Nr Zone (Wasaga Beach PP)	I	1,000	1959
18	O'conner (Lake Superior PP)	I	1,565	1950
19	Pantagruel Creek	I	2,200	1989
20	Petawawa Rapids (Algonquin PP)	I	1,411	1893
21	Pigeon River Clay Plain	I	2,870	1989
22	Round Lake	I	4,620	1989
23	Site 416 (Polar Bear PP)	I	9,300	1984
24	Site 421 (Polar Bear PP)	I	9,300	1984
25	Tarn Lake (Algonquin PP)	I	1,004	1893
26	Treeby Lake (Lake Superior PP)	I	1,005	1950
27	Trout Lake	I	7,850	1988
28	Wachi Creek (Polar Bear PP)	I	50,000	1984
29	Windigo Bay	I	8,300	1989
30	Wood Creek (Polar Bear PP)	I	50,000	1984
	<i>Wildlife Areas</i>			
31	Camden Lake	IV	1,052	
32	Hullett	IV	2,100	
33	Luther Marsh	IV	5,666	
34	Mountain	IV	1,457	
35	Point Petre	IV	1,276	
36	St. Edmunds	IV	6,799	
	<i>Wilderness Area</i>			
37	Cape Henrietta-Marie	I	58,320	1970
	<i>Conservation Authority Areas</i>			
38	Authority Forest	VIII	1,094	
39	Belwood Lake (43)	VIII	1,348	
40	Conestogo Lake (40)	VIII	2,348	
41	Depot Lakes (132)	VIII	1,000	
42	Fanshawe (21)	VIII	1,200	
43	Greenock Swamp	VIII	7,300	
44	Guelph Lake (38)	VIII	1,607	
45	Luther Marsh (44)	VIII	4,800	
46	Wildwood (22)	VIII	1,255	
	<i>Crown Game Preserves</i>			
47	Bridgen	IV	2,613	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
48	Chapleau	IV	811,054	
49	Dumfries	IV	1,000	
50	Geikie Island	IV	5,527	
51	Himsworth	IV	2,659	
52	Nipissing	IV	62,454	
53	Shirley Bay	IV	1,849	
54	Yarmouth	IV	1,318	
<i>Provincial Parks or Areas</i>				
55	Abitibi-de-Troyes	II	11,068	1985
56	Algonquin	IV	765,345	1893
57	Aubrey Falls	II	4,860	1985
58	Awenda	II	2,917	1975
59	Bigwind Lake	II	1,970	1985
60	Bon Echo	II	6,644	1971
61	Butler Lake	I	3,400	1985
62	Cabot Head	I	4,514	1985
63	Carillon	II	1,417	1966
64	Castle Creek	I	1,075	1985
65	Chapleau-Nemegosenda River	II	8,165	1973
66	Cranberry Lake	I	2,800	1985
67	Esker Lakes	II	3,237	1957
68	Fathom Five	II	9,976	1972
69	Frontenac	II	5,130	1974
70	Fushimi Lake	II	5,294	1979
71	Greenwater	II	5,350	1957
72	Grundy Lake	II	2,554	1959
73	Halfway Lake	II	4,730	1980
74	Ivanhoe Lake	II	1,589	1957
75	Kabototikwia River	I	1,965	1985
76	Kashabowie	II	2,055	1985
77	Kesagami	II	55,977	1983
78	Kettle Lakes	II	1,261	1957
79	Killarney	II	48,500	1964
80	Killbear	II	1,756	1971
81	La Cloche	II	7,448	1985
82	Lady Evelyn Smoothwater	II	72,400	1983
83	Lake Nipigon	II	1,458	1960
84	Lake Of The Woods	II	12,900	1967
85	Lake Superior	IV	155,659	1950
86	Larder River	II	2,500	1985
87	Livingstone Point	I	1,800	1985
88	Lola Lake	I	6,572	1985
89	Mac Gregor Point	II	1,204	1975
90	Makobe-Grays River	II	1,427	1985
91	Matawin River Nature	I	2,615	1985
92	Mattawa River	II	3,258	1970
93	Michipicoten Island	II	36,740	1985
94	Missinaibi	II	44,061	1970
95	Mississagi Delta	I	2,395	1985
96	Mississagi	II	2,883	1973
97	Mississagi River	II	19,814	1974
98	Murphy's Point	II	1,240	1967
99	Nagagami Lake	I	1,650	1985
100	Nagagamis	II	8,131	1957
101	Neys	II	3,445	1965
102	Obatanga	II	9,409	1967
103	Ojibway	II	2,630	1963

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
104	Opasquia Wilderness	II	473,000	1983
105	Petroglyphs	II	1,555	1976
106	Polar Bear	II	2,408,700	1970
107	Quetico	II	475,819	1950
108	Quetico Wilderness	II	475,819	1950
109	Rene Brunelle	II	2,964	1957
110	Restoule	II	1,200	1963
111	Rondeau	II	3,254	1894
112	Sable Islands	I	1,980	1985
113	Samuel De Champlain	II	2,550	1967
114	Sandbanks	II	1,509	1970
115	Sandbar Lake	II	5,083	1970
116	Sedgman Lake	I	5,710	1985
117	Sibley	II	24,435	1950
118	Silent Lake	II	1,450	1977
119	Silver Falls	II	3,261	1985
120	Slate Islands	II	6,570	1985
121	South Bay	II	1,525	1985
122	The Pinery	II	2,533	1957
123	The Shoals	II	10,644	1970
124	Wabakimi Wilderness	II	155,000	1983
125	Wakami Lake	II	8,806	1973
126	Wanapitei	II	2,700	1985
127	Wasaga Beach	II	1,545	1959
128	West Bay Nature Reserve	I	1,120	1985
129	White Lake	II	1,726	1963
130	Winisk River	II	173,530	1969
131	Winnange Lake	II	4,745	1985
132	Woodland Caribou Wilderness	II	450,000	1983
<i>Prince Edward Island</i>				
<i>Wildlife Management Area</i>				
1	Malpeque Bay River Wetlands Area	IV	24,440	1988
<i>Quebec</i>				
<i>Ecological Reserves</i>				
1	Lac-Malakisis	I	2,000	1978
2	Tantare	I	1,491	1978
<i>Wildlife Sanctuaries</i>				
3	Aiguebelle	IV	3,950	1945
4	Ashuapmushuan	IV	448,700	1946
5	Assinica	IV	888,500	1961
6	Baie Trinite	VIII	35,600	1974
7	Baldwin	IV	23,000	1974
8	Cap-chat	IV	12,100	1964
9	Chics-chocs	IV	112,600	1949
10	Duchénier	IV	27,000	1977
11	Duchesnay	VIII	8,800	1972
12	Duniere	IV	55,300	1972
13	Eastmain	VIII	434,400	1976
14	Fort George	VIII	1,816,600	1976
15	Fort Rupert	VIII	1,124,000	1976
16	Frontenac	IV	11,900	1978
17	Ile D'Anticosti	IV	511,400	1974
18	Iles Aux Grues, Dune, L'oignon, P.Cochon	VIII	2,500	1977
19	Intowin	VIII	8,800	1976



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
20	Kipawa	VIII	463,600	1950
21	La Verendrye	IV	1,361,000	1939
22	Lacs Albanel, Mistassini & Waconichi	IV	1,640,000	1953
23	Laurentides	IV	796,100	1895
24	Mastigouche	IV	161,900	1971
25	Matane	IV	128,400	1962
26	Mistassini	VIII	1,787,000	1953
27	Nemiscau	VIII	233,800	1976
28	Nouveau Comptoir	VIII	752,100	1976
29	Papineau Labelle	IV	166,700	1971
30	Parke	VIII	12,000	1961
31	Petite Nation	VIII	25,000	1934
32	Plaisance	IV	2,700	1978
33	Pointe-Taillon	VIII	7,500	1965
34	Port Daniel	IV	6,400	1953
35	Portneuf	IV	77,400	1968
36	Post De La Baleine	VIII	535,400	1976
37	Rimouski	IV	79,700	1958
38	Riviere Cascapedia	IV	2,000	1982
39	Riviere Matamec	VIII	103,600	1970
40	Riviere Matane	IV	1,400	1972
41	Riviere Matapedia	IV	1,000	1974
42	Riviere Petite Cascapedia	IV	1,700	1945
43	Riviere Port Daniel	IV	3,600	1948
44	Rouge-Mattawin	IV	163,500	1935
45	Saint Maurice	IV	78,200	1963
46	Sept Iles-port Cartier	IV	642,300	1965
47	Waswanipi	IV	847,000	1976
<i>Provincial Parks or Areas</i>				
48	Aiguebelle	II	24,170	1985
49	Bic	II	3,320	1984
50	Frontenac	II	15,200	1986
51	Gaspesie	II	80,200	1981
52	Grands Jardins	II	31,000	1981
53	Jacques Cartier	II	67,060	1981
54	Mount-Orford	II	5,837	1980
55	Mount-Tremblant	II	124,000	1981
56	Oka	II	2,370	1986
57	Parc Mont Ste Anne	VIII	6,600	1968
58	Paul Sauve	VIII	1,900	1962
59	Pointe-Taillon	II	9,220	1985
60	Saquenay	II	28,360	1983
61	Yamaska	II	1,289	1985
<i>Saskatchewan</i>				
<i>Protected Area</i>				
1	Wildcat Hill	IV	16,997	1971
<i>Provincial Parks or Areas</i>				
2	Big Buffalo Beach	II	3,650	
3	Bronson Forest	II	12,938	1974
4	Buffalo Pound	II	1,927	1963
5	Candle Lake	II	1,274	1986
6	Clearwater River	IV	224,035	1986
7	Cypress Hills	IV	18,410	1931
8	Danielson	II	2,914	1971

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
9	Douglas	IV	4,434	1973
10	Duck Mountain	IV	26,159	1931
11	Good Spirit Lake	IV	1,901	1931
12	Green-water Lake	IV	20,720	1932
13	Jan Lake	II	1,854	1976
14	Lac La Ronge	IV	344,470	1939
15	Meadow Lake	IV	156,967	1959
16	Moose Mountain	IV	40,060	1931
17	Nipawin	IV	53,613	1934
18	Saskatchewan Landing	IV	5,597	1973
19	Whiteswan Lake (Whelan Bay)	II	1,834	
20	Woody River	II	15,540	
<i>Yukon Territory</i>				
<i>Wildlife Sanctuaries</i>				
1	Kluane	IV	422,200	1943
2	Macarthur	IV	169,600	1958
<i>Game Preserve</i>				
3	Peel River	VIII	300,000	
<i>Territorial Parks or Areas</i>				
4	Fishing Branch River	VIII	384,000	1978
5	Herschel Island	IV	11,200	1989

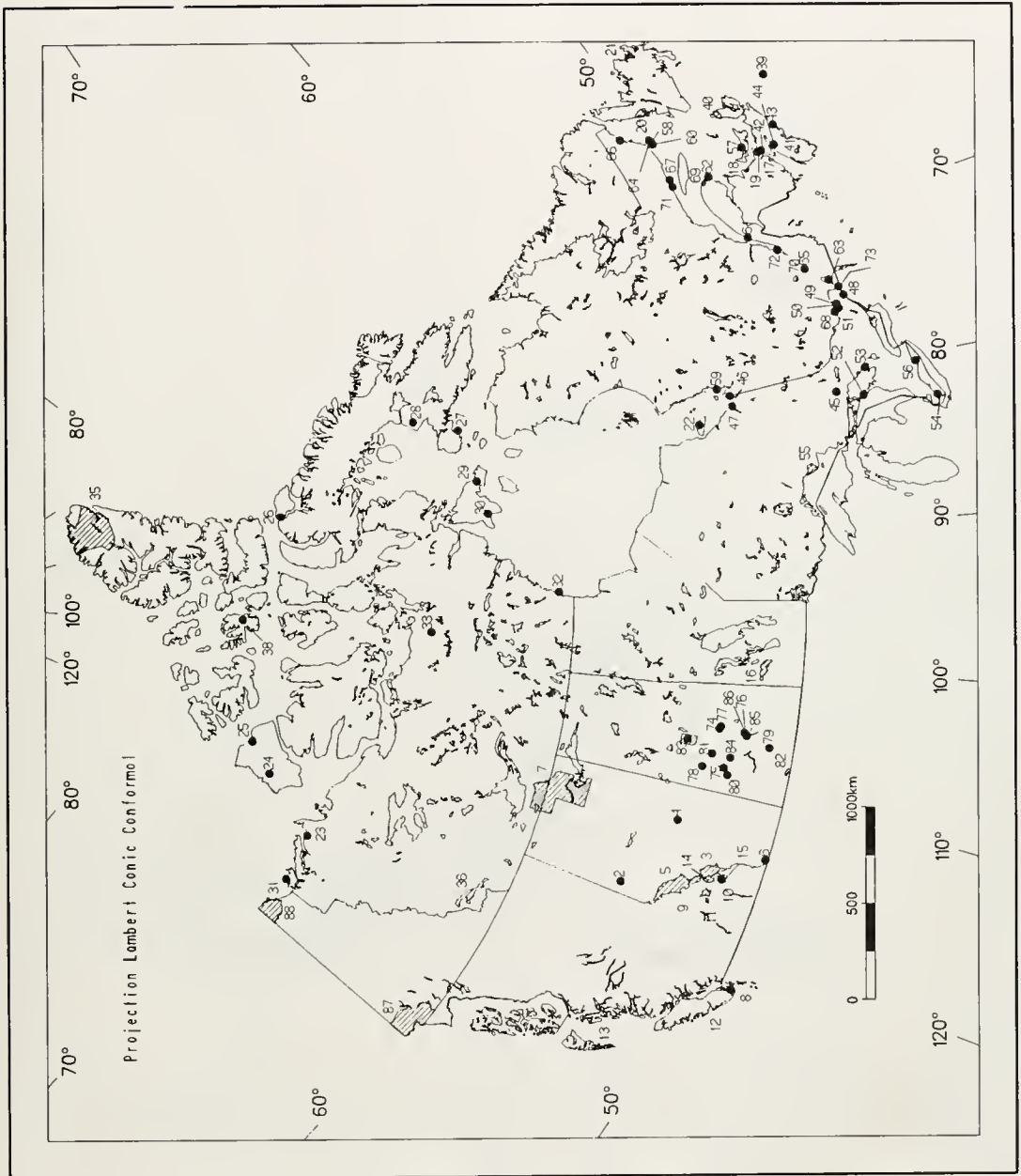
†The "nature reserve" category in Ontario actually refers to "nature reserve zones" which fall within the provincial parks. These are listed, however, as they are equivalent to the "ecological reserves" of other provinces in terms of protection afforded. The number and area of protected areas for Ontario is, therefore, inflated due to inclusion of this category.

Category headings are generic in some cases and may not be defined in legislation (Annex).

The database list for Canada was supplied by Environment Canada, dated September 1990. Upon receiving database lists from the various

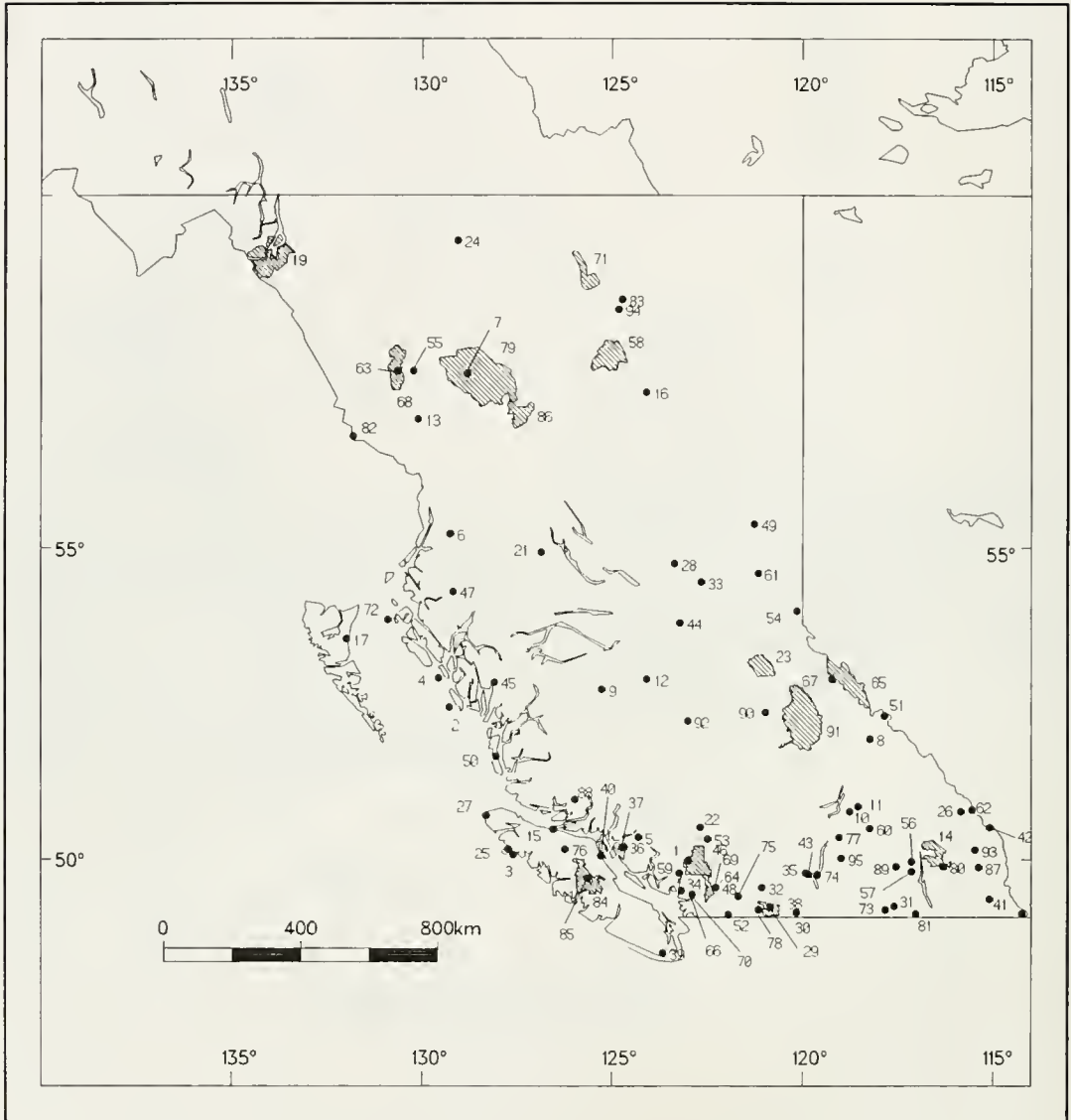
provincial/territorial administrations, the database record will be amended accordingly, and will be reflected in subsequent publications.

Map information (polygons and point sources) from the National Atlas Information Service (1992) is to be regarded as preliminary only. Locations and boundaries of protected areas are currently being verified by the National Atlas Information Service. When completed, a revised spatial dataset will replace the one used in this publication for subsequent work by WCMC.

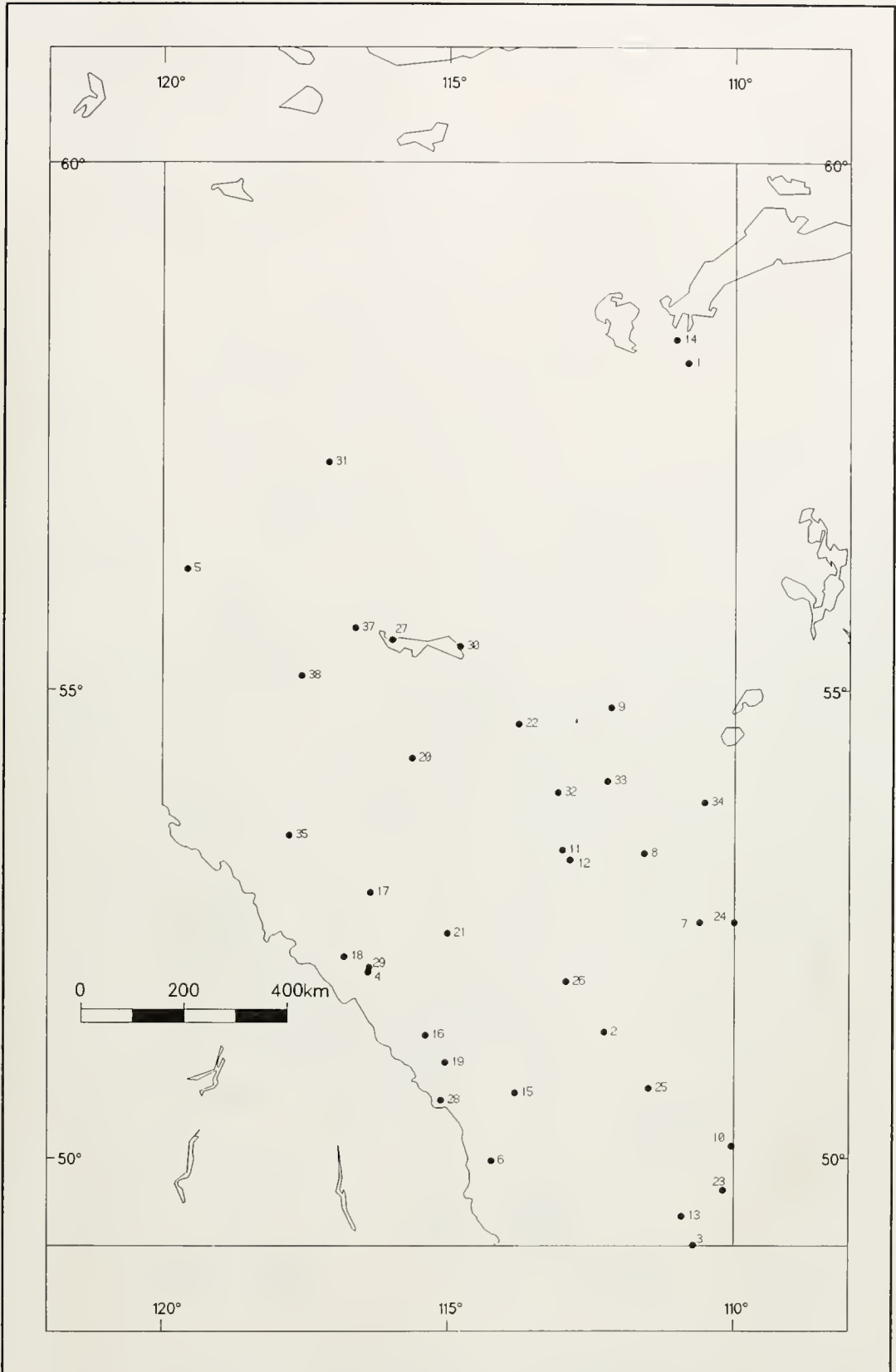


Federal Protected Areas - Canada

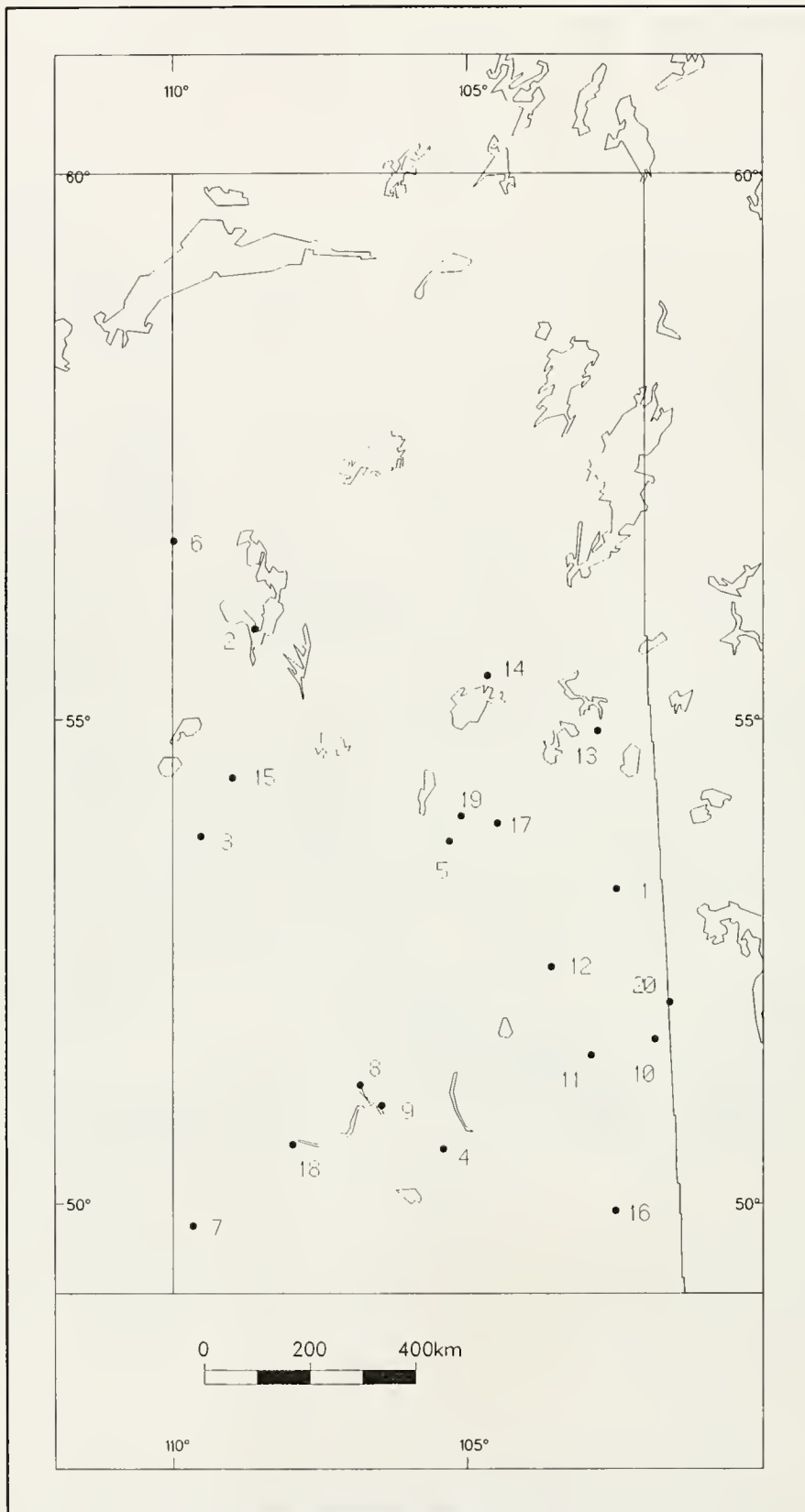




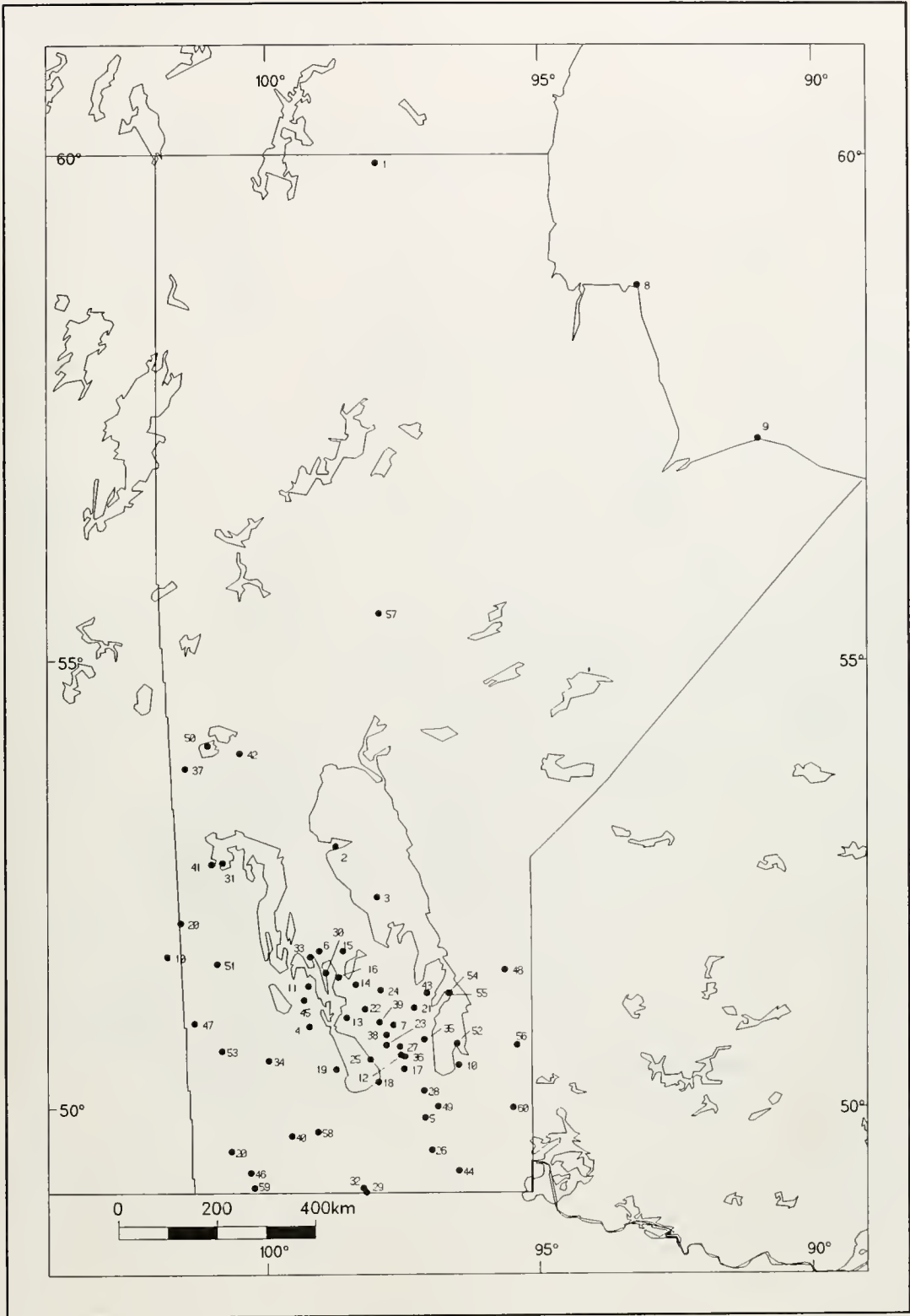
Provincial Protected Areas - British Columbia



Provincial Protected Areas - Alberta

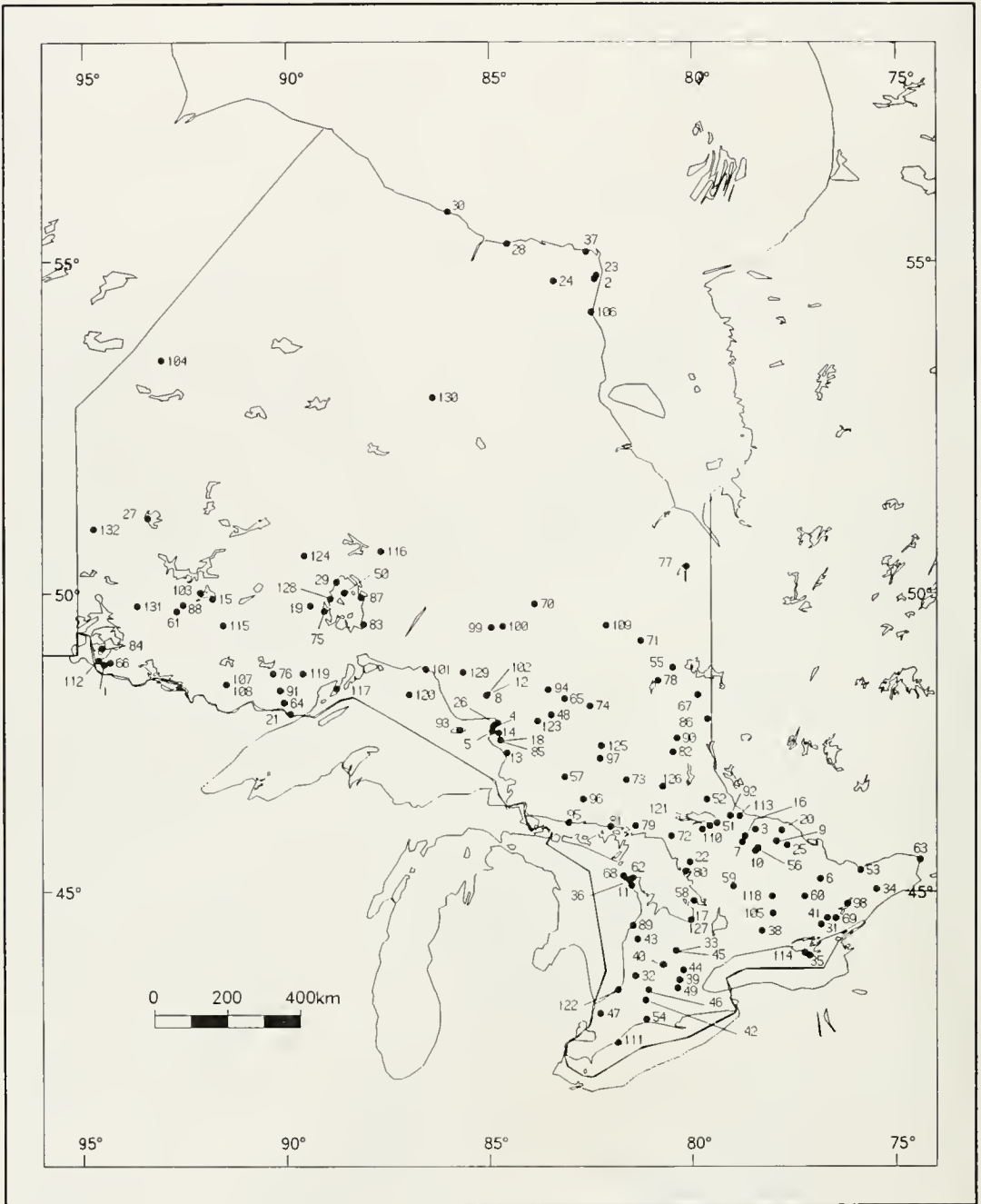


Provincial Protected Areas - Saskatchewan

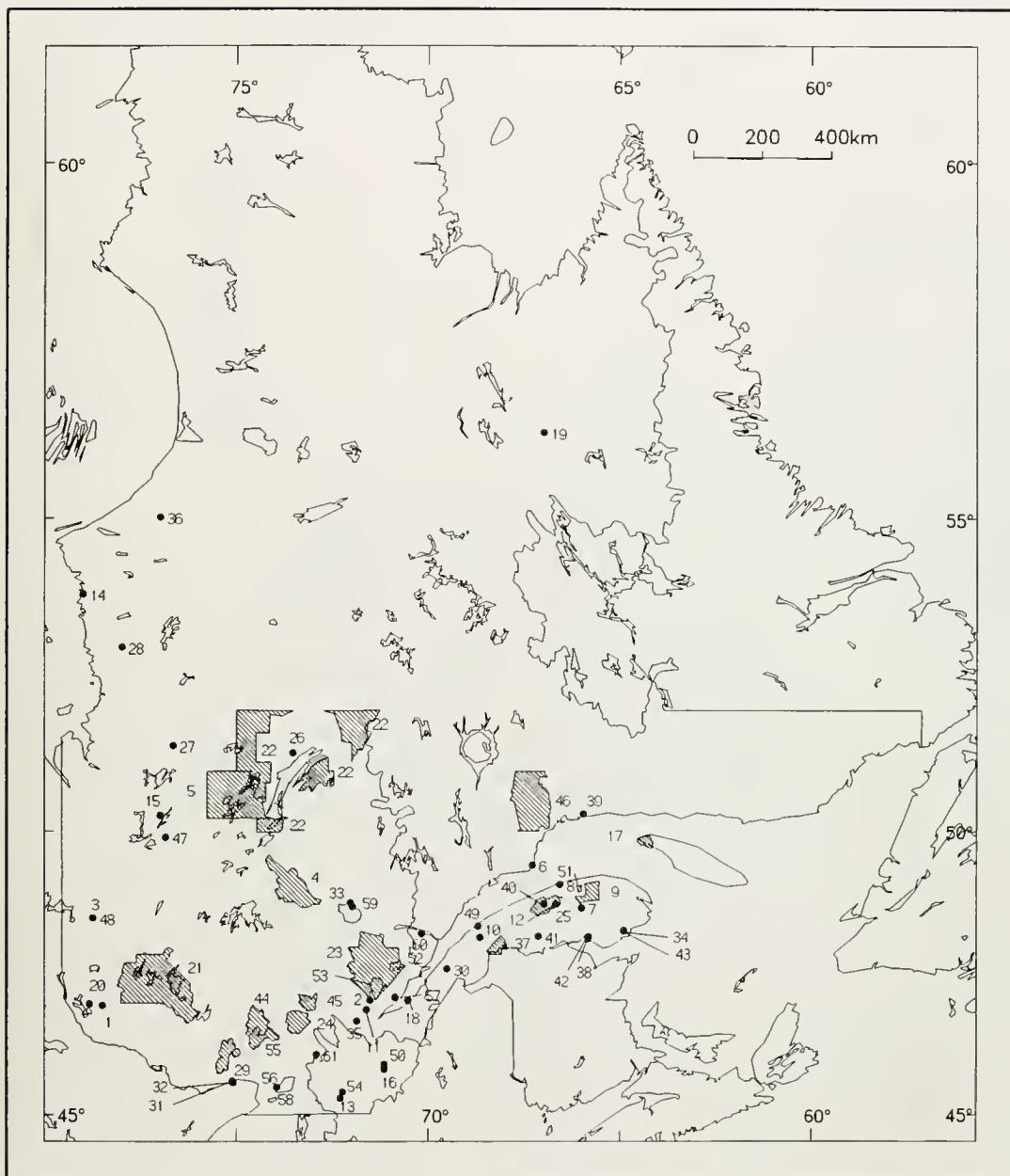


Provincial Protected Areas - Manitoba

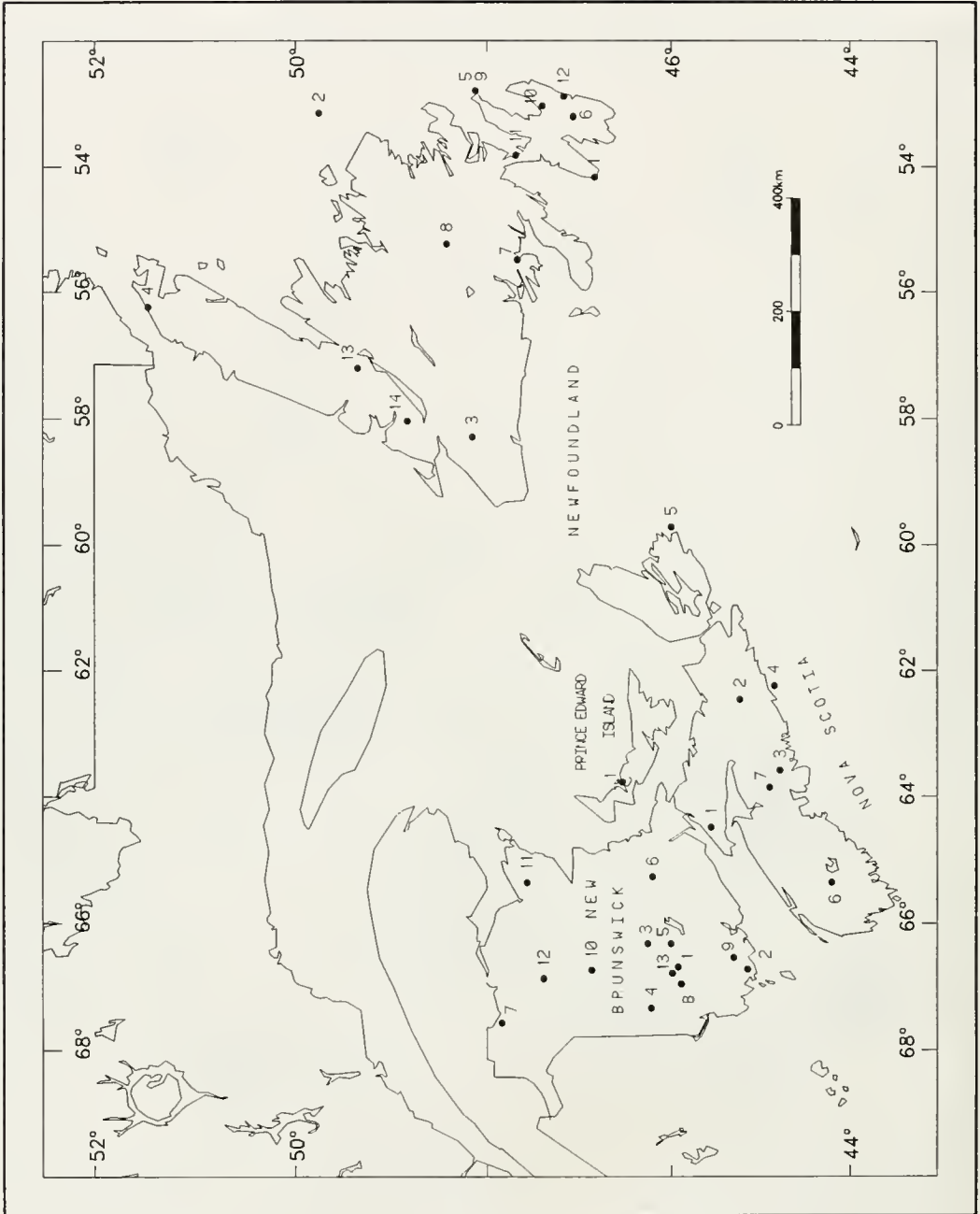




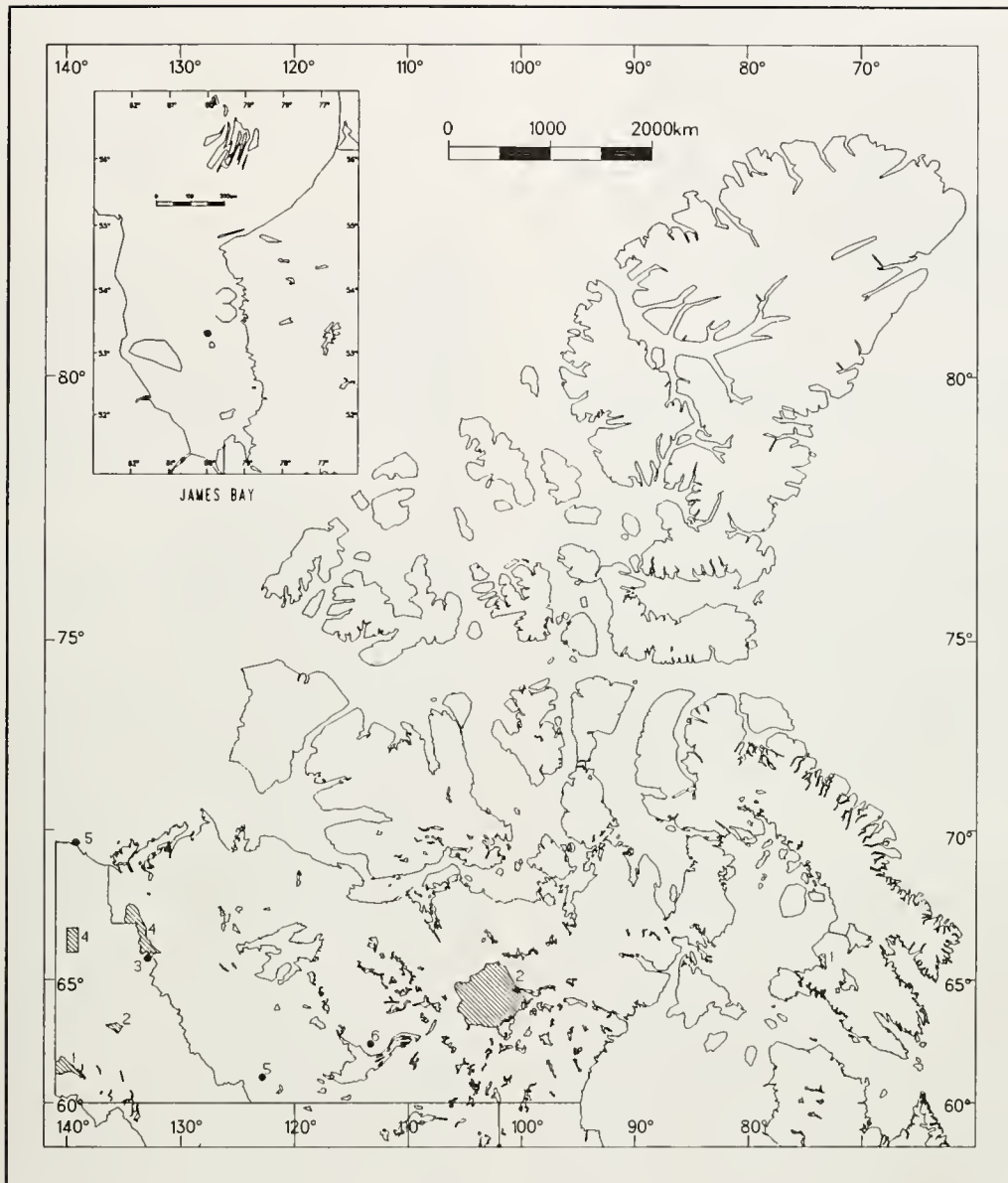
Provincial Protected Areas - Ontario



Provincial Protected Areas - Quebec



Provincial Protected Areas - Maritime Provinces



**Territorial Protected Areas - Northwest & Yukon Territories**





# GREENLAND (DENMARK)

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**Area** 2,175,600 sq. km

**Population** 55,558 (1990) (Hunter, 1991)

Natural increase: 1.3% per annum (1980) (estimate from Anon., 1984a)

## **Economic Indicators**

GDP: No information

GNP: No information

**Policy and Legislation** In 1979, Greenland acquired home rule; full internal self-government was established under the Greenland Home Rule Authorities (Gronlands Hjemmestrye). Prior to this, the highest political assembly was the Greenlandic Council, which had an advisory capacity under the Danish authorities, except in relation to hunting and fishing where the Council had legislative powers which were applied to pass certain hunting regulations (Meyer, 1987).

In 1962 the sub-Arctic valleys of south-west Greenland, with their unique and fragile "woods", were declared preserves by the Greenlandic Council (Meyer, 1987).

The Conservation (Nature and Ancient Relics) Act for Greenland was enacted on 25 May 1974 (Act No. 266). The chief purpose was "to safeguard and care for Greenland's natural scenic assets". It gave authority to protect plant and animal species, and also areas of land where preservation or scientific considerations merit this. Protected areas are established through executive orders within this Act. Thus, in 1974, the two major protected areas were first established, under two separate orders: Northeast Greenland National Park (the largest national park in the world, some 972,000 sq. km) and Melville Bay National Wildlife Reserve. These executive orders were maintained by the Home Rule Government in the Landsting Act No. 11 of 12 November 1980 on the preservation of natural amenities. This Act was later amended in the Landsting Act No. 15 of 9 November 1988, under which Northeast Greenland National Park was expanded in size. Some areas have been declared breeding reserves for birds, where certain restrictions operate only during a defined season (Anon., 1984b; Meyer, 1987). A ruling concerning the preservation of *in situ* relics and buildings, the Landsting Act No. 5, was passed by the home rule government on 16 October 1980.

There is no right to private ownership of land. All land uses requiring areas to be withdrawn from common usage require permission; this is granted by municipal authorities in built-up areas, and by home rule authorities elsewhere. Local authorities are empowered to designate their own protected areas, and to take their own conservation measures (Helms, 1991).

**International Activities** Denmark acceded to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 2 September 1977; Greenland was added to this Convention on 27 January 1988 and 11 sites covering 1,044,000ha have been listed, two of these within NorthEast Greenland National Park. NorthEast Greenland National Park was declared a biosphere reserve in 1977. Unlike mainland Denmark, Greenland is not covered by the World Heritage Convention. It is no longer part of the European Community, and therefore not covered by Community conservation regulations, although there have been some moves to rejoin for economic reasons.

**Administration and Management** Prior to 1980, protected areas administration was under the jurisdiction of the Danish authorities, but since this date it has been under the autonomous home rule government.

The Office of the Environment is responsible for the park system, and collaborates closely with the Danish Ministry of the Environment. The Natural Resources Office works on the Ramsar sites, amongst other things (Helms, 1991). Administration of NorthEast Greenland National Park is under the jurisdiction of the home rule Premier, who is advised by a National Park Board consisting of four members of the Greenland Assembly, four scientists and a chairman (Meyer, 1987; Fredskild, pers. comm., 1986). On the ground administration and management is carried out by the Danish military through their Sirius Sledge Patrol (Silis, 1990).

**Systems Reviews** Greenland is the world's largest island (excluding continental islands). Most of its land area is within the Arctic circle. Iceland lies some 300km off the eastern coast; Canada lies to the west, separated by the Davis Strait in the south and Baffin Bay further north. Ellesmere Island (Canada) in the north is only some 50km from Greenland, separated by the Nares Strait. Some 80% of total land area is covered by an ice-cap 2,500km long, 1,000km wide and up to 3km thick. An icefree zone of some 384,000 sq. km borders the coast. This zone is generally quite narrow, but broadens to 200 – 300km in some places, and is intersected by deep fjords which connect the inland ice with the sea. The country is also much influenced by sea ice. Polar basin ice permanently blocks the north and north-east coast, and pack ice often drifts down along the east coast. In summer this pack ice drifts southwards along the east coast, and passes around Kap Farvel and northwards along the west coast (Anon., n.d.; Grimmert and Jones, 1989).

The country is underlain by Precambrian bedrock, with younger rock overlying it in places. It is largely mountainous, but with some areas of more gentle relief in the coastal zone. The climate is largely low- to

high-Arctic, although in the extreme south some sheltered valleys may be considered subArctic. The northern high-Arctic areas have very low precipitation and short growing seasons; they are sparsely vegetated. Much of the low-Arctic is covered by dwarf-shrub heaths, dominated by 1m high *Salix*. In the sub-Arctic valleys *Betula* woods are found reaching a height of 2–4m. It is largely in marshy areas, along streams and around lakes that the vegetation is relatively luxuriant (Grimmett and Jones, 1989). A total of 497 species of vascular plants has been described, including 15 endemics (Böcher *et al.*, 1978).

Fishing is the principal industry. Subsistence hunting is also important. There is some sheep farming in South Greenland, also reindeer farming and haymaking in some areas. Mining for lead and zinc occurs, as well as oil and mineral exploration. Tourism has also begun to develop, although it is limited at present (Anon., 1983).

The protected areas system comprises Northeast Greenland National Park, Melville Bay Nature Reserve, several Ramsar protected areas along the west and east coasts, which cover 10,500 sq. km, and a huge mosaic of regulated coastal areas, each with its own rules depending on the season and the animal species occurring there (Helms, 1991).

Threats to wildlife, including that within some of the protected areas, may arise from excessive hunting (Grimmett and Jones, 1989). The expansion of sheep-farming is also cause for some concern (Meyer, 1987). Most of Greenland's Ramsar sites lie on the coast, such that any marine oil spills are potential hazards to the fragile ecological integrity and balance of these sites (Ministry of the Environment, 1990). A research programme has been carried out to establish the most effective cultivation measures in southern regions, and how to avoid erosion in these areas (Meyer, 1987). This programme involved the laying out of protected areas as "reference areas". It is suggested (Meyer, 1987) that the research project should create a basis for decisions regarding further regional preserves to safeguard natural assets and recreational use.

**Other Relevant Information** Greenland has been a Danish possession since 1380. It became an integral part of the Danish kingdom on 5 June 1953. A referendum in January 1979 led to home rule from 1 May 1979, followed by full internal self government in January 1981 (Paxton, 1989).

#### Addresses

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title:** No information

**Date:** 1962

**Brief description:** A declaration by the Greenlandic Council for the protection of the "woods" in the subArctic valleys of southwest Greenland.

**Administrative authority:** No information

**Designations:**

All dwellings and all cutting of trees are prohibited; sheep are not allowed to graze in these areas, and camping and hunting are restricted.

**Title:** Conservation (Nature and Ancient Reics) Act (Act No. 266) and Executive Orders formed within the framework of this Act, maintained by the Landsting Act No. 11 on the preservation of natural amenities, amended in the Landsting Act No. 15.

**Date:** 25 May 1974 (Act No. 266); 12 November 1980 (Landsting Act No. 11); 9 November 1988 (Landsting Act No. 15)

**Brief description:** General acts giving authority to protect plant and animal species as well as areas of land. Sites are nominated individually by executive orders within these acts.

**Administrative authority:** Greenland Home Rule Authorities

**Designations:**

Not applicable

**Title:** No information

**Date:** No information

**Brief description:** No information

**Administrative authority:** No information

**Designations:**

*Breeding reserve for birds* No trespassing or traffic is allowed within 500m between 1 June and 31 August.



## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>National Park</i> Greenland	II	97,200,000	1974
2	<i>Nature Reserve</i> Melville Bay	I	1,050,000	1977
	<i>Biosphere Reserve</i> Northeast Greenland National Park	IX	70,000,000	1977
	<i>Ramsar Wetlands</i>			
	Aqajarua-Sullorsuag	R	30,000	1988
	Eqalummiut Nunaat-Nassuttuup Nunaa	R	500,000	1988
	Heden	R	125,000	1988
	Hochstetter Forland	R	140,000	1988
	Ikkatoq	R	35,000	1988
	Kilen	R	30,000	1988
	Kitsissunnguit	R	16,000	1988
	Kuannersuit Kuussuat	R	4,500	1988
	Naternaq	R	150,000	1988
	Qinguata Marraa-Kuussuaq	R	6,000	1988
	Ydre Kitsissut	R	8,000	1988



Protected Areas of Greenland-Denmark



# UNITED MEXICAN STATES (MEXICO)

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**Area** 1,958,201 sq. km

**Population** 81,140,922 (1990)

Natural increase: 2.01% (1990)

## **Economic Indicators**

GDP: US\$ 1,686 per capita (1987)

GNP: US\$ 1,990 per capita (1989)

**Policy and Legislation** Mexico is a representative, democratic and federal republic, comprising 31 states and one federal district. Each state is autonomous in all internal affairs (Hunter, 1991).

In practice, nature conservation began during the Prehispanic era (before 1521). The most notable example is the Maya civilisation, which based its development on a balanced agricultural-forestry system, which involved the strict protection of numerous areas, and provided "rest" periods for exploited areas (Gómez-Pompa, 1987; Gómez-Pompa and Kaus, 1990). This early commitment to resource protection was also shown by Nezahualcōyotl, who planted forested areas in Chapultepec, Molino de las Flores, El Contador and others, and the botanical gardens and zoological parks established by the Emperor Moctezuma II in the 16th century (SEDUE, n.d.a; Vargas, 1984).

The Spanish conquest of Mexico destroyed or modified patterns of traditional resource use. Rapid demographic growth and intensive exploitation of many natural resources left only inaccessible areas, or those remaining under indigenous control, in their natural state (Alcérreca *et al.*, 1988).

Prior to the first Forestry Law of 1926, the declaration of national parks or reserves was carried out by virtue of presidential decrees for individual areas. By this means, the first protected area was created in 1876, the first forest reserve (*reserva forestal*) in 1898 and the first national park in 1917 (SEDUE, n.d.b). The first legal definition of a protected natural area appeared in the Forestry Law (1926), although this definition was rather ambiguous as it allowed the establishment of both forest and tourist areas.

A great increase in the number of protected areas was brought about by President Lázaro Cárdenas (1934-1940): under his presidency, 40 national parks and seven reserves (58% of the present day system) were created, and major improvements were made in administration (Alcérreca *et al.*, 1988; SEDUE, n.d.b; Vargas, 1984). The 1942 Forestry Law made more detailed provisions for the protection of national parks and their resources (Vargas, 1984). In addition, the Regulation of National and International Parks (*Reglamento de Parques Nacionales e Internacionales*) was approved in the same year (SEDUE, n.d.a.), and

provided the clearest concept on national parks so far (Vargas, 1984).

In 1944, further regulations to the 1942 Forestry Law were published, providing some measures for wildlife protection. The 1948 Forestry Law provided some control of forest exploitation. The Regulations of the 1948 Forestry Law were published in 1950. The Forestry Law and its Regulations also provided for the establishment of forestry protected zones. The Federal Hunting Law (*Ley Federal de Caza*), 1952 made provisions for the establishment of wild faunal refuges (Vargas, 1984). Between 1950-1980, a policy of creating "vedas forestales" (hunting reserves) was carried out. These were declared over large areas of the country, but the scheme was a failure and caused serious over-exploitation of resources and corruption (Vargas, 1990; E.J. Jardel, pers. comm., 1992).

The current Forestry Law was promulgated in 1960, and it provided for the establishment of national parks for public use within suitable forested areas by the Federal Executive (SEDUE, n.d.a). In 1973, the National Commission of Works in Natural Parks (*Comisión Nacional de Obras en Parques Naturales*) (CONOPAN) was created within the erstwhile Ministry of Public Works (*Secretaría de Obras Públicas*). CONOPAN promoted the unlegislated concept of "natural parks" (*parques naturales*) which caused increased confusion within the existing system (SEDUE, n.d.a). In 1976 CONOPAN was dissolved. Protected areas thrived again under the presidency of José Lopez Portillo (1976-1982): nine new national parks and 20 new reserves (*reservas*) were declared and administrative changes were made (SEDUE, n.d.b). In 1977 the first two national biosphere reserves, Michilía and Mapimí, were created (Alcérreca *et al.*, 1988), and a third, Montes Azules, was declared the following year (SEDUE, n.d.b).

The Ministry (Secretariat) for Urban Development and Ecology (*Secretaría de Desarrollo Urbano y Ecología*) (SEDUE) was created in 1982. Within the SEDUE, the Sub-secretariat for Ecology (*Subsecretaría de Ecología*) was created in 1983, and it established the national system of natural protected areas (*sistema nacional de áreas naturales protegidas*) (SINAP) in 1986 as part of the National Programme for Ecology. The SINAP is an instrument to ensure the preservation, rational use and value of the natural and cultural resources, determining their management and priorities (SEDUE, n.d.a).

Prior to the 1980s, national biosphere reserves were established by virtue of individual presidential decrees (Vargas, 1984). In addition, the Fisheries Ministry has established aquatic faunal refuges by virtue of the Fisheries Legislation, 1972 and 1986. Similarly, there are a few protected areas that have been established by



virtue of other laws, i.e. the Federal Hunting Law, the Fisheries Legislation, state decrees and other government agencies (Vargas, 1984). Experimental forestry plots (*campos experimentales forestales*) (CEFs) and experimental biological stations (*estaciones experimentales de biología*) (EEBs), administered by the SARH (Secretaría de Agricultura y Recursos Hidráulicos) and the UNAM (Universidad Nacional Autónoma de México), respectively, appeared around 1961. Although these two types of experimental areas were set up mainly for research, they provided some degree of protection (Vargas, 1984).

The current law governing protected areas is the 1988 General Law for Ecological Equilibrium and Environmental Protection (*Ley General del Equilibrio Ecológico y la Protección al Ambiente*) was finally promulgated in 1988 (see Annex). This regulates natural protected areas, makes legal provisions for SINAP, defining categories used and making provisions for wild and aquatic flora and fauna (SEDUE, 1989). It also provides for the decentralisation of environmental management to the federal agencies and municipalities, and includes an ecology code and guidelines for environmental impact assessment (FAO, n.d.). Another positive step appears to be the publication of the General Law for Ecological Equilibrium by 19 states (SEDUE, n.d.a).

Early legislation problems included limitations on the area of jurisdiction (Vargas, 1984). In addition, the concept of 'natural park', introduced by CONOPAN in 1973, caused considerable confusion, as these were established within legally existing areas such as the national parks of El Chico, Iztaccíhuatl-Popocatepetl, Cumbres de Ajusco, Lagunas de Montebello, Nevado de Toluca, and others (SEDUE, n.d.a).

In the past, the protected areas system has been unable to protect adequately the natural richness of the country due to lack of legislation and resources for management (Vargas, 1984; Alcérreca *et al.*, 1988; WCMC, 1988). This has been compounded by the fact that many of the existing decrees have not been carried out (SEDUE, n.d.a). Ambiguity over management arises because areas designated as national parks often remain in private ownership (Halfiter, 1992; Jardel *et al.*, 1992; G. Aguirre, pers. comm., 1992).

In 1992, the President reformed Mexico's Constitution and introduced important changes into the structure of federal government. The full extent of these changes is not yet known (Pérez-Gil and Jaramillo, 1992).

**International Activities** Mexico signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940, and ratified it subsequently. Mexico became a signatory to the

Convention concerning the World Cultural and Natural Heritage (World Heritage Convention) in 1984 and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) in 1986. Mexico participates in the Unesco Man and the Biosphere Programme and has six internationally recognised biosphere reserves. It is also a signatory to the Convention on the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) (IUCN, 1985). Mexico signed this Convention and the related Protocol concerning the Cooperation in Combatting Oils Spills in the Wider Caribbean Region on 24 March 1983. It ratified both these agreements on 9 April 1985. The second Protocol concerning Specially Protected Areas and Wildlife (SPAW) was signed in June 1991.

Mexico, through SEDUE, participates in the FAO Latin American Network Programme (*Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres*).

**Administration and Management** Up until 1976, protected area management was the responsibility of various bodies within the forestry sector. In 1901, the Central Board for Forests and Woods (*Junta Central de Bosques y Arbolados*) was created through a Presidential Decree as the first body responsible for protected areas (Vargas, 1984). Until 1910, natural areas were the responsibility of the Central Board of Forest and Woods; from 1910 to 1912 they were covered by the Forest Department (*Departamento de Bosques*) (SEDUE, n.d.a). From 1914 to 1920 they were the responsibility of the Department of Forests, Hunting and Fishing (*Departamento de Bosques, Caza y Pesca*), and from 1932 to 1934 this responsibility was placed on the General Directorate of Forestry, Hunting and Fishing (*Dirección General Forestal y de Caza y Pesca*) (Vargas, pers. comm., 1992). Between 1934 and 1939, with the creation of a large number of new protected areas, special institutes were created for the administration of these areas. The first was the Forests and National Parks Office (*Oficina de Bosques y Parques Nacionales*) as part of the Autonomous Department of Forestry (*Departamento Autónomo Forestal*). The Office was then raised to the status of a department, the Department of National and International Parks (*Departamento de Parques Nacionales e Internacionales*), within the *Dirección General Forestal y de Caza*, a part of the Secretariat for Agriculture and Public Works (*Secretaría de Agricultura y Fomento*) (SAF). Between 1940 and 1951, the Department of Reserves and National Parks (*Departamento de Reservas y Parques Nacionales*) dealt with protected areas within the General Directorate of Forestry and Hunting of the SAF. There were a great number of changes between 1951 and 1972 and the responsibility for protected areas was shifted between numerous government departments. The short-lived National Commission of Works in Natural Parks (*Comisión Nacional de Obras en Parques Naturales*) (CONOPAN) was created in 1973, but dissolved three

years later due to its incompatibility with existing administrative bodies.

From 1976 to 1982, five government agencies were responsible for protected area management: the Ministry of Agriculture and Water Resources (Secretaría de Recursos Hídricos), the Ministry of Human Settlements and Public Works (Secretaría de Asentamientos Humanos y Obras Públicas), the Government of the Federal District (Gobernación del Distrito Federal), the Ministry of Tourism (Secretaría de Turismo) and the Ministry of Fisheries (Secretaría de Pesca) (Pérez-Gil and Jaramillo, 1992).

The Ministry for Urban Development and Ecology (Secretaría de Desarrollo Urbano y Ecología) (SEDUE) was created in 1982. Within SEDUE, the Subsecretariat of Ecology was responsible for protected areas through the General Directorate for Ecological Conservation of Natural Resources (Dirección General de Conservación Ecológica de los Recursos Naturales) (DGCERN), created in 1985. DGCERN was formed by the amalgamation of the former General Directorate of Reserves and Ecological Protected Areas (Dirección General de Parques, Reservas y Areas Ecológicas Protegidas) (DGPRAP) was established and the General Directorate for Wild Flora and Fauna (Dirección General de Flora y Fauna Silvestres) (Alcérreca *et al.*, 1988). The administration of protected areas was the responsibility of SEDUE, although this responsibility could also be delegated to states and municipalities by SEDUE (SEDUE, n.d.a). Management may also be contracted to NGOs in certain cases (L. González, pers. comm., 1992).

In May 1992, SEDUE was dissolved and its functions taken over by the new Ministry for Social Development (SEDESOL) (Pérez-Gil and Jaramillo, 1992). Further information is not currently available.

**Systems Reviews** Mexico is the third largest country in Latin America after Brazil and Argentina. It is bounded in the north by the USA, west and south by the Pacific Ocean, south-east by Guatemala, Belize and the Caribbean Sea, and north-east by the Gulf of Mexico. It is mainly mountainous, with less than 35% of its surface area below 500m, and more than half above 1,000m (WCMC, 1988). Volcanic activity is considerable and has formed much of the topography.

The Sierra Madre Occidental is the main mountain chain (1,400km) running parallel to the Pacific coast. The Sierra Madre Oriental (600km) runs north-west to south-east down the Atlantic coast. Between these two cordilleras is the Altiplanicie Mexicana, a plateau at an altitude of 3,000m. The Baja California mountain system is continuous with the Sierra Nevada in N. California; being almost completely surrounded by sea, its biological characteristics, like those of the Yucatan Peninsula, resemble those of an island. The 950km Eje Neovolcánico runs east to west and includes Mexico's highest peak, Pico de Orizaba (5,675m). South of this is

the 1,100km Sierra Madre del Sur. The south-east mountain system runs from Chiapas, and is contiguous with the Central American mountain chain (Rzedowski, 1978; G. Aguirre, pers. comm., 1992).

The coastline extends for nearly 10,000km, 6,760km on the Pacific and 2,900km on the Atlantic. There are an important number of islands on both the Pacific and the Atlantic sides of the country, as well as varied and important marine and coastal habitats such as coral reefs, mangroves and estuaries. The Usumacinta Delta (11,000 sq. km) on the Atlantic coast is considered one of the most important wetlands in North America (Duever and Sprunt, 1978). There are two main river basins, the Gulf and the Pacific, with some enclosed basins in the interior of the country.

Mexico ranks fourth in the world after Indonesia, Brazil and Colombia in terms of biodiversity (Toledo, 1988). It is also among the top ten countries in the world for the number of restricted-range bird species and endemic bird areas it supports (ICBP, 1992). It has the highest diversity of reptiles in the world, the second greatest mammal diversity and holds 8.7% of the world's amphibian species, 11% of reptile, bird and mammal species and 14% of fish species. Furthermore, 32% of Mexico's terrestrial vertebrates and 40-50% of her plant species are endemic (Alcérreca *et al.*, 1988; Flores-Villela and Gerez, 1988). This biological richness results from great habitat variation and diverse ecological regions, complex topography, climate, geology and geographical location. Ecosystems range from deserts to rain forests and mangrove swamps. In addition, Mexico, like Indonesia, bridges two major biogeographic realms, the Nearctic and the Neotropical, which provide exchanges between elements of northern temperate and tropical origins (Rzedowski, 1978). Reviews of Mexico's terrestrial biodiversity have been undertaken by Toledo (1988), Flores-Villela and Gerez (1988) and WCMC (1988).

Mexico has tropical and subtropical zones, which, together with the complexity of its terrain, result in a great variety of climates. The Atlantic region is wetter than the north-west. Alpine climate is found in mountains higher than 4,000m.

Vegetation can be divided into three approximately equal areas: the tropical/subtropical, temperate and semi-arid/arid. The tropical/subtropical region includes tropical rain forests originally covering 6% of the country, but half of which has been destroyed. The vegetation of the temperate region occupies the main cordilleras and about 15% of the country; the principal forest consists of a wide diversity of pines *Pinus* spp. and oaks *Quercus* spp.; 80% of plants found in the pine forests are endemic (Rzedowski, 1978). In addition, pine forests supply 80% of national timber production (E. Jardel, pers. comm., 1992). In the higher parts of the cordilleras, to 3,300m, forests of silver fir *Abies* spp. occur. The semi-arid/arid zone is found mainly in the north and centre (Sonoran and Chihuahuan deserts and



central altiplano) and includes mostly open shrubland (matorral), cacti and xerophytic monocotyledons (Davis *et al.*, 1986).

Until recently, the majority of existing protected areas have represented temperate ecosystems. The SINAP intended to include areas representative of all the ecosystems found in the country (SEDUE, n.d.a). However, at present national biosphere reserves are the only protected areas to have been selected using biological criteria; they are also the only ones which fulfil the minimum management requirements for conservation (E. Jardel, pers. comm., 1992). In terms of biological diversity, ecological value and vulnerability, conservation priorities are: montane broad-leaved forest, mangroves and coastal wetlands, moist tropical forest, dry tropical forest and arid zones (E. Jardel, pers. comm., 1992).

There appear to be discrepancies in the definitions and number of established protected areas. According to Vargas (1984 and pers. comm., 1992), at present there are 15 legally defined categories. Flores Villela and Geréz (1988) also reported the same number, although the categories differ, while Alcérreca *et al.* (1988) suggest that the number is as high as 26. The SINAP's current categories only include nine definitions (SEDUE, n.d.a.). By 1969 there was a total of 40 protected areas covering 795,760ha, of which 34 were national parks (649,778ha) and six were special biosphere reserves (145,982ha) (SEDUE, n.d.a). However, Vargas (1984 and pers. comm., 1992) reports 46 national parks only for the same period. By 1992 the total number of protected areas administered by SEDUE had increased to 68 (SEDUE, n.d.a). Although 20% of national territory is protected, these protected areas have not functioned in practice (Jardel, 1990). In view of this, biosphere reserves are the ideal type of protected area as they adapt well to socioeconomic conditions (Halffter, 1984; 1991; Jardel *et al.*, 1992).

Some of the problems facing protected areas include: lack of clear objectives, scientific research and management plans, appropriate legal support, and management resources; irregularities in land tenure and pressure from settlements in and around protected areas; and lack of public awareness (Alcérreca *et al.*, 1988; SEDUE, n.d.a). By the early 1980s, property rights had been left undefined in 60% of national parks (Vargas, 1984). The majority of protected areas have been established on communal land or *ejidales*. This has led to conflicts between nature conservation and local utilisation (Jardel, 1990). The legal situation is further complicated when the limits of protected areas are confused or erroneous, as is frequently the case in existing decrees (Alcérreca *et al.*, 1988). The following are the principal threats: deforestation, poaching, rubbish dumping, plant poaching, mineral exploitation, over-grazing and erosion. Activities, like the expansion of agriculture have resulted in loss of soil, exhaustion of watercourses and pollution (Alcérreca *et al.*, 1988; SEDUE, n.d.a). More detailed analyses of the problems

relating to protected areas are made by Vargas (1984) and Alcérreca *et al.* (1988). For example, in 1970 it was reported that 69.1% of the national parks had human settlements, containing 73,715 people (Vargas, 1984). Thirty-three parks were overgrazed by livestock, hunting occurred in 31 parks, and deforestation and/or tree-cutting occurred in 30 (Vargas, 1984).

#### Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** *Ley General del Equilibrio Ecológico y la Protección al Ambiente (General Law for Ecological Equilibrium and Environmental Protection)*

**Date:** 1 March 1988

**Brief description:** The backbone of ecological regulation in the country and is an integrated approach to the ecology issue and the commitment to tackle the related problems through the combined efforts of the state and society. The first seven categories are federal while the remaining two are of local interest.

**Administrative authority:** Secretaría de Desarrollo Urbano y Ecología (SEDUE)

**Designations:**

*Reserva de la Biósfera (Biosphere Reserve)*

Area no less than 10,000ha containing relevant biogeographic representative areas at the national level, of one or more ecosystems not significantly altered by human action, with at least a pristine area inhabited by endemic, threatened or endangered species.

*Reserva Especial de la Biósfera (Special Biosphere Reserve)*

Representative area of one or more ecosystems not significantly altered by man, inhabited by endemic, threatened or endangered species. Their smaller size and ecosystems are the main differences with the above.

*Parque Nacional (National Park)*

Biogeographic representative area at a national level of one or more ecosystems which are significant as a result of their scenic beauty, their scientific, educational, recreational or historic value, their nationally important flora and fauna and their suitability for tourist development.

*Monumento Natural (Natural Monument)*

Area with one or more natural elements of national importance, consisting of natural places and objects that due to their unique or exceptional character, aesthetic interest, historic and scientific value are incorporated into a system of absolute protection.

*Parque Marino Nacional (Marine National Park)*

Marine areas, beaches and federal maritime-terrestrial neighbouring areas, dedicated to the preservation of the aquatic ecosystems and elements, ecological research and the rational use of their resources under specific norms of ecological protection.

*Area de Protección de Recursos Naturales (Natural Resource Protection Area)* Areas destined to preserve and restore forested areas and to the conservation of the soil and water. The following areas are further found within this category: (a) forest reserve, (b) national forest reserve, (c) protective forest area, (d) area of forest restoration and propagation and (e) protection area for rivers, springs, deposits and in general, sources for urban water replenishment.

*Area de Protección de Flora y Fauna Silvestre y Acuática (Wild and Aquatic Flora and Fauna Protection Area)* Areas containing crucial habitats for the existence, transformation and development of species of wild and aquatic flora and fauna.

*Parque Urbano (Urban Park)* Areas for public use with natural, artificial ecosystems or nature elements dedicated to protect a healthy environment for recreation of the population and for the protection of artistic and historical values and natural beauty of regional or local significance.

*Zona Sujeta a Conservación Ecológica (Ecological Conservation Zone)*

Areas with one or more ecosystems in good conservation state, destined to preserve natural elements indispensable for ecological equilibrium and general welfare. Urban parks and areas subject to ecological conservation are the responsibility of state governments and municipalities.

**Source:** SEDUE (1989)

**Title:** *Regulation of National and International Parks (Reglamento de Parques Nacionales e Internacionales)*

**Date:** Promulgated 15 April 1942; published 29 May 1942

**Brief description:** Provides the clearest national parks concept in the Mexican park legislation

**Administrative authority:** Federal government

**Designations:**

*Parque Nacional (National Park)* Areas destined to ensure the protection of natural scenic beauties and flora and fauna of national importance, which the public may better enjoy by being placed under official surveillance.

**Source:** Original legislation

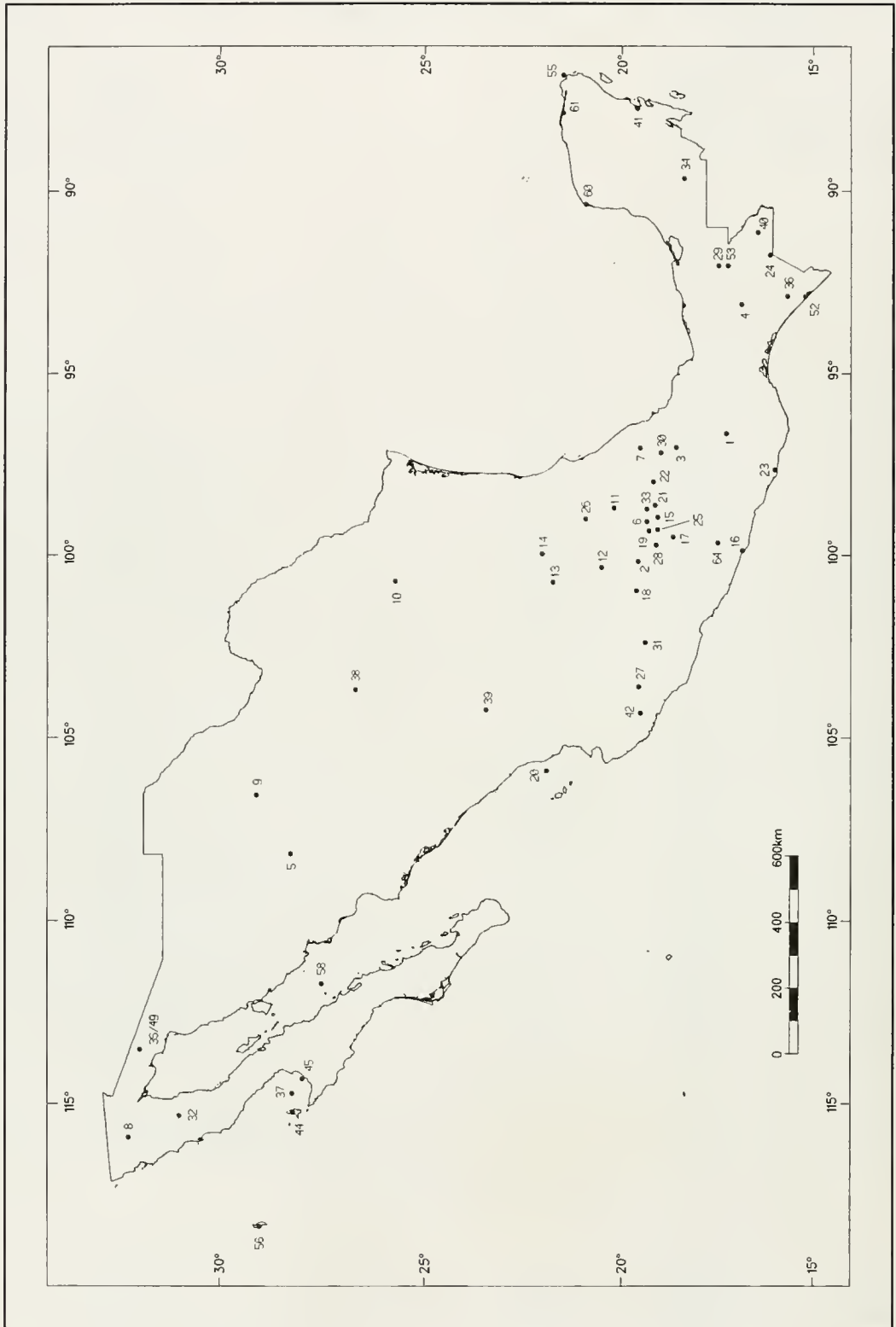
## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Benito Juárez	II	2,737	1937
2	Bosencheve	II	15,000	1940
3	Cañón del Río Blanco	II	55,900	1938
4	Cañón del Sumidero	II	21,789	1980
5	Cascada de Bassaseachic	II	6,263	1981
6	Cerro de la Estrella	II	1,100	1938
7	Cofre de Perote	II	11,700	1937
8	Constitución de 1857	II	5,009	1962
9	Cumbres de Majalca	II	4,772	1939
10	Cumbres de Monterrey	II	246,500	1939
11	El Chico	II	2,739	1982
12	El Cimatarío	II	2,447	1982
13	El Gogorrón	II	25,000	1936
14	El Potosí	II	2,000	1936
15	El Tepozteco	II	24,000	1937
16	El Veladero	II	3,159	1980
17	Grutas de Cacahuamilpa	III	1,600	1936
18	Insurgente José María Morelos y Pavón	II	4,324	1939
19	Insurgente Miguel Hidalgo y Costilla	II	1,760	1936
20	Isla Isabela	II	194	1980
21	Iztaccihuatl-Popocatepetl	II	25,679	1935
22	La Malinche	II	45,711	1938
23	Lagunas de Chacahua	II	14,187	1937
24	Lagunas de Montebello	II	6,022	1959
25	Lagunas de Zempoala	II	4,669	1936
26	Los Mármoles	II	23,150	1936
27	Nevado de Colima	II	22,200	1936
28	Nevado de Toluca	II	51,000	1936
29	Palenque	V	1,772	1981
30	Pico de Orizaba	II	19,750	1937
31	Pico de Tancitaro	II	29,316	1940
32	Sierra de San Pedro Mártir	II	63,000	1947
33	Zoquiapán y Anexas	II	19,418	1937
<i>Biosphere Reserves (National)</i>				
34	Calakmul	V	723,185	1989
35	El Pinacate	V	480,956	
36	El Triunfo	I	119,177	1972
37	El Vizcaíno	V	2,546,790	1988
38	Mapimí	V	103,000	1977
39	Michilía	V	42,000	1977
40	Montes Azules	II	331,200	1978
41	Sian Ka'an	II	528,147	1986
42	Sierra de Manantlán	V	139,577	1987
<i>Marine Reserve</i>				
43	La Blanquilla	IV	66,868	1975
<i>Faunal Reserve</i>				
44	Isla Cedros	I	1,000	1978
<i>Cetacean Sanctuary</i>				
45	Isla de Guerrero Negro	I	40,000	1979

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Refuges</i>			
46	La Mojonera	IV	9,201	1981
47	La Primavera	IV	30,500	1980
48	Sierra de Alvarez	IV	16,900	1981
49	Sierra del Pinacate	IV	28,660	1979
50	Valle de los Cirios	IV	3,500,000	1980
	<i>Natural Monument</i>			
51	Cerro de la Silla	I	6,045	1991
	<i>Natural and Typical Biotope</i>			
52	La Encrucijada	IV	30,000	1972
	<i>Special Biosphere Reserves</i>			
53	Cascadas de Agua Azul	III	2,580	1980
54	El Ocote	IV	48,140	1982
55	Isla Contoy	I	176	1961
56	Isla Guadalupe	I	25,000	1922
57	Isla Tiburón	VII	120,800	1963
58	Islas del Golfo de California	I	150,000	1978
59	Mariposa Monarca	I	16,100	1980
60	Ría Celestún	IV	59,130	1979
61	Ría Lagartos	IV	47,840	1979
62	Sierra de Santa Martha	VII	20,000	1980
63	Volcán de San Martín	VII	1,500	1979
	<i>Park</i>			
64	Omitemi	II	3,600	
	<i>Forest Reserves</i>			
65	Bavispe	VIII	198,164	1939
66	Campo Verde	VIII	78,792	1938
67	Centenario	VIII	3,000	1949
68	El Gavilán	VIII	9,682	1923
69	Mesa del Pitorreal	VIII	4,900	1923
70	Papigochic	VIII	172,480	1939
71	Porción Boscosa de San Luís Potosí	VIII	29,885	1923
72	San José de los Molinos	VIII	2,995	1942
73	Sierra de Juarez	VIII	140,000	1951
74	Sierra de Los Ajos, Buenos Aires y Purica	VIII	21,494	1936
75	Sierra de Pedro Mártir	VIII	74,000	1951
76	Sierras de Hansen y San Pedro Mártir, y Mesa Pinal	VIII	1,249,000	1923
77	Tequixquipan	VIII	32,000	1935
78	Terenos de Puebla y México	VIII	18,215	1926
79	Tutuaca	VIII	364,952	1937
	<i>Protection Area for Wild Flora and Fauna</i>			
80	Corredor Biológico Chichinautzin	IV	37,302	1988
	<i>Biosphere Reserves</i>			
	El Cielo	IX	144,530	1986
	Montes Azules	IX	331,200	1979
	Reserva de Mapimí	IX	103,000	1977
	Reserva de la Michilía	IX	42,000	1977
	Sian Ka'an	IX	523,147	1986
	Sierra de Manantlán	IX	139,577	1988

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Ramsar Wetlands</i> Ría Lagartos, Yucatán	R	47,480	1986
	<i>World Heritage Site</i> Sian Ka'an	X	528,000	1987





Protected Areas of Mexico

# ST PIERRE AND MIQUELON (FRANCE)

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**Area** 242 sq. km (SaintPierre group: 26 sq. km; MiquelonLanglade group: 216 sq. km)

**Population** 6,392 (1990)  
Natural increase: No information

**Economic Indicators**  
GDP: No information  
GNP: No information

**Policy and Legislation** The eight islands of the St Pierre and Miquelon archipelago were first settled from France in the 17th century they were ceded by Britain to France in 1776. They remained French territory from 1816 to 1976 and an overseas department until 1985. In June 1985 they were reformed as a collectivité territoriale, with intermediate status between overseas department and overseas territory (Hunter, 1991).

As a dependency, the islands adhere to the policy and legislation of France (Frean, 1991; Hunter, 1991), and are administered by a General Council, which is represented in the National Assembly in Paris. The French government is represented on the islands by a Commissioner.

The Constitution of the Fifth Republic, superseding that of 1946, came into force on 4 October 1958. It has 92 articles and gave rise to the current conservation legislation. The general framework for establishing protected areas in France and its dependencies is provided by the Law Relating to the Creation of National Parks No. 60.708 of 22 July 1960 and the Nature Conservation Act No. 76 629 of 10 July 1976, which includes provision for the general framework for defining, designating and establishing nature reserves (réserves naturelles). No information is available concerning protected areas in St Pierre and Miquelon.

**International Activities** No international sites have been designated in the islands, although France itself is a signatory to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (1 October 1986) and the Convention concerning the World Natural and Cultural Heritage (World Heritage Convention) (27 June 1975), and is also a participant in the Unesco Man and the Biosphere Programme.

France has not signed a number of important regional treaties in North America, most notably the Migratory Birds Convention which was signed between Canada and the USA in 1917 and the North American Waterfowl Management Plan (NAWMP): a joint project involving Mexico, the USA and Canada.

**Administration and Management** As a collectivité territoriale, authority is vested in the Commissioner. The

ordinary budget for 1989 was balanced at FF 87.4 million.

Administrative responsibility for nature conservation throughout France lies with the Ministry of the Environment (Ministère de l'Environnement), which was established in 1971. Bodies involved in the central organisation within France include the Agency for the Quality of Life (Délégation à la qualité de la vie), the Directorate for Water and the Prevention of Pollution Risks (Direction de l'eau et de la prévention des pollutions et des risques), the Directorate for Nature Conservation (Direction de la protection de la nature), and the High Committee for the Environment (Haut Comité de l'Environnement). There are several semi-autonomous bodies which fall under the supervision of the Ministry of the Environment; these include the National Hunting Office (Office national de la chasse), the Higher Council for Fishing (Conseil supérieur de la pêche), the National Parks and the Coastal and Lakeshore Conservancy (Conservatoire de l'espace littoral et des rivages lacustres) (CERL).

The Higher Council for Fishing has had some involvement in negotiations with the government of Canada and the province of Newfoundland over fishing rights for the islands (Frean, 1991).

**Systems Reviews** The eight islands of the Archipelago lie in the northwest Atlantic, some 20km off the south coast of Newfoundland, west of the Burin Peninsula. Much of the area of the islands is rocky, while ponds, swamps and marshes cover over half of the total area. Most of the land area is treeless; however, some of the valleys are wooded. Agriculture is not a major feature of the landscape, although some vegetables and livestock are kept for local consumption (Davis *et al.*, 1986; Hunter, 1991).

There are 391 native species and 96 introduced species of vascular plants (Davis *et al.*, 1986).

Fisheries provide the economical mainstay of the islands, although fish stocks are now severely depleted due to overfishing (Horsfield, 1990). The islanders claim a 200mile fishing zone to the south and east of the islands. This fishing zone is the source of a major dispute with the Canadians, who blame the islanders for overfishing in the area (Frean, 1991; Hunter, 1991).

**Other Relevant Information** For further information relating to national French policy, administration and management, see the relevant section in Volume 2. In 1989 there were 14,100 visitors to the islands.

**Addresses**

Commissioner, Collectivité Territoriale, St Pierre,  
Saint Pierre et Miquelon, France

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# UNITED STATES OF AMERICA

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Area 9,372,614 sq. km

Population 249,224,000 (1989)

Natural increase: 0.72% per annum

## Economic Indicators

GDP: US\$19,049 per capita (1989)

GNP: US\$21,100 per capita (1989)

**Policy and Legislation** The Declaration of Independence of the American colonies from Great Britain was adopted by Congress on 4 July 1776 and the Treaty of Peace ratified on 14 January 1784. The Constitution dates from 17 September 1787, and by this the national government is divided into executive, legislative and judicial coordinated branches. Under Article I Section 1 all legislative powers are vested in the Congress of the United States (US). The US is a federal nation, comprising 48 coterminous states, as well as the disjunct states of Alaska and Hawaii. Each of these 50 states has its own Constitution and legislation. Overseas, the Commonwealth of Puerto Rico, American Samoa, Guam and the Virgin Islands each has a local legislature, the acts of which may be modified or annulled by Congress. For detailed information concerning Puerto Rico and the US Virgin Islands see the relevant sections in this volume. For information relating to Hawaii, American Samoa and Guam see the relevant sections of Volume 1.

In North America the protected area systems are large and complex. Policy and legislation for the conservation of protected areas is found at both state and federal level, whilst, within states, a number of sites have been protected at the local and regional levels. This report deals largely with protected areas declared under federal legislation and administered by federal agencies.

When first colonised by Europeans, North America was very much a wilderness, with a vast and largely undisturbed wealth of natural resources. The native Americans had a great respect for the natural environment, on which their livelihood, religion and culture were almost wholly dependent. For generations sacred areas had been respected by the tribes, entry forbidden, or such activities as hunting and fishing restricted, and in a number of locations this philosophy continues to the present day (Gattuso, 1991).

The evolution of the modern concept of protected area is generally regarded as having started in the State of Georgia which boasted a reserve for public use as early as 1825. However, there is some evidence which traces the history of parks to a state reservation in Massachusetts in 1641. Parks conservation began in earnest, however, on 30 June 1864, when President Abraham Lincoln signed a law granting the Yosemite Valley and the Mariposa Grove of Giant Sequoias to California to be held for "public use, resort, and

recreation...inalienable for all time." A short time after this, on 1 March 1872 Yellowstone was declared as a "national park", widely accepted as the first national park in the world. The Antiquities Act, 1906 granted the President the power unilaterally to declare sites of historic or scientific value as monuments. The Act favoured cultural and historical preservation, but President Theodore Roosevelt interpreted the criteria of scientific value broadly, and invoked his new executive powers widely to create national monuments in areas of value for nature conservation.

## Federal Policy and Legislation

Legislation governing protected areas is largely covered under single organic acts or series of laws enacted by Congress giving protected area jurisdiction to specific agencies. These organic acts impose on the agencies certain duties or areas of responsibility for a whole range of laws pertaining to protected areas. These areas of responsibility have been grouped into systems such as the National Park System with a number of different park designations. The main systems listed here include the National Park System, National Wilderness Preservation System, National Forest System, National Wild and Scenic Rivers System, National Marine Sanctuary Code/National Estuarine Research Reserves System and the National Wildlife Refuge System (see below and Annex).

Individual federal laws are contained in a series of volumes (*Statutes at Large*) in the order in which they were passed, and subsequently codified and put into the *United States Code* (USC). The President may also delegate specific duties to specific departments and agencies by Executive Order. Regulations for the differing categories of protected area are drafted in the relevant department or agency and put before the public in open hearings and published both in the draft and final form in the *Federal Register*. Final regulations are, like individual pieces of legislation which are passed by Congress, codified, appearing in the *Code of Federal Regulations* (CFR) (see Annex).

**National Park System** National parks and other categories of lands within this system are established by individual acts of Congress (prior to 1980, national monuments could also be established by the President on federal lands by proclamation under the Antiquities Act, 1906). The National Park Service was established by the Act of 1916, Title 16 of the USC, Chapter 1 (16 USC 1). It contains the authorising legislation, or "organic act" for the National Park Service. This law stipulates that "the Service...shall promote and regulate the use of the federal areas known as national parks, monuments, and reservations hereinafter specified..." The National Park Service has responsibility for three broad types of areas, natural, historical and recreational, represented by some



16 categories of nomenclature under the National Park System. These include: national park, national monument, national reserve, national preserve, national recreation area, national historic site, national historic park, national battlefield, national seashore, national lakeshore, national scenic trail, national river, as well as national wild and scenic river (see Annex). Detailed definitions for these different categories are not provided under general legislation, and restrictions and regulations vary considerably between sites of the same category.

**National Wilderness Preservation System** This is based on the Wilderness Act (Wilderness Act, 1964, PL 88-577, 16 USC 1131-1136) and dates from 3 September 1964. The Act establishes criteria for the management of areas of land as "wilderness" and the processes under which many areas have been added to the system, areas are added only by individual acts of Congress (see Annex). Four federal agencies (US National Park Service, US Forest Service, US Fish and Wildlife Service and US Bureau of Land Management) are authorised and mandated to manage wilderness. A large proportion of the designated areas lie within other categories of protected land administered by the federal agencies, and, where this is the case, the additional categorisation as wilderness will generally increase the degree of protection.

**National Forest System** This is based on the Forest Reserves Act, often referred to as the Creative Act, 1891 (USC Title 16, Chapter 2 (16 USC 2)); the Organic Administration Act, 1897 (16 USC 475); and the Weeks Law and Resources Planning Act. The Resources Planning Act, 1974 incorporated the term national forest system into the statutes. Under the System the US Forest Service has responsibility for national forests, national grasslands and land utilisation projects. Within national forests are a number of administrative designations: forests are classed into general or special interest areas, the latter listed as scenic areas, palaeontological areas, geological areas, botanical areas and zoological areas (see Annex).

The resources of these lands are managed according to the Multiple Use-Sustained Yield Act, 1960 and the National Forest Management Act, 1976. The former established the policy that national forests be established and administered for "outdoor recreation, range, timber, watershed and wildlife and fish purposes", while the latter required the development and implementation of integrated plans for the management of forest and rangeland ecosystems. Under these Land and Resource Management Plans management direction is provided for the entire National Forest System: lands may be protected from or managed for various uses and at varying levels of intensity, and, in this way, a form of *de facto* protection status is provided for large areas. Two further administrative designations on Forest Service land are game refuges and game preserves, of which there are 21 sites, mostly in the eastern US, which

provide an additional degree of habitat protection within parts of some national forests (McCloskey, 1992).

In addition to its own legal and administrative categories, the Forest Service manages lands in the following categories: wilderness area, national recreation area, research natural area, national wild and scenic river, and national monument. In terms of degree of protection and area covered, the wilderness areas on USFS land are undoubtedly the most important form of protected area for conservation purposes. The Forest Service maintains probably the largest network of research natural areas of any federal agency. It also administers a number of large natural monuments, notably Misty Fjords and Admiralty Island in Alaska, and Mount St Helens in Washington.

**National Wild and Scenic Rivers System** This is based on the Wild and Scenic Rivers Act (USC, Title 16, Chapter 28) of 2 October 1968. The system was authorised by Congress in 1968, declaring certain selected rivers of the nation as national wild and scenic rivers. They are designated as wild river areas, scenic river areas or recreational river areas, and include both federal and state land. The Law states that the system shall comprise rivers that are designated by Act of Congress or designated by a legislature of the state(s) through which they flow (see Annex).

**National Estuarine Research Reserves System and National Marine Sanctuaries** Congress has authorised the National Oceanic and Atmospheric Administration (NOAA) to maintain two types of protected areas: national marine sanctuaries and national estuarine research reserves. The National Marine Sanctuary Programme was authorised by the Marine Protection, Research and Sanctuaries Act, 1972 (PL 92-532), as amended, 16 USC 1431 *et seq.* Programme regulations for the national marine sanctuary programme are found at 15 CFR 922. National marine sanctuaries are established in the ocean and coastal environment for resource protection and management of compatible uses. The National Estuarine Research Reserve System was authorised by section 315 of the Coastal Zone Management Act of 1972 (PL 92-583), as amended, 16 USC 1451 *et seq.* Programme regulations for the national estuarine research reserve system are found at 15 CFR 921. National estuarine research reserves are established primarily as "natural laboratory" areas for estuarine research (see Annex).

**National Wildlife Refuge System** The Organic Act relating to national wildlife refuges is the National Wildlife Refuge System Administration Act, 1966, which expresses policy and provides guidelines for operating the system. The most important category in this system is the national wildlife refuge, although waterfowl production areas and coordination areas also form part of the system. The Refuge Recreation Act, 1962 authorises the purchase of adjacent lands to serve as recreational areas and as buffer areas to the refuges (funds for the purchase of such lands under the Land and Water Conservation Fund Act, 1965). The Wilderness

Act, 1964 and the Endangered Species Act, 1973 (revised 1982, supplemented in the International Environmental Protection Act, 1983) have some bearing on the system. The Fish and Wildlife Coordination Act, 1934 (amended 1958) authorises federal water resource agencies to acquire lands in connection with water resource projects specifically for the conservation of wildlife. In 1903, Pelican Island, Florida, was protected as a wildlife refuge under an executive order. Subsequent growth in numbers of wildlife refuges created under executive order resulted in the need for a management authority.

Policy and direction for the Refuge System are identified in the USFWS's refuge manual. This gives four broad goals for the management of the System: to preserve, restore and enhance populations of species that are becoming endangered; to perpetuate the migratory bird resource; to preserve a natural biodiversity on refuge lands; and to provide for an understanding and appreciation of ecology and man's role in the environment and provide for recreation where this is compatible with the primary purposes of the specific refuge. Management plans have been, or will be developed for each refuge

#### **Bureau of Land Management (BLM) Lands**

The Federal Land Policy and Management Act, 1976 (PL 94-579; 43 USC 170) is the equivalent of an organic act which contains the authorising legislation for the BLM and the declaration of congressional policy with respect to public lands administered by the BLM. The Act specifies that the public lands be managed in a manner that: will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; where appropriate, the BLM will preserve and protect certain public lands in their natural condition; management will provide food and habitat for fish and wildlife and domestic animals; will also provide for outdoor recreation and human occupancy and use; and that regulations and plans for the protection of public land areas of critical environmental concern be promptly developed. The Act also states that: public lands should generally be retained in Federal ownership; goals and objectives be established by law as guidelines for public land use planning; and management should be on the basis of multiple use and sustained yield, unless otherwise specified by law.

Several different categories of protected areas are operative on public lands administered by the BLM. The first type of designations are administrative designations, such as: scenic areas, areas of environmental concern, trails, natural areas, research natural areas, special recreation management areas, by-ways, significant caves and others. Such administrative designations are made by the general authority of the Secretary of the Interior in administering the public lands, or by the BLM under the resource management planning process (eg. areas of critical environmental concern) using the authority contained in Section 202 of the Federal Land Policy and Management Act. The other categories of protected area are those founded in legislation and enacted as public land laws

on a generic basis such as wilderness areas under the authority of the Wilderness Act, scenic and recreation rivers under the authority of the Wild and Scenic Rivers Act, or by special laws on an *ad hoc* basis for a specific area, such as national recreation areas, national conservation areas, national historic trails, national scenic trails, national outstanding natural areas and others.

**Department of Defense Lands** The Organic Act relating to Department of Defense (DoD) land, federal statutes (Title 16, USC) authorises the Secretary of Defense "to carry out a programme of planning for, and the development, maintenance, and coordination of wildlife, fish and game conservation and rehabilitation in military reservations". There are a number of other laws which also relate specifically to conservation on military lands, for example Public Laws 86-797, 90-465, 93-452 and 96-561. Several sections of the US Code (Title 10) provide for conservation on military land. Finally, worth mentioning, is the Department of Defense Directive Number 4700.4, the Natural Resources Management Program (Keystone Center, 1991).

Also of relevance at the federal level is the system of national natural landmarks which are designated on any areas of land outside the national park system. This is an administrative rather than a legal designation, participation in the scheme by private landowners is entirely voluntary (see Annex). Another non-legislated category is that of research natural area, designated by any one of eight federal agencies on federal land. Their objective is to preserve a representative array of natural and mostly undisturbed natural ecosystems, and to use these for education and research into these areas. Most of these sites lie within existing protected areas (see Annex).

The Endangered Species Act, 1973 has some relation to the protection of land. This Act lists some 600 species (a further 3,000 species are considered as candidates for listing). Among the measures listed for the protection of these species is the designation of critical habitat for listed species and that this habitat should also receive protection. Current controversies concerning the fate of the northern spotted owl and its equally threatened habitat of oldgrowth temperate forest of the Pacific north-west coast of North America are clearly putting the habitat protection clauses of this Act to the test, and it remains to be seen how much of its fast-disappearing critical habitat receives protection in the near future.

There is also a considerable body of legislation which relates to the protection of wetland areas within the US, this includes: the Clean Water Act, 1977; Executive Order 11990 Protection of Wetlands, 1977; the Food Security Act, 1985 (Swampbuster and other provisions); Emergency Wetland Act, 1986; Tax Reform Act, 1986; and Water Resources Development Act, 1986. Although these do not actually provide a legal category of protection, or provide clearly delineated boundaries, it is



estimated that the total area of wetlands protected under such legislation may be in excess of 40 million ha.

The 1965 Land and Water Conservation Fund Act established the Land and Water Conservation Fund which is largely supplied from tax revenues. Money from the fund is used for protection purposes, with approximately half going to federal agencies, and half to individual states. The federal money is used largely for land acquisition purposes for the establishment or expansion of protected areas, and some of the state money is also used for this purpose, although much of the remainder is granted more broadly to a range of outdoor recreation activities.

#### *State Policy and Legislation*

Each of the 50 states within the United States has its own state park system, with at least one protected area management agency (Myers and Green, 1989). The state of New York created Niagara Falls Reservation in 1883, and Adirondak Park two years later. By 1907, the state of Wisconsin had developed a park system plan. It is beyond the scope of this publication to describe in detail the situation of each and every one of the 50 states (for greater detail see TNC, 1976). The establishment and expansion of the conservation units in Alaska is governed by the Alaska National Interests Lands Conservation Act, 1980, which provided for the additional preservation of some 42 million ha within this state. All of these areas fall within federal protected area systems.

**International Activities** The United States participates in the Unesco Man and the Biosphere Programme, with 47 sites having been recognised as part of the international biosphere reserve network. The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) was ratified on 18 December 1986, and ten sites have been listed. The United States ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 7 December 1973. Ten natural sites have been inscribed on the World Heritage List, including a joint nomination with Canada.

The United States ratified both the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region on 31 October 1984. The Protocol Concerning Specially Protected Areas and Wildlife has also been signed. The United States is party to the South Pacific Regional Environment Programme, and the 1986 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP Convention) has been signed (25 November 1986), but not yet ratified. The Migratory Birds Convention was signed between Canada and the USA in 1917. The North American Waterfowl Management Plan is a joint project involving Canada and Mexico, 27 US states,

approximately 200 conservation groups and many corporations, in the planning of programmes conserving waterfowl and wetland habitats. A similar programme is in development for international cooperation in the protection of neotropical migrants.

The US Fish and Wildlife Service and the US National Park Service maintain cooperative agreements with protected area agencies throughout the world for technical assistance in support of protected area management.

There are a number of transboundary protected areas. Glacier National Park in Montana and Waterton National Park in Alberta, Canada were combined in 1932 to form the first international peace park in the world. Others include the Wrangell-St Elias national park (USA) and Kluane national park (Canada); Arctic national wildlife refuge (USA) and Northern Yukon national park (Canada); Boundary Waters Canoe Area national forest wilderness (USA) and Quetico Wilderness provincial park (Canada); Pasayten national forest wilderness (USA) and the complex of Cathedral, Cascade and Manning provincial parks (Canada). A management agreement is currently being discussed concerning the establishment of a 2 million ha border park between the USA and Mexico along the Rio Grande which would incorporate Big Bend national park in the USA.

**Administration and Management** There are five principal federal authorities, and at least four others with minor roles; the overall expenditure of federal agencies on protected areas in 1991 alone was US\$ 1,962,704,000 (Waugh and Perez Gil, 1992).

#### *Federal Land*

**National Park Service (NPS), US Department of the Interior** was established in 1916 with two main aims: to conserve the scenery and natural and historic objects and wildlife within the areas under its jurisdiction; and to provide for public access and enjoyment of these areas. The efforts to balance these two missions have shaped the development of this agency, making it unique among the federal natural resource management agencies. The NPS administers over 360 units, covering over 32 million ha, including sites of both natural and cultural significance, visited by over 360 million people each year. Under the Director of the NPS are associate directors responsible for: Natural Resources (includes the NPS science programme); Cultural Resources (includes the NPS history and archaeology programmes); Operations (includes visitor services, ranger activities, and interpretation); Budget and Administration; Planning and Development (includes the Denver Service Center); and Management Systems. Appropriations legislation for the fiscal year 1993 has designated some US\$ 992.4 million for the operation of the national park system, with a further US\$ 118.9 million to be derived from the Land and Water Conservation Fund to be granted for land acquisition and

state assistance, and with a further US\$ 231.8 million for construction, improvements, repair or replacement of physical facilities. The National Fish and Wildlife Foundation has recently recommended a restructuring of the NPS budgets. One of the main aims of this is to shift the emphasis away from development within parks, notably the large sums directed to accommodating visitor needs and services, towards an increase in funding for natural resource management under four headings: protection, mitigation, inventory and monitoring, and research (NFWF, 1992). NPS has over 13,000 full time employees, and nearly double this number, with part time employees and volunteers, during peak visitation periods.

As part of its science programme, the NPS maintains ties to research and academic institutions through a network of Cooperative Park Study Units at major universities. Authority for most national monuments administered by the Forest Service was transferred to the NPS in 1933, and responsibility for national battlefields was transferred from the Department of the Army soon after. Other federal agencies, including the Forest Service and the Bureau of Land Management, continue to maintain significant holdings in national monuments and recreation areas.

**The US Fish and Wildlife Service (USFWS) of the US Department of the Interior:** Federal involvement in the conservation of fish and wildlife began with the establishment of the Bureau of Fisheries in 1871 in the Department of Commerce. The Bureau of Biological Inventory was established in 1885 in the Department of Agriculture. In 1939 both of these agencies were transferred to the Department of the Interior, where they were later consolidated into the USFWS. The central aim of the Service is to conserve, protect and enhance fish and wildlife populations and their habitats – it has principal authority and responsibility for migratory birds, threatened and endangered species and lands under Service control. In terms of protected areas the USFWS has responsibility for the National Wildlife Refuge System. The Service employs around 7,000 people, with a headquarters in Washington, and eight regional offices. Appropriations legislation for the fiscal year 1993 has designated some US\$ 535.1 million for resource management (as a guide, in 1990 somewhat less than one third of this figure went to "refuge operations and maintenance"). A further US\$ 76.2 million has been designated for land acquisition to be derived from the Land and Water Conservation Fund in 1993, and a further US\$ 82.1 million for construction of buildings and other facilities. The most important protected areas under USFWS jurisdiction include national wildlife refuges, waterfowl production areas, and coordination areas. The Service also manages wildlife research centres, fish hatcheries and fish research stations. There are a number of federal acts which give the USFWS an important role in projects and activities concerning fish and wildlife resources on non-USFWS lands. Through these, for example, the Service plays an important role

in the protection and restoration of wetland habitats. It is also able to influence the land management strategies of other federal agencies, such as the Department of Defense. The Service began work in 1990 on a combined plan and environmental impact statement for management of the system through the year 2003, the 100th anniversary of the establishment of the first national wildlife refuge on Pelican Island, Florida.

**The US Forest Service (USFS), US Department of Agriculture** was established in 1905 and has often been faced with the balancing the conflicting demands of production and protection in the forest resources under its authority – the Multiple Use Sustained Yield Act and the National Forest Management Act have helped to refine this balance to some degree. Appropriations legislation for the fiscal year 1993 has designated some US\$ 1,318.5 million for the management, protection, improvement, and utilisation of the national forest system, with a number of large additional funds covering fire protection, firefighting, construction, research and land acquisition. In this latter fund, US\$ 62.9 million have been designated for land acquisition, to be derived from the Land and Water Conservation Fund in 1993.

Of the 77.4 million ha managed in the National Forest System, some 24 million ha are considered as potentially suitable for timber production, although a proportion of these will remain protected from timber production. The USFS maintains a network of forest research laboratories, through which it cooperates with academic and research institutions.

**The National Oceanic and Atmospheric Administration (NOAA), US Department of Commerce** was established in 1970 with a broad range of aims from managing marine resources, to mapping, to meteorology, to oceanographic and atmospheric research. NOAA's programmes are grouped into six areas: the National Ocean Service which manages ocean and coastal resources, National Marine Fisheries Service, Oceanic and Atmospheric Research, National Weather Service, National Environmental Satellite, Data and Information Service, and Program Support. Appropriations legislation for the fiscal year 1993 has designated some US\$ 1,539 million for the operations, research and facilities for this entire organisation. Only a very small proportion of this, however will in any way be related to protected areas (see below). Through the Sanctuary Programme, NOAA is empowered to enforce protected area regulations, and to manage protected areas in two distinct programmes covering national estuarine research reserves and national marine sanctuaries. NOAA works cooperatively with state agencies and with research institutions in the management of the national estuarine research reserve system. NOAA's mandate to manage marine protected areas has no parallel in the federal system; because it does not manage titled land, but an intensively-used public resource, NOAA is thus required to develop collaborative mechanisms with numerous bodies. The annual budget for managing the national marine sanctuary programme is less than US\$



10 million annually. The federal share of the budget for the administration of national estuarine research reserves is US\$ 3.2 million annually (NOAA, pers comm, 1992).

**The Bureau of Land Management (BLM), US Department of the Interior** was established in 1946 through the consolidation of the General Land Office and the Grazing Service. It is responsible for over 100 million ha of federal land, as well as many millions of hectares of subsurface, reserved mineral rights. Under the Federal Land Policy and Management Act, 1976, the BLM was required to review and inventory its roadless lands of 5,000 acres (2,025ha) or more, as well as roadless islands, in the contiguous 48 states. The aim of this exercise was to report to the President, with a recommendation as to the suitability of each such area or island for preservation as a wilderness area. Certain areas identified as natural or primitive areas prior to 1975 were also to be reported to the President. Public lands administered by the BLM in Alaska were exempt from the FLPMA wilderness review, and may be studied for wilderness as part of the regular land and resource use planning process used by the BLM, as provided for by the provisions of the Alaska National Interest Lands Conservation Act, 1980, as amended. Appropriations legislation for the fiscal year 1993 has designated some US\$ 544.9 million for the management of lands and resources.

BLM's protected areas are typically "islands within the lands" administered for multiple uses, including forestry, mining, and grazing. BLM has developed proficiency in community outreach that can be applied in participation in the planning and management of its protected areas. Its managers are responsible not only for the protected areas, but for the managed areas that constitute potential buffers. BLM's routine interactions with the public in these more intensively-used areas provide a basis for cooperation in management of the protected areas as well.

**The Bureau of Indian Affairs (BIA), US Department of the Interior**, authorised under Title 25 of the US Code, does not have a specific mandate for protected areas, but under general provisions for welfare of Indian citizens of the US, can administer reservation lands for nature conservation. BIA provides technical assistance to tribes, with a general mandate for multiple uses, and assists, upon application of a tribe, in protected area management. Management authority is reserved by the tribe. Navaho Park is an example of management by a tribe of tribal lands for nature conservation.

**The Bureau of Reclamation, US Department of the Interior**, and the **Tennessee Valley Authority** are not specifically authorised to manage protected areas, but do maintain protected lands under executive orders to maintain watersheds and water resources. These sites are frequently developed and managed as recreation areas similar to those of other federal agencies.

The four services of the **Department of Defense** manage approximately 10 million ha between them. Although not responsible directly for conservation issues, the DoD clearly has an enormous wealth of natural resources on its lands. It does maintain some programmes dealing with monitoring, research, protection and restoration, often in coordination with federal, state and local agencies, whilst in December 1988 it entered into a cooperative agreement with The Nature Conservancy. Funding for the majority of this environmental work comes from the DoD Natural Resources Reserves Account, and from similar accounts in the individual services this money is largely generated from the sale of hunting and fishing licences, timber, and rents paid for agriculture and grazing leases. Money generated in this way amounts to approximately US\$ 30 million per year. The DoD employs over 300 professional resource managers, and a number of military personnel who are assigned natural resource functions.

Another important and extremely influential body is the **Environmental Protection Agency (EPA)** which was established in 1971 as an independent agency of the government. Discussions are underway concerning the raising of the rank of this organisation to that of a department (Department of Environmental Protection). Although not specifically responsible for any categories of protected area, the EPA has considerable powers in the field of pollution control, waste dumping and water control in federal and other lands, which can lead directly to the protection of resources. This is particularly true in relation to wetlands. The principal authorities relating to wetlands in the US are the US Army Corps of Engineers, the EPA and the USFWS. Permits are required for most activities relating to wetland use, even on private land these are granted by the Corps, with input from the EPA and the USFWS, and this form of strict control provides some form of protection for all major wetlands.

Management constraints in the protected areas systems of North America vary greatly, however the USNPS has been singled out here for a more detailed appraisal, to provide a single, but wide-ranging example. According to the National Parks and Conservation Association (NPCA), industrialisation and urbanisation are "making islands of ...national parks...impairing natural processes in the larger ecosystems upon which the parks depend". In the USNPS, federal budgets have failed to keep pace with inflation; combined with a doubling in size of the national parks system over the past 20 years, this has reduced the relative managerial capacity of the NPS to effectively manage properties under its jurisdiction by as much as 20%. Pay has not kept pace with the cost of living for park rangers. Experienced rangers are leaving; low pay, a stressful work environment, and a restricted career path are drawing top talent away from parks. Overall, the backlog of repair, maintenance, preservation, and public health and safety projects in national parks exceeds US\$ 2 billion. There is a US\$ 500 million backlog just for essential monitoring and resource management projects that must be addressed

immediately in parks. According to the NPCA, development of credible fundraising mechanisms for parks worth US\$ 250 million is needed to supplement the US\$ 1.2 billion appropriated annually (Waugh and Perez Gil, 1992). An assessment of the threats reported by units of the NPS was undertaken in 1988 (USNPS, 1988): some twenty-one major issues stemming from the threats were identified. Representative of the threats facing the protected area estate as a whole, these include: overpopulation of species; impacts to, or loss of, plant and animal species; degradation of resources due to non-native plants and animals; disruptions due to past land practices; disruption of natural fire regimes; degradation of water quality; alteration of water flows or groundwater levels; lack of secure water rights; loss of visibility and biological diversity and damage due to air pollution; and lack of basic data about sites.

#### *State Land*

Every state has its own state park system, with at least one protected area management agency, and often more, as the fragmentation at the federal level is characteristic of the state activities too (Myers and Green, 1989). All 50 states also have coordinated programmes to protect flora, fauna and their habitats through establishment of parks and other protected areas; the first such programme began in 1951 although there is considerable variation from one state to the next. Many state agencies have cooperative agreements with such agencies as the BLM and the USFS.

The situation described above for the national parks system is regarded as being much worse in state parks, many of which have been forced to close their gates to users as a result of budgetary shortfalls in 1990-91 (Waugh and Perez Gil, 1992).

#### *Private Land*

A number of non-governmental organisations (NGOs) are responsible for the acquisition and management of protected areas. With a number of these, purchased land is later sold to federal or state protected area authorities, who frequently are unable to buy land at short notice. Many of these NGOs are extremely powerful economically, and also have an influential role politically. Amongst these, The Nature Conservancy (TNC) is pre-eminent. Since its founding in 1951, TNC has conserved over 2 million ha, much of which has been passed to federal or state agencies. TNC has created a 50-state natural heritage network that sets protection priorities for itself, and which is also used by most states and a growing number of federal agencies. The projected income in 1991 was US\$ 122.8 million. TNC has launched a Last Great Places initiative, aimed at protecting 75 large, landscape level, ecological systems and plans to invest US\$ 1 billion from public and private sources (including grants from the federal Land and Water Conservation Fund) in this enterprise over the next five years. Also of great importance is the Trust for

Public Land which, after TNC, is largest and most active land acquiring agency in the country.

Of the other larger citizen groups involved with protected areas ownership or administration, the National Audubon Society, owns or leases a number of sanctuaries. The Society of American Foresters has designated over 500 natural areas. There are several other programmes in private land conservation, notably the Conservation Fund, the Land Trust Alliance, Ducks Unlimited and Trout Unlimited. The Land Trust Alliance represents local land trusts across the continent which together manage a very large area this land is either held outright, or under easements, where the landowner voluntarily, or for payment, surrenders rights to certain types of development and use. Public-private partnerships have been central to the history of conservation in the USA, such as the Boone and Crockett Club and the Sierra Club. The National Fish and Wildlife Foundation, a non-profit organisation established by Congress in 1984 to foster cooperation, uses funds appropriated by Congress as seed money for partnerships in challenge grants to be matched by private-sector institutions. The foundation has supported more than 120 projects, and spent US\$ 31.5 million on habitat protection and restoration in cooperation with the USFWS and other organisations. The National Parks Foundation is a similar body, established by the US government.

**Systems Reviews** The US is among the largest countries in the world. Including the disjunct states of Alaska and Hawaii, it covers a vast range of latitude, from the Arctic Circle in northern Alaska to the tropics in southern Hawaii, and over 120° of longitude, from the east coast of Maine to the westernmost of the Aleutian Islands and also the westernmost of the Hawaiian Islands.

The east coast of the 48 coterminous states runs along the Atlantic Ocean from Maine to Florida and then runs west along the north coast of the Gulf of Mexico until the border with Mexico at the Rio Grande. America's largest river, the Mississippi, also flows into the Gulf. Moving west from the Atlantic coast, the Appalachian mountains run from Georgia in the south to the states of New England in the north reaching 2,037m. North-west of these, along the Canadian border, lie the Great Lakes: Ontario, Erie, Huron, Michigan and Superior, and, to the south of these, the Mississippi Basin. West again lie the Great Plains of the mid-west which stretch to the base of the Rocky Mountains. The Rockies are a huge band of geologically recent mountains, which run north-south along the entire length of the continent, and stretch up to 1,500km east-west from the Great Plains to the Pacific coast there are a number of peaks in these ranges that rise above 4,000m.

Alaska, the largest state, lies some 900km north-west of Washington, separated by the western seaboard of British Columbia in Canada. Alaska has a long border with Canada, with an even longer coastline, facing the



Arctic Ocean to the north, the Chukchi Sea and Bering Sea to the west, and the Pacific to the south. Much of the state is mountainous, dominated by the Brooks Range to the north and the Alaska Range to the south, which includes Mount McKinley, the highest peak in the US, reaching 6,194m.

The Hawaiian Islands are a chain of volcanic islands lying in the North Pacific, and stretching some 2,300km from Hawaii in the southeast, to Kure Atoll in the northwest. For reasons of their geographic location, the Hawaiian Islands have been included in a separate account, in Volume 1 of this work.

The following is a simplified summary of the major vegetation types. Tundra of low scrub dominated by willows and birches is found in Alaska, with plant cover decreasing northwards. Large areas of coniferous forest, mainly pine, spruce and fir, are found in Alaska, in a belt stretching over much of Canada and down the Pacific coast to central California. Montane coniferous forest is found in the Rockies, the Appalachians and on other mountain ranges; in eastern North America, the original vegetation cover was deciduous forest of many different associations that variously included bald cypress, hemlock, hickory, maple and oak, but is now extensively cleared. In the centre, from the Rockies east to Indiana, and from Canada south to Mexico, the former massive grassland (prairie) has largely been cleared for agriculture, and now survives only in relicts. In the west, from Washington south to Mexico, deserts, including the Great Basin, Mojave and Sonoran, are found. On coastal California, the chaparral, a high, dense scrub, is found. Subtropical vegetation, including mangrove, is found in Florida. Anderson (1977) gives an indication of the area covered by each type. Klopatek *et al.* (1979) present a map showing loss in natural vegetation, based on Kuchler's 1964 map of potential natural vegetation. Twenty-three of Kuchler's 106 predominant vegetation types have lost more than 50% of their potential area, including the Florida Everglades, California steppe, southern floodplain forest, bluestem prairie and beech-maple forest (Davis *et al.*, 1986).

A preliminary assessment of the status of major terrestrial ecosystems on federal and Indian lands in the United States has been prepared by Crumpacker *et al.* (n.d.). This used 135 potential natural vegetation types of Kuchler. Their results indicate that at least 33 types are inadequately represented, and 9 of these have no representation, whilst 11 others have relatively little representation as they are either naturally rare or have been largely converted to non-natural uses.

All of the federal agencies mentioned undertake some regular form of inventorying and monitoring of the land resources under their control. The NPS has no centrally coordinated systems review procedure. Most of the lands under its jurisdiction, however, have some inventory and/or ongoing monitoring programs, arranged on a site-by-site basis. The BLM conducts inventories of soils, vegetation and wildlife – to date soil surveys have

been completed for a large proportion of BLM lands, but only 15% (outside Alaska) has received the mandatory minimum vegetation survey, and less than 5% has been surveyed under the standard wildlife inventory system. The USFWS carries out inventory, monitoring and research activities which provide information for the management of refuge lands; it also carries out other surveys relating to migratory and breeding birds, selected populations of fish stocks, the effects of pesticides and toxic chemicals in the environment and waterfowl and wetlands surveys which form part of the National Wetlands Inventory. The Forest Service has a comprehensive system of inventorying, mapping and monitoring of its lands, with a large amount of this information stored on a highly developed computer network. Inventories have been compiled for a large proportion of DoD lands, often undertaken in conjunction with local authorities or educational establishments, or with local or national NGOs (Keystone Center, 1991).

The number of land management agencies complicates systematic approaches to protected area conservation. As a result, there is no comprehensive system plan for the United States. The government in general lacks action plans for the completion of protected area systems at the federal level, with the exception of the NOAA, which is authorised by legislation to develop a programme for marine reserves. The 500 or more national natural landmarks designated since 1962 by the Secretary of the Interior, on advice from the USNPS, are listed in the National Registry of Natural Landmarks which is published regularly. In order to augment government efforts, NGOs such as the National Parks and Conservation Association have produced their own action plan which covers the National Parks System. Other bodies advocating programmes for protected areas agencies include the Sierra Club, the Wilderness Society (wilderness issues, especially with the Forest Service), Defenders of Wildlife (formed an alliance with the Fish and Wildlife Service) and the American Rivers (National Wild and Scenic Rivers System). The Natural Heritage System organised by TNC, together with the initiatives of other citizens groups, provides a foundation for a scientifically-based interagency planning programme.

The North American Waterfowl Management Plan (NAWMP) is a joint project involving Mexico, USA and Canada, 27 states and approximately 200 conservation groups and many private corporations, in planning programmes to conserve waterfowl and wetland habitats.

The establishment of Yosemite Valley and the Mariposa Grove of Giant Sequoias in 1864 was the first instance of the nation setting aside a natural area through legislation to be protected explicitly for public use. The federal government ceded Yosemite to a state government for management as a public park during a period when there was no precedent for federal management of parks. Even as President Abraham Lincoln signed the act transferring Yosemite to a state

government, the United States was in the grips of a civil war over the issue of state sovereignty. Had the territory of Yellowstone fallen under the jurisdiction of a state rather than an unincorporated territory in 1872, Yellowstone would have been handed over to the state authorities, just as Yosemite had been 18 years before. The establishment of Yellowstone as a national park under the jurisdiction of federal rather than state authorities was an historic precedent. It provided the first instance of the exercise of federal power, an ascendant force in American public life, for the sequestration of land for conservation. Yellowstone represents the transition of the US from a federation of sovereign states to a nation united in which all parties participate in a common vision of the future. An upwelling of support for parks followed the Yellowstone experiment, and Congress authorised additional parks in 1890 (Sequoia, General Grant, later incorporated into Kings Canyon, and Yosemite); in 1899 (Mount Rainier); and 1902 (Crater Lake).

The basis for the current National Wilderness Preservation System began with an administrative designation established by the USFS, that of wilderness and wild areas. The first such area to be designated was Gila Wilderness in New Mexico in 1924. All of the former USFS wilderness and wild areas became part of the National Wilderness Preservation System in 1964.

Approximately 2.6 million sq. km, or nearly 30% of the US land area, is owned by the federal government, with the great majority lying in the western half of the country and in Alaska. The remainder of the land lies within state, local or private ownership, and hence can only be added to the federal protected areas network through purchase, lease, exchange or other agreement by federal agencies. By 1893, the government had reserved 5.25 million ha of forest, and, by 1910, the system of national forests rose to 60 million ha. In 1916 there were 35 national parks and monuments. By 1992 the National Park System included 360 units covering nearly 32.5 million ha; the National Forest System, included over 77 million ha including 154 national forests, 19 national grasslands and 17 land utilisation projects; the National Wildlife Refuge System included 492 national wildlife refuges covering some 35.75 million ha administered by the FWS; National Marine Sanctuaries and the National Estuarine Reserves System, administered by NOAA included 8 national marine sanctuaries covering some 3.1 million ha, and 21 national estuarine research reserves; Bureau of Land Management had responsibility for over 28 research natural areas on 23,000ha, 40 other natural areas including outstanding natural areas and primitive areas on 328,000ha. The national wilderness preservation system consists of 492 wilderness areas covering 37.3 million ha (well over half of this lies in Alaska). A large proportion of these areas are further protected under the other protection systems listed above (Hendee *et al.*, 1990). More than one-third of the Wilderness System (13.1 million ha) is managed by the USFS, including nearly 80% of the

wilderness area outside Alaska (CRS, 1989). Of the Federal lands administered by the BLM, approximately 10,754,000ha were designated as wilderness study areas for possible wilderness designation. Of these lands, the BLM recommended, and the Secretary of the Interior concurred, that 3,950,000ha were suitable for designation as wilderness. By 1992, some 652,000ha had been legally designated as wilderness under the National Wilderness Preservation System, comprising 66 units in nine different states.

The National Association of State Park Directors (NASPD) annually publishes data relating to state park systems: in June 1990 there were 2,040 state parks covering 2.98 million ha. These state agencies frequently manage other areas – NASPD (1991) lists over 80 categories, covering forests, natural areas, recreation areas, historic sites, water use areas, environmental education areas and state trails. The total for all these categories (including state parks) is 4,022 sites covering over 4.5 million ha. This is not a comprehensive figure for all state protected areas however, given that it only covers sites managed by one agency, and in many states there are likely to be others, for example dealing specifically with forestry, or with fish and wildlife, which are not included.

Private protected areas include over 1,300 preserves covering 650,000ha administered by The Nature Conservancy (Waugh and Perez Gil, 1992), the National Audubon Society owns or leases over 100 sanctuaries, covering over 60,000 ha (NAS, 1991); the Society of American Foresters has designated over 500 natural areas which overlap with the Research Natural Areas network established under the federal government; Ducks Unlimited administers 161,780ha of wetlands; the local land trusts across the continent represented in the Land Trust Alliance administer a total of 828,630ha (McCloskey, 1992); Operation Stronghold is an alliance of 800-900 private landholders who have undertaken conservation measures on private land estimated to cover 2-2.5 million ha (Waugh and Perez Gil, 1992).

In a recent analysis McCloskey (1992) estimates that some 11% of the total area of the US is protected in areas managed in categories equivalent to IUCN categories I-V, with the federal government protecting 9.2% of the territory, and non-federal agencies the remaining 1.8%. Of the non-federal agencies the most important are the state government agencies, although the figure also includes a number of local government protected areas, tribal lands and private protected areas. This analysis estimates that more than 8 million ha of federal lands are awaiting permanent legal designation mostly land that is already being administered as wilderness by the Forest Service or the BLM. Actually data for the percentage cover, and for the total area covered, by the federal protected estate are to some degree misleading, as they are skewed by the very high proportion of protected land in the western states and Alaska, and by the vast area of protected land in Alaska.



Waugh and Perez Gil (1992) list the priorities for action in the North American region, most of which could be applied equally to the US. These include: enhancing the capacity to manage protected areas; strengthening the constituency of protected areas; assessing and demonstrating benefits; extending coverage; developing the capacity to protect marine and coastal areas; putting all protected areas on a sound financial footing; strengthening protected areas through development planning; restoring the quality of degraded parks and applying the lessons of science and management.

The General Authorities Act, 1976 directed that the Department of the Interior investigate, study, and continually monitor the welfare of areas whose resources "exhibit qualities of national significance" that have potential for inclusion in the National Park System. The Secretary of the Interior was directed to transmit a listing each year of not less than 12 areas for consideration of inclusion in the system. In 1981, Congress retracted the funding to undertake these studies and expansion of the system in favour of additional funding to improve management of existing areas.

The USFWS and the University of Idaho are undertaking an analysis of gaps in protected area coverage of biological resources, on a state-by-state basis. Completion of this process is expected to take five to ten years.

**Other Relevant Information** Recreation and tourism is a major element of the protected areas philosophy. Visits to parks increased from six million in 1942 to 33 million in 1950, and 72 million in 1960. In 1990 more than 250 million visitors came to national parks, whereas state parks hosted 723 million visitors (NASPD, 1991; Waugh and Perez and Gil, 1992). Huge numbers of visitors in many parks are causing problems of erosion, waste and pollution and general overcrowding and disturbance.

#### Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title: National Park Service Act, United States Code: Title 16, Chapter 1 (16 USC 1): the National Park System; related acts include Cooperation Agreement Act (16 USC 17)**

**Date:** 25 August 1916 (National Park Service Act); 1946 (Cooperation Agreement Act); 1964 (Land and Water Conservation Fund Act)

**Brief description:** Contains the authorising legislation, or "Organic Act" for the National Park Service. This law stipulates that "the Service...shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations. It provides for the establishment of national parks networks with over 11 categories throughout the USA.

The Act of 25 August 1916 (39 Stat. 535) provides for the creation of the US National Parks Service. It has the authority to identify areas within the national parks system which are established by individual acts of Congress.

The Cooperation Agreement Act, 1946 permits large natural areas of land to come into the park system without specific acts of Congress. Eight units of the park system entered through the 1946 Act.

**Administrative authorities:** National Park Service (NPS) of the US Department of the Interior

**Designations:**

Three broad categories are placed within the National Park System: natural, recreational and

historic. All sites are established by Acts of Congress. The National Parks System as a whole holds two, occasionally contradictory, missions: to provide for public access and enjoyment of natural and historic areas, and to conserve their scenery and natural resources. Within each park, regardless of management category, all lands are classified into a land-use system with flexible zoning and sub-zoning. They are divided into natural zones, historic zones, development zones and special use zones. The natural zone may be sub-divided into wilderness/wilderness study subzone; environmental protection subzone; outstanding natural feature subzone; and natural environment subzone.

Exact definitions vary within the different categories of protected area in the System, and there may well be similarities and overlaps between the different categories. The designations under the system include the following:

**Natural sites** These include: national park, national monument, national reserve, and national preserve.

**Recreation sites** These include: national recreation area, national seashore, national lakeshore, national scenic trail, national river, and national wild and scenic river.

**Historic sites** These include: national historic site, national historic park, national battlefield.

**Source:** US Department of the Interior (1992); TNC (1975)



**Title:**An Act to establish a National Wilderness Preservation System for the permanent good of the whole people, and for other purposes. Short title: the "Wilderness Act". PL 88-577, 16 USC 1131-1136.

**Date:** 3 September 1964

**Brief description:** Federal agencies are authorised and mandated to manage areas of land as wilderness under the Wilderness Act, 1972. Under this Act of Congress, the statute states that the National Wilderness Preservation System was established with major objectives "to secure for the American people of present and future generations the benefits of an enduring resource of wilderness".

The system consists of federally-owned lands designated by Congress as Wilderness areas. All lie within the National Parks System, the National Forest System, the National Wildlife Refuge System, and public lands administered by the Bureau of Land Management. The Wilderness Act does not apply to public or Federal Lands administered by Departments or Agencies other than these.

**Administrative authorities:** US National Park Service, US Forest Service, US Fish and Wildlife Service, US Bureau of Land Management

**Designations:**

**Wilderness area** To "be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness."

Wilderness as "in contrast with those areas where man and his own works dominate the landscape, is hereby recognised as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain."

An area of wilderness is further defined to mean in this chapter an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which:

- generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- has outstanding opportunities for solitude or a primitive and unconfined type of recreation;

– covers at least 5,000 acres (2023.4ha) of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition;

– may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

**Source:** US Department of Interior (1992), TNC (1975)

**Title:** Forest Reserves Act, often referred to as the Creative Act, 1891, United States Code: Title 16. Chapter 2 (16 USC 2); Organic Administration Act (16 USC 475); Weeks Law; Resources Planning Act: National Forest System; National Forest Management Act

**Date:** May 1891 (Forest Reserve Act/Creative Act); 4 June 1897 (Organic Administration Act); 1905 (US Forest Service establishment); 1911 (Weeks Law); Resources Planning Act, 1974; National Forest Management Act, 1976.

**Brief description:** In 1891 Congress passed the Forest Reserve Act (Creative Act), giving the President authority to withdraw portions of the public domain and designate them as forest reservations. A system of administration of the reserves was set forth in the Organic Administration Act, 1897. The US Forest Service (USFS) was established in 1905. Authority for the USFS is contained in Chapter 2 of Title 16, US Codes, that grants the Secretary of Agriculture authority to administer the nation's forest reserves.

The Resources Planning Act, 1974 incorporated the term "National Forest System" into the statutes. Under the System the USFS has responsibility for national forests, national grasslands and land utilisation projects. The resources of these lands are managed according to the Multiple Use-Sustained Yield Act, 1960. The rules which require the integration of land and resource planning can be found in 36 CFR Part 219, the implementing regulations for the National Forest Management Act.

**Administrative authorities:** US Forest Service of the US Department of Agriculture

**Designations:**

**NATIONAL FOREST** The laws contained in Chapter 2 specify that each Forest Service unit develop an integrated management plan. Chapter 36 of the same Code requires the USFS to develop guidelines for multiple-use management of reserves under its authority that "require the identification of the suitability of lands for resource management; provide for obtaining inventory data on the various renewable resources, and soil and water, including pertinent maps, graphic material, and explanatory



aids; and provide for methods to identify special conditions or situations involving hazards to the various resources and their relationship to alternative activities."

The law makes provision for land management plans that: "ensure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish; provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan; (and) ensure research and evaluation (based on continuous monitoring and assessment in the field) of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land."

Under the Organic Administration Act (36 CFR 294) areas worthy of special classification within the National Forest, are classed as special interest areas, and listed as the following:

**Scenic area** place of outstanding beauty which requires special management to preserve its qualities;

**Palaeontological area** containing relict palaeontological specimens of fauna and flora;

**Geological area** unit of land with outstanding formations or unique geological features of the earth's development, including caves and fossils;

**Botanical area** contains specimens or group exhibits of plants, plant groups and plant communities which are significant for a variety of reasons;

**Zoological area** contains authentic, significant and interesting evidence of American natural heritage.

Source: US Department of Agriculture (1992) TNC (1975)

**Title: Wild and Scenic Rivers Act, National Wild and Scenic Rivers System, United States Code, Title 16. Chapter 28**

Date: 2 October 1968

**Brief description:** The National Wild and Scenic Rivers System was authorised by Congress in 1968. This statute, found in Title 16, US Code, Chapter 28 declares as national policy "that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfil other vital national conservation purposes."

**Administrative authorities:** Relevant federal authorities

**Designations:**

**NATIONAL WILD AND SCENIC RIVER** The system shall comprise rivers that are designated by Act of Congress or designated by a legislature of the state(s) through which they flow. Every wild scenic or recreational river in its free-flowing condition, or upon restoration to this condition, shall be considered eligible for inclusion in the national wild and scenic rivers system and if included, shall be classified, designated, and administered as one of the following:

**Wild river area** those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

**Scenic river area** those rivers or sections of rivers that are free of impoundments, with shorelines and watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

**Recreational river area** those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Source: TNC (1975)

**Title: National Marine Sanctuary Program: Marine Protection, Research and Sanctuaries Act of 1972 (PL 92-532), as amended, 16 USC 1431 *et seq.* (authorization); 15 CFR 922 (program regulations). National estuarine research reserve system: Section 315 of the Coastal Zone Management Act of 1972 (PL 92-583), as amended, 16 USC 1451 *et seq.* (authorization); 15 CFR 921 (program regulations).**

**Date:** 1972

**Brief description:** Congress authorises the National Oceanic and Atmospheric Administration (NOAA) to establish and maintain two types of protected areas: national marine sanctuary and national estuarine research reserve.

The Marine Protection, Research and Sanctuaries Act authorises the Secretary of Commerce to designate ocean waters as marine sanctuaries.

**Administrative authorities:** National Oceanic and Atmospheric Administration (NOAA)

**Designations:**

*National marine sanctuary* Acknowledging that the US has directed most protected area efforts towards the terrestrial estate, the statutes reflected in this code affirm that "certain areas of the marine environment" possess qualities of "conservation, recreational, ecological, historical, research, educational, or aesthetic qualities which give them special national significance." The Code characterizes this programme as serving "to enhance public awareness, understanding, appreciation, and wise use of the marine environment."

*National Estuarine Research Reserves System* Title 15 of the Code of Federal Regulations, Chapter IX, provides regulations for the National Estuarine Reserve Research System. The mission of the National Estuarine Reserve Research System, according to the Regulations, "is the establishment and management, through Federal-State cooperation, of a national system of estuarine research reserves representative of the various regions and estuarine types in the United States."

*Estuarine research reserve* established to provide opportunities for long-term research, education, and interpretation and:

– to ensure a stable environment for research through long-term protection of estuarine reserve resources;

– address coastal management issues identified as significant through coordinated estuarine research within the System;

– enhance public awareness and understanding of the estuarine environment and provide suitable opportunities for public education and interpretation;

– promote federal, state, public and private use of one or more reserves within the System when such entities conduct estuarine research; and

– conduct and coordinate estuarine research within the System, gathering and making available information necessary for improved understanding and management of estuarine areas."

– Under the provisions of the Act an area may be designated as an estuarine reserve only if the area is a representative estuarine ecosystem that is suitable for long-term research.

**Source:** NOAA (1992) TNC (1975)

**Title: National Wildlife Refuge System Administration Act: National Wildlife Refuge System. Incorporates the Migratory Bird Treaty Act (16 USC 703-711); Migratory Bird Hunting and Conservation Stamp Act, 1934; Migratory Bird Convention Act, 1929; Land and Water Conservation Fund Act, Wilderness Act, 1964; Endangered Species Act, 1973 (revised 1982, supplemented in the International Environmental Protection Act, 1983); Fish and Wildlife Coordination Act, 1934 (amended 1958); Fish and Wildlife Improvement Act, 1978**

**Date:** 1966 (National Wildlife Refuge System Administration Act)

**Brief description:** Expresses policy and provides guidelines for operating the system. The Refuge Recreation Act, 1962 authorises the purchase of adjacent lands to serve as recreational areas and as buffer areas to the refuges (funds for the purchase of such lands under the Land and Water Conservation Fund Act, 1965). The Wilderness Act, 1964 and the Endangered Species Act, 1973 have some bearing on the system. The Fish and Wildlife Coordination Act, 1934 (amended 1958) authorizes Federal water resource agencies to acquire lands in connection with water resource projects specifically for the conservation and enhancement of fish and wildlife, and requires consultation with the FWS and the wildlife agency of the state concerned.

**Administrative authorities:** Fish and Wildlife Service (USFWS), US Department of the Interior

**Designations:**

Within the Refuge System are a series of the following different categories as defined in the Code of Federal Regulations (Title 50, Chapter 1, Section 25): Migratory Bird (Waterfowl) Areas; Migratory



Bird (General) Areas; Big Game Areas, National Game Ranges; National Wildlife Ranges and Waterfowl Production Areas.

**National wildlife refuge** maintained for the primary purpose of developing a national programme of wildlife and ecological conservation and rehabilitation. These refuges are established for the restoration, preservation, development and management of wildlife and wildlands habitat; for the protection and preservation of endangered or threatened species and their habitat; and for the management of wildlife and wildlands to obtain the maximum benefits from these resources.

Supplementary designations may be applied to parts of, or entire, refuges. These include wilderness areas, research natural areas, wild and scenic rivers, natural landmarks, international shorebird reserves.

The FWS also has obligations for wildlife management areas or coordination areas under cooperative agreements with federal, state, local and private agencies and organisations.

Source: TNC (1975)

#### Title: Department of Defense, United States Code, Title 16

Date: 1966

**Brief description:** The organic act relating to Department of Defense (DoD) land. Federal statutes (Title 16, US Code) authorise the Secretary of Defense "to carry out a programme of planning for, and the development, maintenance, and coordination of wildlife, fish and game conservation and rehabilitation in each military reservation in accordance with a cooperative plan mutually agreed upon by the Secretary of Defense, the Secretary of the Interior, and the appropriate State agency designated by the state in which the reservation is located."

**Administrative authorities:** Department of Defense

#### Designations:

**Military reservation** Cooperative plans under this authority are intended to include "fish and wildlife habitat improvements or modifications...range rehabilitation where necessary for support of wildlife,...control of off-road vehicle traffic, and...specific habitat improvement projects and related activities and adequate protection for species of fish, wildlife, and plants considered threatened or endangered." Cooperative plans are to be "reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years, . . . shall, if a multi-use natural resources management plan is applicable to the

military reservation, be treated as the exclusive component of that management plan with respect to wildlife, fish, and game conservation and rehabilitation."

The statute continues, "the Secretary of each military department shall manage the natural resources of each military reservation with the United States that is under the jurisdiction of the Secretary . . . so as to provide for sustained multipurpose uses of those resources; and to provide the public access that is necessary or appropriate for those uses; to the extent that those uses and that access are not inconsistent with military mission of the reservation."

Source: TNC (1976)

#### Title: The National Natural Landmarks Program

Date: 1963

**Brief description:** An administrative rather than a legal designation, national natural landmarks are designated on any areas of land outside the national park system. Participation in the scheme by private landowners is entirely voluntary. Guidelines concerning the objectives of this designation are given in the Federal Register Volume 40, No.87, 5 May, 1975, p.19504.

**Administrative authorities:** National Parks Service, US Department of the Interior

#### Designations:

**National natural landmark** Sites must lie outside land already administered by the National Park Service. They are designated if they are of national significance in illustrating the diversity of the country's natural history. Sites are entered on the National Registry of Natural Landmarks this is voluntary and does not change ownership. Inclusion "is intended to: 1) encourage the preservation of sites illustrating the geological and ecological character of the US; 2) enhance the educational and scientific value of sites thus preserved; 3) strengthen cultural appreciation of natural history; and 4) foster a wider interest and concern in the Nation's natural heritage".

Source: TNC (1976)

#### Title: The Research Natural Areas Program

Date: No information

**Brief description:** An administrative rather than a legal designation, research natural areas are designated by any one of eight cooperating federal agencies with the aim of preserving a representative array of all significant natural ecosystems and providing for their research



**Administrative authorities:** Forest Service in the US Department of Agriculture; Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service and National Parks Service in the US Department of the Interior; Department of Defense; Energy Research and Development Administration; Tennessee Valley Authority

**Designations:**

*Research natural area* to preserve an array of all significant natural ecosystems and their inherent processes as baseline areas, and to obtain from them, through research and education, information

concerning the natural systems, their components and comparisons with representative manipulated systems. Restrictions and regulations vary depending on the administrative agency and the specific site, but generally sites are areas of minimal human intervention and activities such as logging, grazing burning or restocking are prohibited. Hunting, fishing and trapping, as well as camping, swimming and hiking are generally not encouraged. Research is encouraged, although generally it must be non-destructive in character.

Source: USFS (1977)

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<b>Alabama</b>				
<i>National Wildlife Refuges</i>				
1	Bon Secour (FWS)*	IV	1,819	
2	Choctaw (FWS)	IV	1,708	
3	Eufaula (FWS)	IV	3,211	
4	Wheeler (FWS)	IV	13,839	
<i>National Estuarine Research Reserve</i>				
5	Weeks Bay (NOAA)*	IV	1,483	1986
<i>Parkway</i>				
6	Natchez Trace (NPS)*	V	18,300	1938
<i>Wildernesses**</i>				
7	Cheaha (FS)*	II	3,031	1983
8	Sipsey (FS)	II	10,484	1975
<b>Alaska</b>				
<i>National Parks</i>				
9	Denali (NPS)	II	1,911,495	1917
10	Gates of the Arctic (NPS)	II	2,939,689	1980
11	Glacier Bay (NPS)	II	1,304,550	1925
12	Katmai (NPS)	II	1,504,774	1980
13	Kenai Fjords (NPS)	II	271,255	1980
14	Kobuk Valley (NPS)	II	708,502	1978
15	Lake Clark (NPS)	II	1,068,805	1978
16	Wrangell-St Elias (NPS)	II	3,382,014	1978
<i>National Preserves</i>				
17	Aniakchak (NPS)	II	188,427	1978
18	Bering Land Bridge (NPS)	II	1,125,124	1980
19	Denali (NPS)	II	529,800	1980
20	Gates of the Arctic (NPS)	II	383,246	1980
21	Glacier Bay (NPS)	II	23,385	1978
22	Katmai (NPS)	II	151,096	1980
23	Lake Clark (NPS)	II	568,546	1980
24	Noatak (NPS)	II	2,655,870	1978
25	Wrangell-St. Elias (NPS)	II	1,962,115	1980
26	Yukon Charley Rivers (NPS)	II	915,000	1978
<i>National Wildlife Refuges</i>				
27	Alaska Maritime (FWS)	IV	1,440,597	1980
28	Alaska Peninsula (FWS)	IV	1,417,500	1980
29	Arctic (FWS)	IV	7,714,940	1980
30	Becharof (FWS)	IV	486,000	1978
31	Innoko (FWS)	IV	1,559,250	1980
32	Izembek (FWS)	IV	129,961	1960
33	Kanutu (FWS)	IV	579,150	1980
34	Kenai (FWS)	IV	797,850	1980
35	Kenai National Moose Range (FWS)	IV	698,920	
36	Kodiak (FWS)	IV	755,325	
37	Koyukuk (FWS)	IV	1,437,750	1980
38	Nowitna (FWS)	IV	631,800	1980
39	Selawik (FWS)	IV	870,750	1980
40	Tetlin (FWS)	IV	283,500	1980
41	Togiak (FWS)	IV	1,662,525	1980
42	Yukon Delta (FWS)	IV	7,947,905	1980

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
43	Yukon Flats (FWS)	IV	3,495,150	1980
	<i>National Monuments</i>			
44	Admiralty Island (FS)	III	387,530	1980
45	Aniakchak (NPS)	III	55,514	1978
46	Cape Krusenstern (NPS)	III	267,206	1978
47	Misty Fjords (FS)	III	928,491	1980
	<i>Wildernesses</i>			
48	Chuck River (FS)	II	29,341	1990
49	Coronation Island (FS)	II	7,783	1980
50	Endicott River (FS)	II	39,954	1980
51	Karta River (FS)	II	15,640	1990
52	Kootznoowoo (FS)	II	386,732	1980
53	Kuiu (FS)	II	24,514	1990
54	Maurelle Islands (FS)	II	1,998	1980
55	Misty Fjords (FS)	II	866,939	1980
56	Petersburg Creek-Duncan Salt Chuck (FS)	II	18,930	1980
57	Pleasant/Lemusurier/Inian Islands (FS)	II	9,364	1990
58	Russell Fjord (FS)	II	141,115	1980
59	South Baranof (FS)	II	129,325	1980
60	South Etolin (FS)	II	33,849	1990
61	South Prince of Wales (FS)	II	36,825	1980
62	Stikine-LeConte (FS)	II	181,640	1980
63	Tebenkof Bay (FS)	II	27,049	1980
64	Tracy Arm-Fords Terror (FS)	II	264,333	1980
65	Warren Island (FS)	II	4,525	1980
66	West Chichagof-Yakobi (FS)	II	107,140	1980
	<b>Arizona</b>			
	<i>National Parks</i>			
67	Grand Canyon (NPS)	II	493,441	1919
68	Petrified Forest (NPS)	II	37,880	1962
	<i>National Wildlife Refuges</i>			
69	Buenos Aires (FWS)	IV	45,126	
70	Cabeza Prieta (FWS)	IV	348,042	
71	Cibola (FWS)	IV	1,277	
72	Havasú (FWS)	IV	3,138	1941
73	Imperial (FWS)	IV	7,206	1941
74	Kofa (FWS)	IV	267,102	1939
	<i>National Memorial</i>			
75	Coronado (NPS)	V	1,145	1952
	<i>National Monuments</i>			
76	Canyon de Chelly (NPS)	III	33,536	1931
77	Chiricahua (NPS)	III	4,853	1924
78	Organ Pipe Cactus (NPS)	III	133,925	1937
79	Saguaro (NPS)	III	33,836	1933
80	Sunset Crater (NPS)	III	1,230	1930
81	Wupatki (NPS)	III	14,267	1924
	<i>Wildernesses</i>			
82	Apache Creek (FS)	II	2,193	1984
83	Bear Wallow (FS)	II	4,484	1984
84	Castle Creek (FS)	II	10,534	1984
85	Cedar Bench (FS)	II	6,050	1984
86	Chiricahua (FS)	II	35,491	1964



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
87	Escudilla (FS)	II	2,104	1984
88	Fossil Springs (FS)	II	8,963	1984
89	Four Peaks (FS)	II	24,716	1984
90	Galiuro (FS)	II	30,885	1964
91	Granite Mountain (FS)	II	3,966	1984
92	Hellsgate (FS)	II	15,151	1984
93	Juniper Mesa (FS)	II	3,076	1984
94	Kachina Peaks (FS)	II	7,534	1984
95	Kanab Creek (FS)	II	25,803	1984
96	Kendrick Mountain (FS)	II	2,635	1984
97	Mazatzal (FS)	II	102,139	1964
98	Miller Peak (FS)	II	8,171	1984
99	Mount Baldy (FS)	II	2,865	1970
100	Mount Wrightson (FS)	II	10,222	1984
101	Munds Mountain (FS)	II	9,879	1984
102	Pajarita (FS)	II	3,003	1984
103	Pine Mountain (FS)	II	8,118	1972
104	Pusch Ridge (FS)	II	23,040	1978
105	Red Rock-Secret Mountain (FS)	II	19,099	1984
106	Rincon Mountain (FS)	II	15,617	1984
107	Saddle Mountain (FS)	II	16,406	1984
108	Salome (FS)	II	7,499	1984
109	Salt River Canyon (FS)	II	12,991	1984
110	Santa Teresa (FS)	II	10,838	1984
111	Sierra Ancha (FS)	II	8,438	1964
112	Strawberry Crater (FS)	II	4,348	1984
113	Superstition (FS)	II	64,652	1964
114	Sycamore Canyon (FS)	II	22,637	1972
115	West Clear Creek (FS)	II	6,167	1984
116	Wet Beaver (FS)	II	2,491	1984
117	Woodchute (FS)	II	2,266	1984
118	Aravaipa Canyon (BLM)*	II	7,972	1984
119	Arrastra Mountain (BLM)	II	52,528	1990
120	Aubrey Peak (BLM)	II	6,232	1990
121	Beaver Dam Mountains (BLM)	II	6,070	1984
122	Big Horn Mountains (BLM)	II	8,498	1990
123	Cottonwood Point (BLM)	II	2,776	1984
124	Coyote Mountains (BLM)	II	2,064	1990
125	Dos Cabezas (BLM)	II	4,735	1990
126	Eagletail Mountains (BLM)	II	40,712	1990
127	East Cactus Plain (BLM)	II	5,921	1990
128	Fishhooks (BLM)	II	4,249	1990
129	Gibraltar Mountain (BLM)	II	7,604	1990
130	Grand Wash Cliffs (BLM)	II	14,986	1984
131	Harcuvar Mountains (BLM)	II	10,137	1990
132	Harquahala Mountains (BLM)	II	9,259	1990
133	Hassayampa River Canyon (BLM)	II	4,978	1990
134	Hells Canyon (BLM)	II	4,290	1990
135	Hummingbird Springs (BLM)	II	12,626	1990
136	Kanab Creek (BLM)	II	2,711	1984
137	Mount Logan (BLM)	II	5,929	1984
138	Mount Nutt (BLM)	II	11,194	1990
139	Mount Tipton (BLM)	II	13,258	1990
140	Mount Trumbull (BLM)	II	3,189	1984
141	Mount Wilson (BLM)	II	9,672	1990
142	Muggins Mountains (BLM)	II	3,092	1990
143	Needle's Eye (BLM)	II	3,545	1990

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
144	New Water Mountains (BLM)	II	9,955	1990
145	North Maricopa Mountains (BLM)	II	25,576	1990
146	North Santa Teresa (BLM)	II	2,347	1990
147	Paiute (BLM)	II	35,572	1984
148	Paria Canyon-Vermilion Cliffs (BLM)	II	36,179	1984
149	Peloncillo Mountains (BLM)	II	7,867	1990
150	Rawhide Mountains (BLM)	II	15,568	1990
151	Redfield Canyon (BLM)	II	4,019	1990
152	Sierra Estrella (BLM)	II	5,827	1990
153	Signal Mountain (BLM)	II	5,403	1990
154	South Maricopa Mountains (BLM)	II	24,322	1990
155	Swansea (BLM)	II	6,637	1990
156	Table Top (BLM)	II	13,921	1990
157	Tres Alamos (BLM)	II	3,359	1990
158	Trigo Mountains (BLM)	II	12,262	1990
159	Upper Burro Creek (BLM)	II	11,105	1990
160	Wabayuma Peak (BLM)	II	16,187	1990
161	Warm Springs (BLM)	II	45,487	1990
162	White Canyon (BLM)	II	2,343	1990
163	Woolsey Peak (BLM)	II	25,900	1990
<i>National Recreation Areas</i>				
164	Glen Canyon (NPS)	V	483,404	1972
165	Lake Mead (NPS)	IV	1,000	1964
<b>Arkansas</b>				
<i>National Park</i>				
166	Hot Springs (NPS)	II	2,330	1921
<i>National River</i>				
167	Buffalo NaRiv (NPS)	V	38,100	1972
<i>National Wildlife Refuges</i>				
168	Big Lake (FWS)	IV	4,466	
169	Cache River (FWS)	IV	1,898	
170	Felsenthal (FWS)	IV	26,285	1975
171	Holla Bend (FWS)	IV	2,274	1957
172	Overflow (FWS)	IV	2,875	
173	Wapanocca (FWS)	IV	2,219	1961
174	White River (FWS)	IV	45,746	
<i>National Military Park</i>				
175	Pea Ridge (NPS)	V	1,729	1961
<i>Wildernesses</i>				
176	Black Fork Mountain (FS)	II	3,066	1984
177	Caney Creek (FS)	II	5,852	1975
178	Dry Creek (FS)	II	2,554	1984
179	East Fork (FS)	II	4,361	1984
180	Flatside (FS)	II	4,089	1984
181	Hurricane Creek (FS)	II	6,093	1984
182	Leatherwood (FS)	II	6,772	1984
183	Poteau Mountain (FS)	II	4,405	1984
184	Richland Creek (FS)	II	4,782	1984
185	Upper Buffalo (FS)	II	4,445	1975
<b>California</b>				
<i>National Parks</i>				
186	Channel Islands (NPS)	II	100,987	1980

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
187	Kings Canyon (NPS)	II	187,069	1940
188	Lassen Volcanic (NPS)	II	43,293	1916
189	Redwood (NPS)	II	42,400	1968
190	Sequoia (NPS)	II	163,115	1890
191	Yosemite (NPS)	II	308,273	1890
<i>National Wildlife Refuges</i>				
192	Butte Sink (FWS)	IV	3,275	
193	Clear Lake (FWS)	IV	13,543	
194	Coachella Valley (FWS)	IV	1,049	
195	Colusa (FWS)	IV	1,636	
196	Delevan (FWS)	IV	2,282	
197	Grasslands (FWS)	IV	10,669	
198	Imperial # (FWS)	IV	3,223	
199	Kern (FWS)	IV	4,297	
200	Kesterson (FWS)	IV	2,388	
201	Lower Klamath (FWS)	IV	19,027	
202	Merced (FWS)	IV	1,038	
203	Modoc (FWS)	IV	1,038	
204	Pixley (FWS)	IV	2,426	
205	Sacramento (FWS)	IV	4,367	1937
206	Salton Sea (FWS)	IV	15,219	
207	San Francisco Bay (FWS)	IV	6,978	1972
208	San Luis (FWS)	IV	3,009	
209	San Pablo Bay (FWS)	IV	4,737	
210	Sutter (FWS)	IV	1,049	1945
211	Tule Lake (FWS)	IV	15,646	1928
212	Willow Creek-Lurline (FWS)	IV	1,586	
<i>National Marine Sanctuaries</i>				
213	Bitter Creek (NOAA)	IV	5,482	1973
214	Channel Islands (NOAA)	V	405,506	1980
215	Cordell Bank (NOAA)	V	128,777	1989
216	Gulf of the Farallones (NOAA)	V	307,044	1981
<i>National Monuments</i>				
217	Death Valley (NPS)	III	837,388	1933
218	Joshua Tree (NPS)	III	226,781	1936
219	Lava Beds (NPS)	III	18,856	1925
220	Pinnacles (NPS)	III	6,587	1908
<i>National Seashore</i>				
221	Point Reyes NS (NPS)	V	28,733	1972
<i>Wildernesses</i>				
222	Agua Tibia (FS)	II	6,448	1975
223	Ansel Adams (FS)	II	93,182	1964
224	Bucks Lake (FS)	II	8,498	1984
225	Caribou (FS)	II	8,315	1964
226	Carson-Iceberg (FS)	II	64,195	1984
227	Castle Crags (FS)	II	3,491	1984
228	Chanchelulla (FS)	II	3,318	1984
229	Cucamonga (FS)	II	5,172	1984
230	Desolation (FS)	II	25,688	1969
231	Dick Smith (FS)	II	27,438	1984
232	Dinkey Lakes (FS)	II	12,141	1984
233	Dome Land (FS)	II	37,952	1964
234	Emigrant (FS)	II	45,437	1975
235	Golden Trout (FS)	II	122,827	1978



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
236	Granite Chief (FS)	II	7,708	1984
237	Hauser (FS)	II	3,054	1984
238	Hoover (FS)	II	19,668	1964
239	Ishi (FS)	II	16,632	1984
240	Jennie Lakes (FS)	II	4,164	1984
241	John Muir (FS)	II	234,849	1964
242	Kaiser (FS)	II	9,186	1976
243	Machesna Mountain (FS)	II	7,997	1984
244	Marble Mountain (FS)	II	97,831	1964
245	Mokelumne (FS)	II	40,032	1964
246	Monarch (FS)	II	18,169	1984
247	Mount Shasta (FS)	II	13,697	1984
248	North Fork (FS)	II	3,237	1984
249	Pine Creek (FS)	II	5,455	1984
250	Red Buttes (FS)	II	6,536	1984
251	Russian (FS)	II	4,856	1984
252	San Gabriel (FS)	II	14,616	1968
253	San Geronio (FS)	II	22,955	1964
254	San Jacinto (FS)	II	13,050	1964
255	San Mateo Canyon (FS)	II	15,574	1984
256	San Rafael (FS)	II	61,100	1968
257	Santa Lucia (FS)	II	7,559	1978
258	Santa Rosa (FS)	II	5,579	1984
259	Sheep Mountain (FS)	II	16,950	1984
260	Siskiyou (FS)	II	61,788	1984
261	Snow Mountain (FS)	II	14,718	1984
262	South Sierra (FS)	II	33,218	1984
263	South Warner (FS)	II	28,577	1964
264	Thousand Lakes (FS)	II	6,611	1964
265	Trinity Alps (FS)	II	201,591	1984
266	Ventana (FS)	II	66,441	1969
267	Yolla Bolly-Middle Eel (FS)	II	59,366	1964
268	Trinity Alps (BLM)	II	1,871	1984
269	Yolla Bolly-Middle Eel (BLM)	II	2,891	1984
<i>National Recreation Areas</i>				
270	Golden Gate (NPS)	V	29,611	1972
271	Santa Monica Mountains (NPS)	V	60,729	1978
272	Whiskeytown Shasta Trinity (NPS)	V	17,213	1965
<b>Colorado</b>				
<i>National Parks</i>				
273	Mesa Verde (NPS)	II	20,830	1906
274	Rocky Mountain (NPS)	II	107,519	1915
<i>National Wildlife Refuges</i>				
275	Alamosa (FWS)	IV	4,523	1962
276	Arapaho (FWS)	IV	7,393	1967
277	Browns Park (FWS)	IV	5,449	
278	Monte Vista (FWS)	IV	5,746	
<i>National Monuments</i>				
279	Black Canyon of the Gunnison (NPS)	III	5,682	1933
280	Colorado (NPS)	III	8,274	1911
281	Dinosaur (NPS)	III	82,655	1915
282	Florissant Fossil Beds (NPS)	III	1,698	1969
283	Great Sand Dunes (NPS)	III	14,596	1932

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Wildernesses</i>			
284	Big Blue (FS)	II	39,847	1980
285	Cache La Poudre (FS)	II	3,739	1980
286	Collegiate Peaks (FS)	II	67,468	1980
287	Comanche Peak (FS)	II	27,029	1980
288	Eagles Nest (FS)	II	53,955	1976
289	Flat Tops (FS)	II	95,116	1975
290	Holy Cross (FS)	II	49,529	1980
291	Hunter Fryingpan (FS)	II	30,108	1978
292	Indian Peaks (FS)	II	28,479	1978
293	La Garita (FS)	II	42,082	1964
294	Lizard Head (FS)	II	16,669	1980
295	Lost Creek (FS)	II	42,529	1980
296	Maroon Bells-Snowmass (FS)	II	73,233	1980
297	Mount Evans (FS)	II	30,109	1980
298	Mount Massive (FS)	II	11,323	1980
299	Mount Sneffels (FS)	II	6,679	1980
300	Mount Zirkel (FS)	II	56,583	1964
301	Neota (FS)	II	4,016	1980
302	Never Summer (FS)	II	5,567	1980
303	Raggeds (FS)	II	24,087	1980
304	Rawah (FS)	II	29,570	1964
305	South San Juan (FS)	II	51,675	1980
306	Weminuche (FS)	II	185,996	1975
307	West Elk (FS)	II	71,295	1964
	<i>National Recreation Area</i>			
308	Curecanti (NPS)	V	16,985	1965
	<b>Delaware</b>			
	<i>National Wildlife Refuges</i>			
309	Bombay Hook (FWS)	IV	6,124	
310	Prime Hook (FWS)	IV	3,929	
	<b>Florida</b>			
	<i>National Parks</i>			
311	Biscayne (NPS)	II	41,967	1980
312	Everglades (NPS)	II	592,920	1947
	<i>National Preserve</i>			
313	Big Cypress (NPS)	II	21,198	1974
	<i>National Wildlife Refuges</i>			
314	Arthur R. Mitchell Loxahatchee (FWS)	IV	58,994	1951
315	Chassahowitzka (FWS)	IV	12,317	
316	Crocodile Lake (FWS)	IV	1,619	
317	Great White Heron (FWS)	IV	2,996	
318	J.N. "Ding" Darling (FWS)	IV	2,037	1945
319	Lake Woodruff (FWS)	IV	7,494	1964
320	Lower Suwannee (FWS)	IV	15,856	
321	Merritt Island (FWS)	IV	56,356	
322	National Key Deer (FWS)	IV	3,068	
323	Okefenokee (Florida) (FWS)	IV	1,490	1937
324	Pelican Island (FWS)	IV	1,780	
325	St. Johns (FWS)	IV	2,533	
326	St. Mark's (FWS)	IV	26,399	1931
327	St. Vincent (FWS)	IV	31,650	1968

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Marine Sanctuaries</i>			
328	Key Largo Coral Reef (NOAA)	V	32,388	1975
329	Looe Key (NOAA)	V	1,554	1981
	<i>National Estuarine Research Reserve</i>			
330	Rookery Bay (NOAA)	IV	8,585	1991
	<i>National Monument</i>			
331	Fort Jefferson (NPS)	III	19,083	1935
	<i>National Seashores</i>			
332	Canaveral NS (NPS)	V	23,321	1975
333	Gulf Islands (Florida) NS (NPS)	V	57,084	1971
	<i>Wildernesses</i>			
334	Alexander Springs (FS)	II	3,116	1984
335	Big Gum Swamp (FS)	II	5,504	1984
336	Billies Bay (FS)	II	1,263	1984
337	Bradwell Bay (FS)	II	9,956	1975
338	Juniper Prairie (FS)	II	5,366	1984
339	Little Lake George (FS)	II	1,012	1984
340	Mud Swamp/New River (FS)	II	3,157	1984
	<b>Georgia</b>			
	<i>National Wildlife Refuges</i>			
341	Banks Lake (FWS)	IV	1,639	
342	Blackbeard Island (FWS)	IV	2,275	1940
343	Eufaula (FWS)	IV	1,309	
344	Harris Neck (FWS)	IV	1,119	1962
345	Okefenokee (FWS)	IV	158,518	
346	Piedmont (FWS)	IV	14,044	1939
347	Savannah (FWS)	IV	4,586	1927
348	Wassaw Island (FWS)	IV	4,078	1968
349	Wolf Island (FWS)	IV	2,076	1930
	<i>National Marine Sanctuary</i>			
350	Gray's Reef (NOAA)	IV	5,441	1981
	<i>National Military Park</i>			
351	Chickamauga and Chattanooga (NPS)	V	3,278	1890
	<i>National Battlefield Park</i>			
352	Kennesaw Mountain (NPS)	V	1,488	1917
	<i>National Estuarine Research Reserve</i>			
353	Sapelo Island (NOAA)	IV	2,892	1976
	<i>National Monument</i>			
354	Fort Pulaski (NPS)	V	2,229	1924
	<i>National Seashore</i>			
355	Cumberland Island NS (NPS)	V	14,924	1972
	<i>Wildernesses</i>			
356	Blood Mountain (FS)	II	3,157	1991
357	Brasstown (FS)	II	5,000	1986
358	Cohutta (FS)	II	14,264	1975
359	Mark Trail (FS)	II	6,831	1991
360	Raven Cliffs (FS)	II	3,465	1986
361	Rich Mountain (FS)	II	3,840	1986



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
362	Southern Nantahala (FS)	II	5,034	1984
363	Tray Mountain (FS)	II	3,926	1986
<b>Hawaii</b>				
For a list of sites, a map, and detailed information concerning this state, see Volume I				
<b>Idaho</b>				
<i>National Scenic River</i>				
364	Salmon River (FS)	V	12,943	1968
<i>National Wildlife Refuges</i>				
365	Bear Lake (FWS)	IV	7,269	1968
366	Camas (FWS)	IV	4,284	
367	Deer Flat (FWS)	IV	4,562	
368	Grays Lake (FWS)	IV	6,652	1965
369	Kootenai (FWS)	IV	1,123	
370	Minidoka (FWS)	IV	8,386	
<i>National Monument</i>				
371	Craters of the Moon (NPS)	III	21,669	1924
<i>Wildernesses</i>				
372	Gospel Hump (FS)	II	83,270	1978
373	Hells Canyon (FS)	II	33,917	1975
374	Sawtooth (FS)	II	87,853	1972
375	Selway-Bitterroot (FS)	II	440,711	1964
376	Frank Church-River of No Return (FS)	II	957,224	1980
<i>National Historic Park</i>				
377	Nez Perce (NPS)	V	1,212	1965
<b>Illinois</b>				
<i>National Wildlife Refuges</i>				
378	Chautauqua (FWS)	IV	2,510	
379	Crab Orchard (FWS)	IV	17,682	
380	Mark Twain (FWS)	IV	6,714	1958
381	Mississippi River Caue (FWS)	IV	8,148	
<i>Wildernesses</i>				
382	Bald Knob (FS)	II	2,373	1990
383	Bay Creek (FS)	II	1,160	1990
384	Burden Falls (FS)	II	1,486	1990
385	Clear Springs (FS)	II	1,914	1990
386	Garden of the Gods (FS)	II	1,323	1990
387	Lusk Creek (FS)	II	1,807	1990
<b>Indiana</b>				
<i>National Wildlife Refuge</i>				
388	Muscatatuck (FWS)	IV	3,128	
<i>National Lakeshore</i>				
389	Indiana Dunes (NPS)	V	5,073	1966
<i>Wilderness</i>				
390	Charles C. Deam (FS)	II	5,235	1982
<b>Iowa</b>				
<i>National Wildlife Refuges</i>				
391	De Soto (FWS)	IV	1,417	
392	Mark Twain (FWS)	IV	4,241	
393	Mississippi River Caue (FWS)	IV	12,278	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
394	Union Slough (FWS)	IV	1,152	1938
395	Upper Mississippi (FWS)	IV	8,230	1924
<b>Kansas</b>				
<i>National Wildlife Refuges</i>				
396	Flint Hills (FWS)	IV	7,478	1966
397	Kirwin (FWS)	IV	4,365	
398	Quivira (FWS)	IV	8,837	
<b>Kentucky</b>				
<i>National Park</i>				
399	Mammoth Cave (NPS)	II	20,541	1934
<i>Wildernesses</i>				
400	Beaver Creek (FS)	II	1,925	1975
401	Clifty (FS)	II	5,029	1985
<i>National Historic Park</i>				
402	Cumberland Gap (NPS)	V	8,150	1940
<b>Louisiana</b>				
<i>National Wildlife Refuges</i>				
403	Atchafalaya (FWS)	IV	6,178	
404	Bogue Chitto (FWS)	IV	8,324	
405	Breton (FWS)	IV	3,664	1904
406	Catahoula (FWS)	IV	2,150	
407	D'Arbonne (FWS)	IV	7,055	
408	Delta (FWS)	IV	19,763	1935
409	Lacassine (FWS)	IV	13,213	
410	Sabine (FWS)	IV	56,472	
411	Tensas River (FWS)	IV	22,259	
412	Upper Ouachita (FWS)	IV	8,460	1978
<i>Wilderness</i>				
413	Kisatchie Hills (FS)	II	3,521	1980
<i>National Historic Park</i>				
414	Jean Lafitte (NPS)	V	3,480	1978
<b>Maine</b>				
<i>National Park</i>				
415	Acadia (NPS)	II	15,590	1919
<i>National Wildlife Refuges</i>				
416	Moosehorn (FWS)	IV	9,211	1937
417	Petit Manan (FWS)	IV	1,350	
418	Rachel Carson (FWS)	IV	1,280	
<i>Wilderness</i>				
419	Caribou-Speckled Mountain (FS)	II	4,856	1990
<b>Maryland</b>				
<i>National Wildlife Refuges</i>				
420	Blackwater (FWS)	IV	6,353	
421	Martin (FWS)	IV	1,791	
422	Patuxent (FWS)	IV	1,896	
<i>National Estuarine Research Reserve</i>				
423	Chesapeake Bay (NOAA)	IV	2,374	1981

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
424	<i>National Seashore</i> Assateague Island NS (NPS)	V	16,038	1965
	<i>Parks</i>			
425	Catoctin Mountain (NPS)	V	2,334	1936
426	Piscataway (NPS)	V	1,701	1961
	<i>National Historic Park</i>			
427	Chesapeake and Ohio Canal (NPS)	V	50,161	1971
	<b>Massachusetts</b>			
	<i>National Wildlife Refuges</i>			
428	Great Meadows (FWS)	IV	1,168	1944
429	Monomoy (FWS)	IV	1,094	
430	Parker River (FWS)	IV	1,888	
	<i>National Estuarine Research Reserve</i>			
431	Waquoit Bay (NOAA)	IV	1,077	1988
	<i>National Seashore</i>			
432	Cape Cod (NPS)	V	18,018	1961
	<b>Michigan</b>			
	<i>National Park</i>			
433	Isle Royale (NPS)	II	215,740	1940
	<i>National Wildlife Refuges</i>			
434	Kirtlands Warbler (FWS)	IV	2,127	
435	Seney (FWS)	IV	38,659	
436	Shiawassee (FWS)	IV	3,639	1953
	<i>National Lakeshores</i>			
437	Pictured Rocks (NPS)	V	28,661	1966
438	Sleeping Bear Dunes (NPS)	V	28,775	1970
	<i>Wildernesses</i>			
439	Big Island Lake (FS)	II	2,363	1987
440	Delirium (FS)	II	4,804	1987
441	Horseshoe Bay (FS)	II	1,534	1987
442	Mackinac (FS)	II	4,949	1987
443	McCormick (FS)	II	6,819	1987
444	Nordhouse Dunes (FS)	II	1,396	1987
445	Rock River Canyon (FS)	II	1,878	1987
446	Sturgeon River Gorge (FS)	II	5,868	1987
447	Sylvania (FS)	II	7,417	1987
	<b>Minnesota</b>			
	<i>National Park</i>			
448	Voyageurs (NPS)	II	87,772	1971
	<i>National Wildlife Refuges</i>			
449	Agassiz (FWS)	IV	24,726	1937
450	Big Stone (FWS)	IV	4,371	
451	Mid-Continent WMP (FWS)	IV	1,999	
452	Minnesota Valley (FWS)	IV	2,973	
453	Mississippi River Caue (FWS)	IV	6,246	
454	Rice Lake (FWS)	IV	6,629	
455	Sherburne (FWS)	IV	11,981	1965
456	Tamarac (FWS)	IV	14,252	1938
457	Upper Mississippi (FWS)	IV	7,189	



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Wilderness</i>			
458	Boundary Waters Canoe Area (FS)	II	323,457	1964
	<b>Mississippi</b>			
	<i>National Wildlife Refuges</i>			
459	Bogue Chitto (FWS)	IV	2,648	
460	Hillside (FWS)	IV	6,239	1975
461	Mississippi Sandhill Crane (FWS)	IV	7,692	1974
462	Morgan Brake (FWS)	IV	1,324	
463	Noxubee (FWS)	IV	18,786	1940
464	Panther Swamp (FWS)	IV	10,993	
465	Yazoo (FWS)	IV	5,051	
	<i>Wilderness</i>			
466	Black Creek (FS)	II	2,028	1984
	<b>Missouri</b>			
	<i>National Scenic River</i>			
467	Ozark NScRv (NPS)	V	32,209	1972
	<i>National Wildlife Refuges</i>			
468	Clarence Cannon (FWS)	IV	1,513	1964
469	Mingo (FWS)	IV	8,779	
470	Squaw Creek (FWS)	IV	2,802	
471	Swan Lake (FWS)	IV	4,321	1937
	<i>Wildernesses</i>			
472	Bell Mountain (FS)	II	3,633	1980
473	Devils Backbone (FS)	II	2,669	1980
474	Hercules Glades (FS)	II	4,983	1976
475	Irish (FS)	II	6,522	1984
476	Paddy Creek (FS)	II	2,841	1983
477	Piney Creek (FS)	II	3,273	1980
478	Rockpile Mountain (FS)	II	1,655	1980
	<b>Montana</b>			
	<i>National Park</i>			
479	Glacier (NPS)	II	410,058	1910
	<i>National Wildlife Refuges</i>			
480	Benton Lake (FWS)	IV	5,015	
481	Bowdoin (FWS)	IV	5,094	
482	Charles M. Russell (FWS)	IV	364,808	1936
483	Creedman Coulee (FWS)	IV	1,105	
484	Halfbreed Lake (FWS)	IV	1,748	
485	Lake Mason (FWS)	IV	6,773	
486	Lake Thibadeau (FWS)	IV	1,567	
487	Lee Metcalf (FWS)	IV	1,131	1964
488	Medicine Lake (FWS)	IV	9,243	
489	National Bison Range (FWS)	IV	7,509	
490	Pablo (FWS)	IV	1,030	
491	Red Rock Lakes (FWS)	IV	14,050	
492	Ul Bend (FWS)	IV	22,700	
493	War Horse (FWS)	IV	1,293	
	<i>Wildernesses</i>			
494	Absaroka-Beartooth (FS)	II	372,445	1978
495	Anaconda-Pintler (FS)	II	63,890	1964
496	Bob Marshall (FS)	II	408,474	1964
497	Cabinet Mountains (FS)	II	38,151	1964

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
498	Gates of the Mountains (FS)	II	11,559	1964
499	Great Bear (FS)	II	116,024	1978
500	Lee Metcalf (FS)	II	100,744	1983
501	Mission Mountains (FS)	II	29,897	1975
502	Rattlesnake (FS)	II	13,292	1980
503	Scapegoat (FS)	II	96,840	1972
504	Selway-Bitterroot (FS)	II	101,756	1964
505	Welcome Creek (FS)	II	11,386	1978
506	Lee Metcalf (BLM)	II	2,428	1983
<i>National Recreation Area</i>				
507	Bighorn Canyon (NPS)	V	48,644	1966
<b>Nebraska</b>				
<i>National Wildlife Refuges</i>				
508	Crescent Lake (FWS)	IV	18,556	
509	De Soto (FWS)	IV	1,751	
510	Fort Niobrara (FWS)	IV	7,563	1912
511	North Platte (FWS)	IV	2,044	
512	Valentine (FWS)	IV	27,174	1935
<i>National Monuments</i>				
513	Agate Fossil Beds (NPS)	III	1,236	1965
514	Lehman Caves (NPS)	III	3,098	1922
515	Scotts Bluff (NPS)	V	1,209	1919
<i>Wilderness</i>				
516	Soldier Creek (FS)	II	3,154	1986
<b>Nevada</b>				
<i>National Park</i>				
517	Great Basin (NPS)	II	31,080	1986
<i>National Wildlife Refuges</i>				
518	Ash Meadows (FWS)	IV	5,174	
519	Desert (FWS)	IV	643,471	
520	Fallon (FWS)	IV	7,250	
521	Paharanagat (FWS)	IV	2,179	
522	Ruby Lake (FWS)	IV	15,230	
523	Sheldon (FWS)	IV	231,037	1931
524	Stillwater (FWS)	IV	9,802	
<i>Wildernesses</i>				
525	Alta Toquima (FS)	II	15,378	1989
526	Arc Dome (FS)	II	46,539	1989
527	Boundary Peak (FS)	II	4,047	1989
528	Currant Mountain (FS)	II	14,569	1989
529	East Humboldt (FS)	II	14,933	1989
530	Grant Range (FS)	II	20,234	1989
531	Jarbidge (FS)	II	45,797	1964
532	Mount Charleston (FS)	II	17,402	1989
533	Mount Moriah (FS)	II	33,184	1989
534	Mount Rose (FS)	II	11,331	1989
535	Quinn Canyon (FS)	II	10,927	1989
536	Ruby Mountains (FS)	II	36,422	1989
537	Santa Rosa - Paradise Peak (FS)	II	12,545	1989
538	Table Mountain (FS)	II	39,659	1989
539	Mount Moriah (BLM)	II	2,604	1989

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
540	<i>National Recreation Area</i> Lake Mead (NPS)	V	606,123	1964
<b>New Hampshire</b>				
541	<i>National Estuarine Research Reserve</i> Great Bay (NOAA)	IV	3,002	1989
<i>Wildernesses</i>				
542	Great Gulf (FS)	II	2,247	1964
543	Pemigewasset (FS)	II	18,211	1984
544	Presidential Range-Dry River (FS)	II	11,080	1975
545	Sandwich Range (FS)	II	10,117	1984
<b>New Jersey</b>				
546	<i>National Reserve</i> Pinelands NaR (NPS)	V	438,210	1978
<i>National Wildlife Refuges</i>				
547	Edwin B. Forsythe (FWS)	IV	14,017	
548	Great Swamp (FWS)	IV	2,809	1964
<i>National Recreation Area</i>				
549	Delaware Water Gap (NPS)	V	28,340	1965
<b>New Mexico</b>				
550	<i>National Park</i> Carlsbad Caverns (NPS)	II	18,921	1930
<i>National Wildlife Refuges</i>				
551	Bitter Lake (FWS)	IV	9,457	
552	Bosque del Apache (FWS)	IV	23,162	1939
553	Grulla (FWS)	IV	1,309	1969
554	Las Vegas (FWS)	IV	3,499	
555	Maxwell (FWS)	IV	1,498	
556	San Andres (FWS)	IV	23,172	
557	Sevilleta (FWS)	IV	92,394	1973
<i>National Monuments</i>				
558	Bandelier (NPS)	III	14,904	1916
559	Chaco Canyon (NPS)	III	8,708	1907
560	White Sands (NPS)	III	58,614	1933
902	El Malpais (NPS)	III	46,170	1987
<i>Wildernesses</i>				
561	Aldo Leopold (FS)	II	81,753	1980
562	Apache Kid (FS)	II	18,060	1980
563	Blue Range (FS)	II	11,859	1980
564	Capitan Mountains (FS)	II	14,026	1980
565	Chama River Canyon (FS)	II	20,356	1978
566	Cruces Basin (FS)	II	7,284	1980
567	Dome (FS)	II	2,104	1980
568	Gila (FS)	II	225,764	1964
569	Latir Peak (FS)	II	8,094	1980
570	Manzano Mountain (FS)	II	14,923	1978
571	Pecos (FS)	II	90,380	1964
572	San Pedro Parkss (FS)	II	16,646	1964
573	Sandia Mountain (FS)	II	15,328	1978
574	Wheeler Peak (FS)	II	7,957	1964
575	White Mountain (FS)	II	19,509	1964
576	Withington (FS)	II	7,689	1980

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
577	Bisti (BLM)	II	1,597	1984
578	Cebolla (BLM)	II	25,414	1987
579	De-na-zin (BLM)	II	9,087	1984
580	West Malpais (BLM)	II	16,066	1987
<i>National Historic Park</i>				
581	Chaco Culture (NPS)	V	13,760	1907
<b>New York</b>				
<i>National Wildlife Refuges</i>				
582	Iroquois (FWS)	IV	4,381	1958
583	Montezuma (FWS)	IV	2,605	
584	Oyster Bay (FWS)	IV	1,298	
<i>National Estuarine Research Reserve</i>				
585	Hudson River (NOAA)	IV	2,023	1982
<i>National Seashore</i>				
586	Fire Island NS (NPS)	V	7,834	1964
<i>National Historic Park</i>				
587	Saratoga (NPS)	V	2,222	1938
<b>North Carolina</b>				
<i>National Wildlife Refuges</i>				
588	Alligator River (FWS)	IV	56,297	
589	Cedar Island (FWS)	IV	5,073	
590	Great Dismal Swamp # (FWS)	IV	9,945	
591	Mackay Island (FWS)	IV	2,526	
592	Mattamuskeet (FWS)	IV	20,323	
593	Pea Island (FWS)	IV	2,376	
594	Pee Dee (FWS)	IV	3,418	
595	Pungo (FWS)	IV	5,002	
596	Swanquarter (FWS)	IV	6,335	
<i>National Estuarine Research Reserve</i>				
597	North Carolina (NOAA)	IV	4,743	1982
<i>National Seashores</i>				
598	Cape Hatteras NS (NPS)	V	12,270	1937
599	Cape Lookout National Seashore (NPS)	V	11,493	1966
<i>Wildernesses</i>				
600	Birkhead Mountains (FS)	II	1,938	1984
601	Catfish Lake South (FS)	II	3,076	1984
602	Ellicott Rock (FS)	II	1,590	1975
603	Joyce Kilmer-Slickrock (FS)	II	5,314	1975
604	Linville Gorge (FS)	II	4,441	1964
605	Middle Prong (FS)	II	3,197	1984
606	Pocosin (FS)	II	4,452	1984
607	Sheep Ridge (FS)	II	3,861	1984
608	Shining Rock (FS)	II	7,466	1964
609	Southern Nantahala (FS)	II	4,895	1984
<b>North Dakota</b>				
<i>National Park</i>				
610	Theodore Roosevelt (NPS)	II	28,150	1978
<i>National Wildlife Refuges</i>				
611	Ardoch (FWS)	IV	1,092	
612	Arrowwood (FWS)	IV	6,453	1935



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
613	Audubon (FWS)	IV	5,969	1956
614	Chase Lake (FWS)	IV	1,776	1908
615	Dakota Lake (FWS)	IV	1,116	
616	Des Lacs (FWS)	IV	7,915	
617	J. Clark Salyer (FWS)	IV	23,771	
618	Lake Alice (FWS)	IV	4,534	
619	Lake George (FWS)	IV	1,263	
620	Lake Ilo (FWS)	IV	1,637	
621	Lake Nettie (FWS)	IV	1,237	
622	Lake Zahl (FWS)	IV	1,548	
623	Long Lake (FWS)	IV	9,046	1932
624	Lostwood (FWS)	IV	10,048	
625	Rock Lake (FWS)	IV	2,230	
626	Silver Lake (FWS)	IV	1,356	
627	Slade (FWS)	IV	1,215	1941
628	Tewaukon (FWS)	IV	3,327	1935
629	Upper Souris (FWS)	IV	12,997	
630	Willow Lake (FWS)	IV	1,062	
<b>Ohio</b>				
<i>National Wildlife Refuge</i>				
631	Ottawa (FWS)	IV	2,346	
<i>National Recreation Area</i>				
632	Cuyahoga Valley (NPS)	V	12,950	1975
<b>Oklahoma</b>				
<i>National Wildlife Refuges</i>				
633	Optima (FWS)	IV	1,755	
634	Salt Plains (FWS)	IV	12,958	1930
635	Sequoyah (FWS)	IV	8,424	1971
636	Tishomingo (FWS)	IV	6,668	1943
637	Washita (FWS)	IV	3,274	
638	Wichita Mountains (FWS)	IV	23,903	
<i>Wildernesses</i>				
639	Blackfork Mountain (FS)	II	1,855	1988
640	Upper Kiamichi (FS)	II	3,922	1988
<i>National Recreation Area</i>				
641	Arbuckle (NPS)	V	3,576	1965
<b>Oregon</b>				
<i>National Park</i>				
642	Crater Lake (NPS)	II	74,150	1902
<i>National Wildlife Refuges</i>				
643	Ankeny (FWS)	IV	1,132	1965
644	Baskett Slough (FWS)	IV	1,009	1965
645	Bear Valley (FWS)	IV	1,378	
646	Cold Springs (FWS)	IV	1,262	1909
647	Hart Mountain (FWS)	IV	100,994	
648	Klamath Forest (FWS)	IV	6,633	
649	Lewis and Clark (FWS)	IV	15,390	
650	Lower Klamath # (FWS)	IV	2,680	
651	Malheur (FWS)	IV	74,707	
652	Umatilla (FWS)	IV	3,596	1969
653	Upper Klamath (FWS)	IV	5,045	1928
654	William L. Finley (FWS)	IV	2,157	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
655	<i>National Estuarine Research Reserve</i> South Slough (NOAA)	IV	2,502	1974
656	<i>National Monument</i> John Day Fossil Beds (NPS)	III	5,671	1974
	<i>Wildernesses</i>			
657	Badger Creek (FS)	II	9,712	1984
658	Black Canyon (FS)	II	5,423	1984
659	Boulder Creek (FS)	II	7,730	1984
660	Bridge Creek (FS)	II	2,185	1984
661	Bull of the Woods (FS)	II	14,124	1984
662	Columbia (FS)	II	15,783	1984
663	Cummins Creek (FS)	II	3,712	1984
664	Diamond Peak (FS)	II	21,928	1964
665	Drift Creek (FS)	II	2,346	1984
666	Eagle Cap (FS)	II	145,065	1964
667	Gearhart Mountain (FS)	II	9,231	1964
668	Grassy Knob (FS)	II	6,961	1984
669	Hells Canyon (FS)	II	52,648	1975
670	Kalmiopsis (FS)	II	72,722	1964
671	Menagerie (FS)	II	1,942	1984
672	Middle Santiam (FS)	II	3,035	1984
673	Mill Creek (FS)	II	7,042	1984
674	Monument Rock (FS)	II	7,952	1984
675	Mount Hood (FS)	II	18,826	1964
676	Mount Jefferson (FS)	II	43,305	1968
677	Mount Thielsen (FS)	II	22,298	1984
678	Mount Washington (FS)	II	21,342	1964
679	Mountain Lakes (FS)	II	9,337	1964
680	North Fork John Day (FS)	II	49,110	1984
681	North Fork Umatilla (FS)	II	8,270	1984
682	Red Buttes (FS)	II	1,518	1984
683	Rock Creek (FS)	II	3,024	1984
684	Rogue-Umpqua Divide (FS)	II	13,436	1984
685	Salmon-Huckleberry (FS)	II	18,033	1984
686	Sky Lakes (FS)	II	47,065	1984
687	Strawberry Mountain (FS)	II	27,802	1964
688	Three Sisters (FS)	II	115,418	1964
689	Waldo Lake (FS)	II	15,864	1984
690	Wenaha-Tucannon (FS)	II	26,861	1978
691	Wild Rogue (FS)	II	10,383	1978
692	Table Rock (BLM)	II	2,327	1984
693	Wild Rogue (BLM)	II	3,630	1978
	<b>Pennsylvania</b>			
694	<i>National Scenic River</i> Middle Delaware NScRv (NPS)	V	1,113	1978
695	<i>National Wildlife Refuge</i> Erie (FWS)	IV	3,238	
696	<i>National Estuarine Research Reserve</i> Narragonsett Bay (NOAA)	IV	1,286	1980
697	<i>Wilderness</i> Hickory Creek (FS)	II	3,468	1984
	<i>National Historic Park</i>			

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
698	Gettysburg (NPS)	V	1,377	1895
699	<i>National Recreation Area</i> Delaware Water Gap (NPS)	V	11,478	1965
	<b>South Carolina</b>			
	<i>National Wildlife Refuges</i>			
700	Cape Romain (FWS)	IV	13,861	1932
701	Carolina Sandhills (FWS)	IV	18,319	
702	Pinckney Island (FWS)	IV	1,641	1975
703	Santee (FWS)	IV	17,673	1941
704	Savannah # (FWS)	IV	5,785	
705	Waubay (FWS)	IV	1,047	
	<i>National Monument</i>			
706	Congaree Swamp (NPS)	III	6,125	1976
	<i>Wildernesses</i>			
707	Ellicott Rock (FS)	II	1,137	1975
708	Little Wambaw Swamp (FS)	II	2,086	1980
709	Wambaw Swamp (FS)	II	1,929	1980
	<b>South Dakota</b>			
	<i>National Parks</i>			
710	Badlands (NPS)	II	98,463	1978
711	Wind Cave (NPS)	II	11,223	1903
	<i>National Wildlife Refuges</i>			
712	La Creek (FWS)	IV	6,650	
713	Pocasse (FWS)	IV	1,047	
714	Sand Lake (FWS)	IV	8,039	1935
	<i>Wilderness</i>			
715	Black Elk (FS)	II	3,976	1980
	<b>Tennessee</b>			
	<i>National Park</i>			
716	Great Smoky Mountains (NPS)	II	209,160	1934
	<i>National Scenic River</i>			
717	Obed (NPS)	V	2,125	1976
	<i>National Wildlife Refuges</i>			
718	Chickasaw (FWS)	IV	6,266	
719	Cross Creeks (FWS)	IV	3,589	
720	Hatchie (FWS)	IV	5,285	1965
721	Lower Hatchie (FWS)	IV	1,678	
722	Tennessee (FWS)	IV	20,800	
	<i>Wildernesses</i>			
723	Bald River Gorge (FS)	II	1,506	1984
724	Big Frog (FS)	II	3,232	1984
725	Big Laurel Branch (FS)	II	2,530	1986
726	Citico Creek (FS)	II	6,566	1984
727	Gee Creek (FS)	II	1,009	1975
728	Joyce Kilmer-Slickrock (FS)	II	1,551	1975
729	Little Frog Mountain (FS)	II	1,896	1986
730	Pond Mountain (FS)	II	2,681	1986
731	Sampson Mountain (FS)	II	3,367	1986
732	Unaka Mountain (FS)	II	1,902	1986

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>Texas</i>				
<i>National Parks</i>				
733	Big Bend (NPS)	II	286,572	1944
734	Guadalupe Mountains (NPS)	II	31,364	1972
<i>National Preserve</i>				
735	Big Thicket (NPS)	V	34,712	1974
<i>National Scenic River</i>				
736	Rio Grande (NPS)	V	3,885	1978
<i>National Wildlife Refuges</i>				
737	Anahuac (FWS)	IV	9,897	1963
738	Aransas (FWS)	IV	42,407	1937
739	Attwater's Prairie Chicken (FWS)	IV	3,234	1972
740	Big Boggy (FWS)	IV	1,770	
741	Brazoria (FWS)	IV	4,941	
742	Buffalo Lake (FWS)	IV	3,104	
743	Hagerman (FWS)	IV	4,585	1945
744	Laguna Atascosa (FWS)	IV	18,301	
745	Lower Rio Grande Valley (FWS)	IV	10,662	
746	McFaddin (FWS)	IV	17,397	
747	Moody (FWS)	IV	1,424	
748	Muleshoe (FWS)	IV	2,352	
749	San Bernard (FWS)	IV	9,904	1967
750	Texas Point (FWS)	IV	3,626	
<i>National Seashore</i>				
751	Padre Island NS (NPS)	V	54,196	1968
<i>Wildernesses</i>				
752	Big Slough (FS)	II	1,450	1984
753	Indian Mounds (FS)	II	4,418	1984
754	Little Lake Creek (FS)	II	1,542	1984
755	Turkey Hill (FS)	II	2,139	1984
756	Upland Island (FS)	II	5,027	1984
<i>National Recreation Areas</i>				
757	Amistad (NPS)	V	26,260	1965
758	Sanford (NPS)	V	16,603	1965
759	Shadow Mountain (NPS)	V	7,369	1952
<b>Utah</b>				
<i>National Parks</i>				
760	Arches (NPS)	II	29,260	1971
761	Bryce Canyon (NPS)	II	14,405	1924
762	Canyonlands (NPS)	II	136,542	1964
763	Capitol Reef (NPS)	II	97,870	1971
764	Zion (NPS)	II	59,308	1909
<i>National Wildlife Refuges</i>				
765	Bear River (FWS)	IV	26,337	
766	Fish Springs (FWS)	IV	5,758	1959
767	Ouray (FWS)	IV	4,651	
<i>National Monuments</i>				
768	Cedar Breaks (NPS)	III	2,469	1933
769	Natural Bridges (NPS)	III	3,040	1908



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>Wildernesses</i>				
770	Ashdown Gorge (FS)	II	2,833	1984
771	Box-Death Hollow (FS)	II	10,421	1984
772	Dark Canyon (FS)	II	18,211	1984
773	Deseret Peak (FS)	II	10,320	1984
774	High Uintas (FS)	II	184,823	1984
775	Lone Peak (FS)	II	12,176	1978
776	Mount Naomi (FS)	II	17,948	1984
777	Mount Nebo (FS)	II	11,331	1984
778	Mount Olympus (FS)	II	6,475	1984
779	Mount Timpanogos (FS)	II	4,350	1984
780	Pine Valley Mountain (FS)	II	20,234	1984
781	Twin Peaks (FS)	II	4,587	1984
782	Wellsville Mountain (FS)	II	9,652	1984
783	Beaver Dam Mountains (BLM)	II	1,469	1984
784	Paria Canyon-Vermilion Cliffs (BLM)	II	9,308	1984
<i>National Recreation Area</i>				
785	Glen Canyon (NPS)	V	580,558	1927
<b>Vermont</b>				
<i>National Wildlife Refuge</i>				
786	Missisquoi (FWS)	IV	2,365	
<i>Wildernesses</i>				
787	Big Branch (FS)	II	2,719	1984
788	Breadloaf (FS)	II	8,693	1984
789	Bristol Cliffs (FS)	II	1,513	1975
790	George D. Aiken (FS)	II	2,048	1984
791	Lyle Brook (FS)	II	6,274	1975
792	Peru Peak (FS)	II	2,800	1984
<b>Virginia</b>				
<i>National Park</i>				
793	Shenandoah (NPS)	II	84,921	1926
<i>National Wildlife Refuges</i>				
794	Back Bay (FWS)	IV	1,859	1938
795	Chincoteague (FWS)	IV	3,853	
796	Great Dismal Swamp (FWS)	IV	33,154	1973
797	Plum Tree Island (FWS)	IV	1,327	
798	Wallops Island (FWS)	IV	1,366	
<i>National Memorial</i>				
799	Fredericksburg and Spotsylvania Co. Battle (NPS)	V	1,483	
<i>National Battlefield</i>				
800	Manassas (NPS)	V	1,101	1940
801	Petersburg (NPS)	V	1,103	1926
<i>Park</i>				
802	Prince William Forest (NPS)	II	7,048	1936
<i>Wildernesses</i>				
803	Barbours (FS)	II	2,266	1988
804	Beartown (FS)	II	2,446	1984
805	James River Face (FS)	II	3,677	1975
806	Kimberling Creek (FS)	II	2,258	1984
807	Lewis Fork (FS)	II	2,348	1984
808	Little Dry Run (FS)	II	1,376	1984

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
809	Little Wilson Creek (FS)	II	1,560	1984
810	Mountain Lake (FS)	II	3,340	1984
811	Peters Mountain (FS)	II	1,346	1984
812	Ramseys Draft (FS)	II	2,722	1984
813	Rich Hole (FS)	II	2,610	1988
814	Rough Mountain (FS)	II	3,764	1988
815	Saint Marys (FS)	II	4,083	1984
816	Shavers Run (FS)	II	1,459	1988
<i>National Historic Park</i>				
817	Colonial (NPS)	V	3,810	1930
<i>Washington</i>				
<i>National Parks</i>				
818	Mount Rainier (NPS)	II	95,268	1899
819	North Cascades (NPS)	II	204,284	1968
820	Olympic (NPS)	II	371,225	1938
<i>National Wildlife Refuges</i>				
821	Columbia (FWS)	IV	11,985	1944
822	Conboy Lake (FWS)	IV	2,290	1965
823	Little Pend Oreille (FWS)	IV	16,200	
824	McNary (FWS)	IV	1,470	1955
825	Nisqually (FWS)	IV	1,145	
826	Ridgefield (FWS)	IV	1,874	
827	Saddle Mountain (FWS)	IV	12,478	1971
828	Turnbull (FWS)	IV	6,304	1937
829	Umatilla (FWS)	IV	5,672	
830	Willapa (FWS)	IV	5,830	
<i>National Monument</i>				
903	Mount St Helens (FS)	III	44,550	1982
<i>Estuarine Sanctuary</i>				
831	Padilla Bay (NOAA)	IV	12,570	1980
<i>Wildernesses</i>				
832	Alpine Lakes (FS)	II	146,748	1976
833	Boulder River (FS)	II	19,698	1984
834	Buckhorn (FS)	II	17,911	1984
835	Clearwater (FS)	II	5,908	1984
836	Colonel Bob (FS)	II	4,840	1984
837	Glacier Peak (FS)	II	231,618	1964
838	Glacier View (FS)	II	1,264	1984
839	Goat Rocks (FS)	II	42,347	1964
840	Henry M. Jackson (FS)	II	41,550	1984
841	Indian Heaven (FS)	II	8,482	1984
842	Lake Chelan-Sawtooth (FS)	II	61,284	1984
843	Mount Adams (FS)	II	18,869	1964
844	Mount Baker (FS)	II	47,562	1984
845	Mount Skokomish (FS)	II	5,267	1984
846	Noisy-Diobsud (FS)	II	5,719	1984
847	Norse Peak (FS)	II	20,778	1984
848	Pasayten (FS)	II	214,497	1968
849	Salmo-Priest (FS)	II	16,728	1984
850	Tatoosh (FS)	II	6,374	1984
851	The Brothers (FS)	II	6,751	1984
852	Trapper Creek (FS)	II	2,416	1984
853	Wenaha-Tucannon (FS)	II	44,940	1978

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
854	William O. Douglas (FS)	II	68,104	1984
855	Juniper Dunes (BLM)	II	2,792	1984
<i>National Recreation Areas</i>				
856	Coulee Dam (NPS)	V	40,424	1946
857	Lake Chelan (NPS)	V	25,044	1968
858	Ross Lake (NPS)	V	47,582	1968
<b>West Virginia</b>				
<i>National River</i>				
859	New River Gorge (NPS)	V	25,101	1978
<i>Wildernesses</i>				
860	Cranberry (FS)	II	14,514	1983
861	Dolly Sods (FS)	II	4,134	1975
862	Laurel Fork North (FS)	II	2,450	1983
863	Laurel Fork South (FS)	II	2,427	1983
864	Mountain Lake (FS)	II	1,012	1988
865	Otter Creek (FS)	II	8,094	1975
<b>Wisconsin</b>				
<i>National Scientific Reserve</i>				
866	Ice Age (NPS)	I	13,153	1964
<i>National Scenic Rivers</i>				
867	Lower St. Croix (NPS)	V	3,512	1972
868	St. Croix (NPS)	V	25,373	1969
<i>National Wildlife Refuges</i>				
869	Horicon (FWS)	IV	8,495	1941
870	Mississippi River Caue (FWS)	IV	16,338	
871	Necedah (FWS)	IV	17,681	
872	Trempealeau (FWS)	IV	2,275	
873	Upper Mississippi (FWS)	IV	19,425	
<i>National Lakeshore</i>				
874	Apostle Island (NPS)	V	17,084	1970
<i>Wildernesses</i>				
875	Blackjack Springs (FS)	II	2,382	1978
876	Headwaters (FS)	II	7,328	1984
877	Porcupine Lake (FS)	II	1,720	1984
878	Rainbow Lake (FS)	II	2,664	1975
879	Whisker Lake (FS)	II	2,972	1978
<b>Wyoming</b>				
<i>National Parks</i>				
880	Grand Teton (NPS)	II	124,140	1929
881	Yellowstone (NPS)	II	899,139	1872
<i>National Wildlife Refuges</i>				
882	National Elk (FWS)	IV	9,989	
883	Pathfinder (FWS)	IV	6,807	
884	Seedskadee (FWS)	IV	6,011	1965
<i>National Monuments</i>				
885	Devil's Tower (NPS)	V	1,346	1906
886	Fossil Butte (NPS)	III	3,280	1972
<i>Parkway</i>				
887	John D. Rockefeller, Jr. Memorial (NPS)	V	9,672	1977

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>Wildernesses</i>				
888	Bridger (FS)	II	173,241	1964
889	Cloud Peak (FS)	II	76,502	1984
890	Encampment River (FS)	II	4,097	1984
891	Fitzpatrick (FS)	II	80,341	1976
892	Gros Ventre (FS)	II	116,145	1984
893	Huston Parks (FS)	II	12,379	1984
894	Jedediah Smith (FS)	II	49,959	1984
895	North Absaroka (FS)	II	141,838	1964
896	Platte River (FS)	II	9,206	1984
897	Popo Agie (FS)	II	41,225	1984
898	Savage Run (FS)	II	6,046	1978
899	Teton (FS)	II	236,838	1964
900	Washakie (FS)	II	285,011	1964
901	Winegar Hole (FS)	II	4,336	1984
<i>Biosphere Reserves</i>				
	Aleutian Islands National Wildlife Refuge	IX	1,100,943	1976
	Beaver Creek Experimental Watershed	IX	111,300	1978
	Big Bend National Park	IX	283,247	1976
	Big Thicket National Preserve	IX	34,217	1981
	California Coast Ranges	IX	62,098	1983
	Carolinian-South Atlantic	IX	125,545	1986
	Cascade Head Experimental Forest			
	Scenic Research Area	IX	7,051	1976
	Central Gulf Coastal Plain	IX	72,964	1983
	Central California Coast	IX	404,863	1988
	Central Plains Experimental Range (CPER)	IX	6,210	1976
	Champlain-Adirondak	IX	3,990,000	1989
	Channel Islands	IX	479,652	1976
	Coram Experimental Forest (incl. Coram NA)	IX	3,019	1976
	Denali National Park and	IX	2,441,295	1976
	Desert Experimental Range	IX	22,513	1976
	Everglades National Park (incl. Ft. Jefferson NM)	IX	585,867	1976
	Fraser Experimental Forest	IX	9,328	1976
	Glacier National Park	IX	410,202	1976
	Glacier Bay-Admiralty Is.	IX	1,515,015	1986
	H.J. Andrews Experimental Forest	IX	6,100	1976
	Hubbard Brook Experimental Forest	IX	3,076	1976
	Isle Royale National Park	IX	215,740	1980
	Jornada Experimental Range	IX	78,297	1976
	Konza Prairie Research Natural Area	IX	3,487	1979
	Land between The Lakes	IX	1,560,000	1991
	Mammoth Cave Area	IX	83,337	1990
	Mojave and Colorado Deserts	IX	1,297,264	1984
	New Jersey Pinelands	IX	445,300	1988
	Niwot Ridge	IX	1,200	1979
	Noatak National Arctic Range	IX	3,035,200	1976
	Olympic National Park	IX	363,379	1976
	Organ Pipe Cactus National Monument	IX	133,278	1976
	Rocky Mountain National Park	IX	106,710	1976
	San Dimas Experimental Forest	IX	6,947	1976
	San Joaquin Experimental Range	IX	1,832	1976
	Sequoia-Kings Canyon National Parks	IX	343,000	1976
	South Atlantic Coastal Plain BR	IX	6,125	1983
	Southern Appalachian	IX	215,596	1988

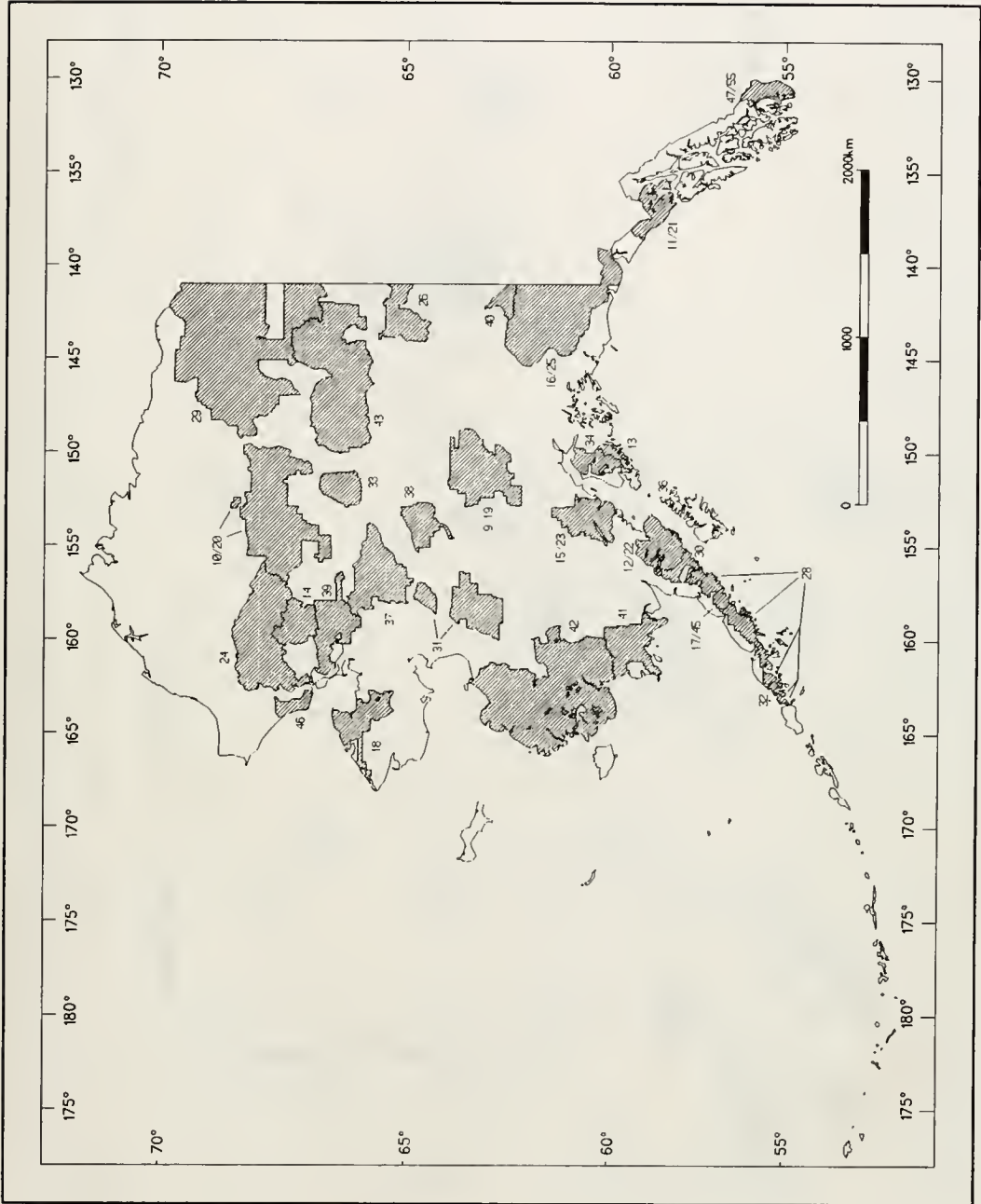


Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	Stanislaus-Tuolumne Experimental Forest	IX	607	1976
	The University of Michigan Biological Station	IX	4,048	1979
	The Virginia Coast Reserve	IX	13,511	1979
	Three Sisters Wilderness	IX	80,900	1976
	Virgin Islands National Park	IX	6,127	1976
	Yellowstone National Park	IX	898,349	1976
	<i>Ramsar Wetlands</i>			
	Ash Meadows	R	9,509	1986
	Cache-Lower White Rivers	R	145,690	1989
	Catahoula Lake	R	12,150	1990
	Chesapeake Bay	R	45,000	1987
	Cheyenne Bottoms	R	8,036	1988
	Edwin B Forsythe NWR	R	13,080	1986
	Everglades	R	566,143	1987
	Horicon Marsh	R	12,911	1990
	Izembek	R	168,422	1986
	Okefenokee	R	159,889	1986
	<i>World Heritage sites</i>			
	Everglades National Park	X	585,867	1979
	Grand Canyon National Park	X	493,270	1979
	Great Smoky Mountains National Park	X	209,000	1983
	Mammoth Cave National Park	X	21,191	1981
	Olympic National Park	X	362,848	1981
	Redwood National Park	X	42,400	1980
	Yellowstone National Park	X	898,349	1978
	Yosemite National Park	X	308,283	1984

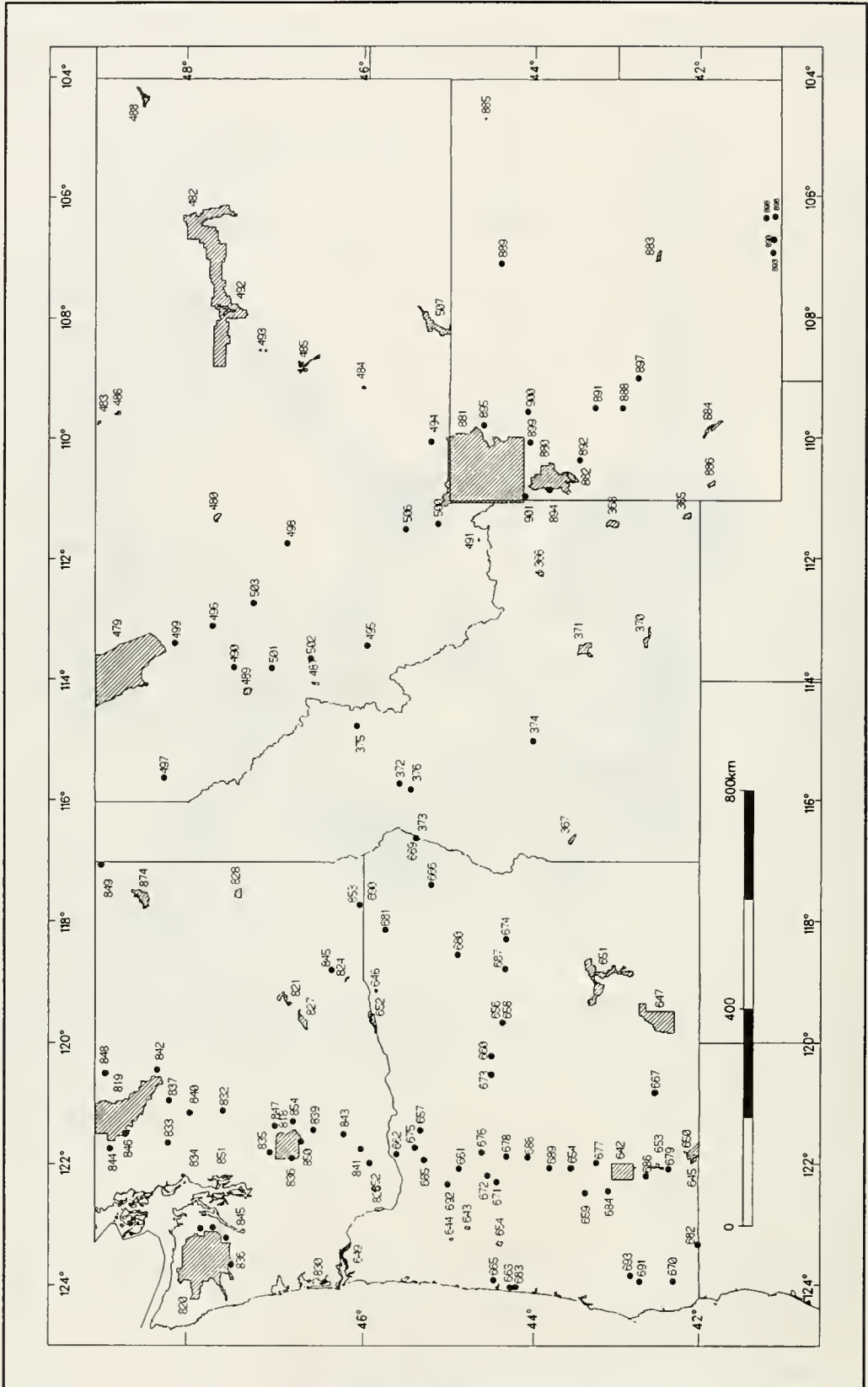
\* Abbreviations following the site name give the name of the management agency responsible for the site, which are as follows:

- FWS US Fish and Wildlife Service
- NOAA National Oceanic and Atmospheric Administration
- NPS National Park Service
- FS US Forest Service
- BLM Bureau of Land Management

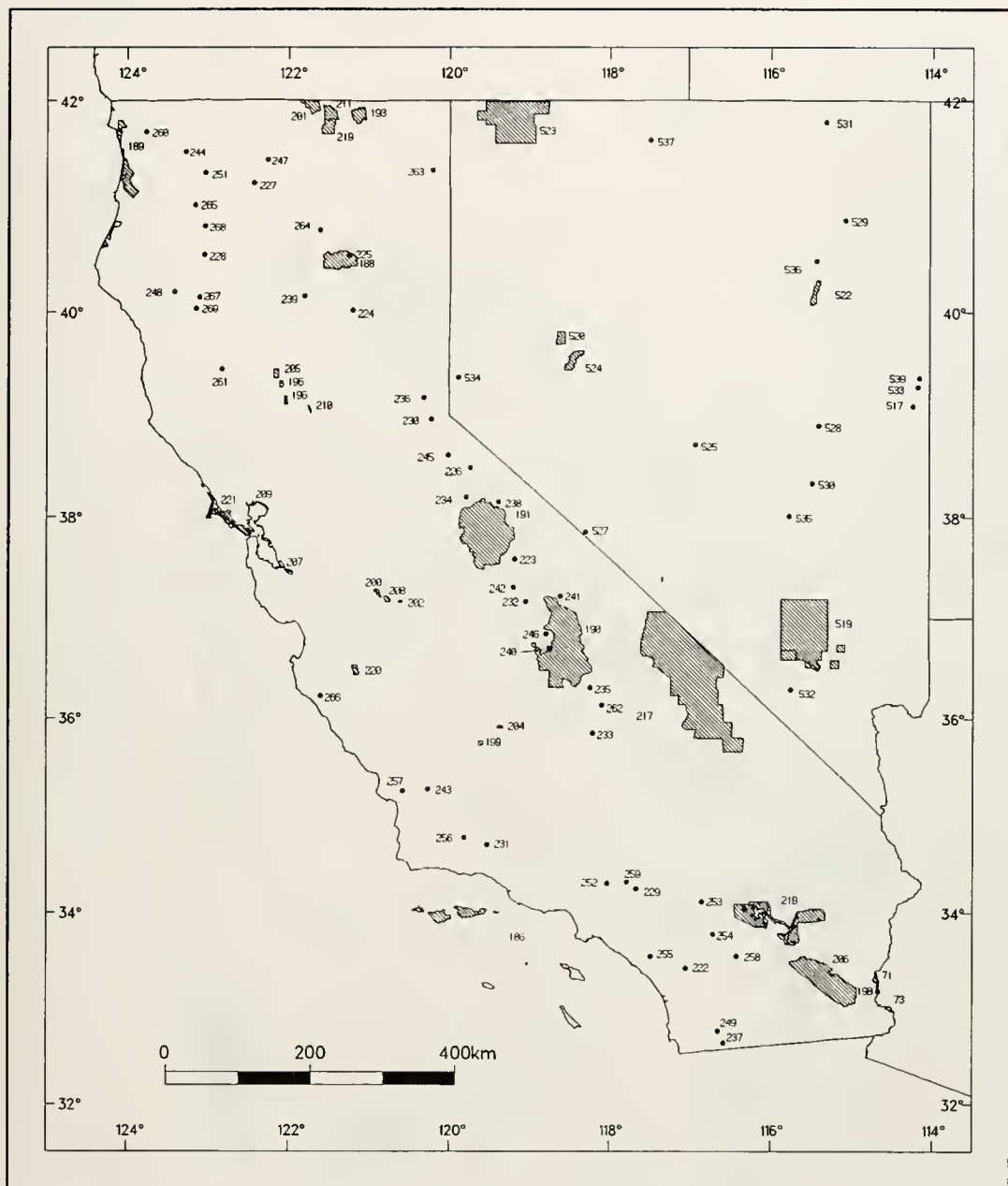
\*\* Wilderness areas have only been listed here when they do not overlap with other categories of protected area included in this list. There are a large number of other wilderness areas which lie within national parks, national monuments, national wildlife refuges and other categories.



**Federally Protected Areas of the USA**  
**Alaska**

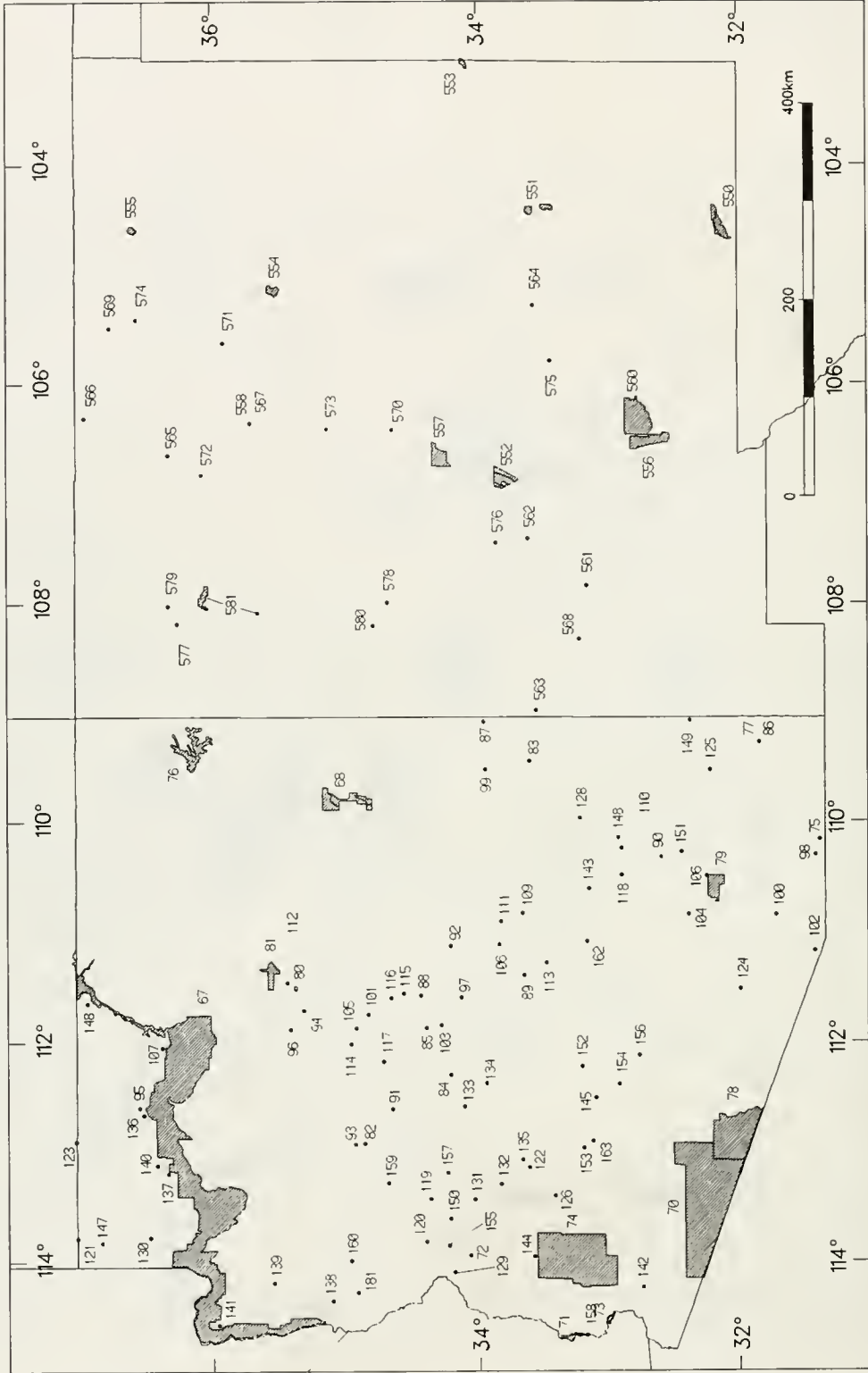


Federally Protected Areas of the USA  
Idaho, Montana, Oregon, Washington, Wyoming

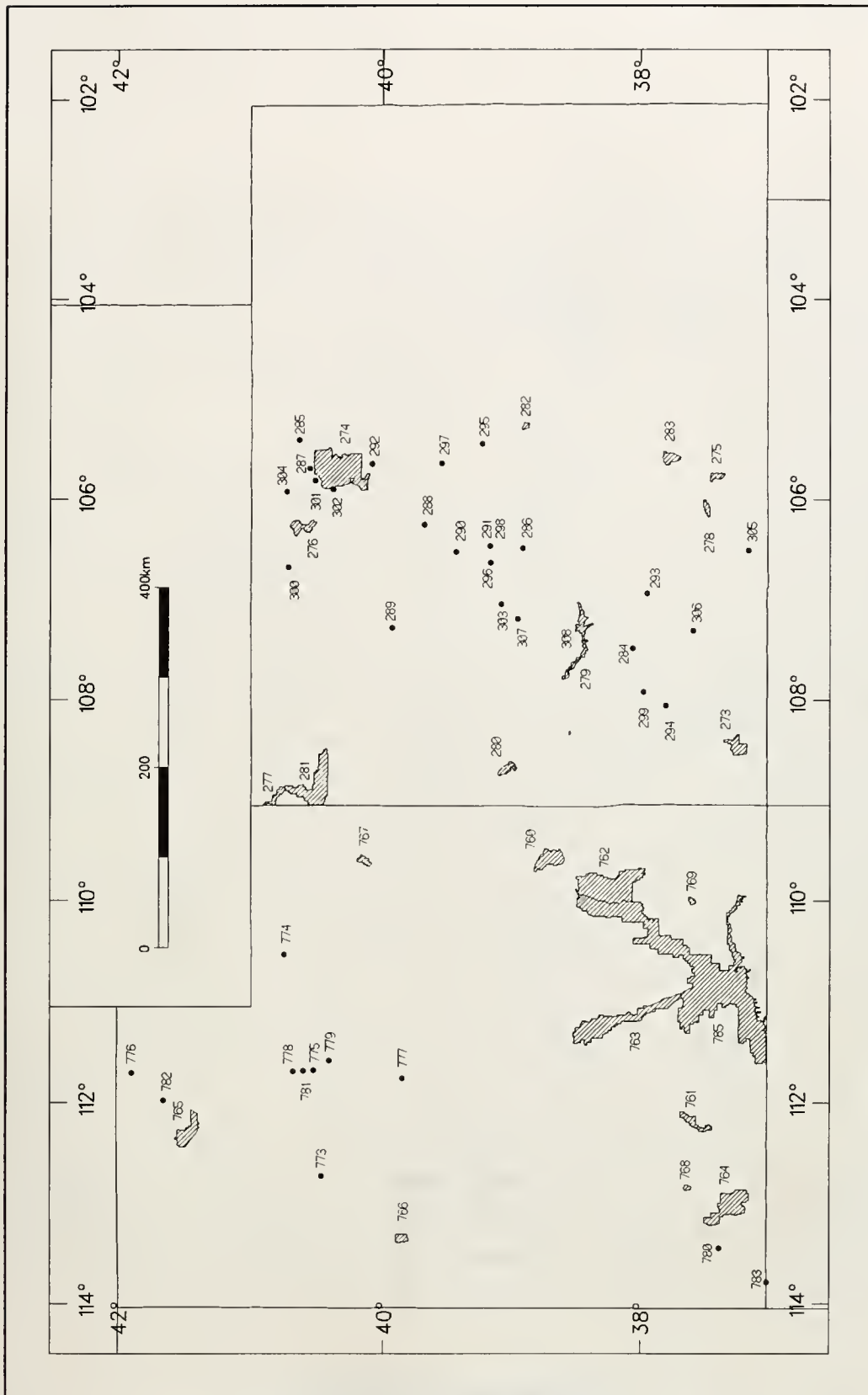


Federally Protected Areas of the USA  
California, Nevada

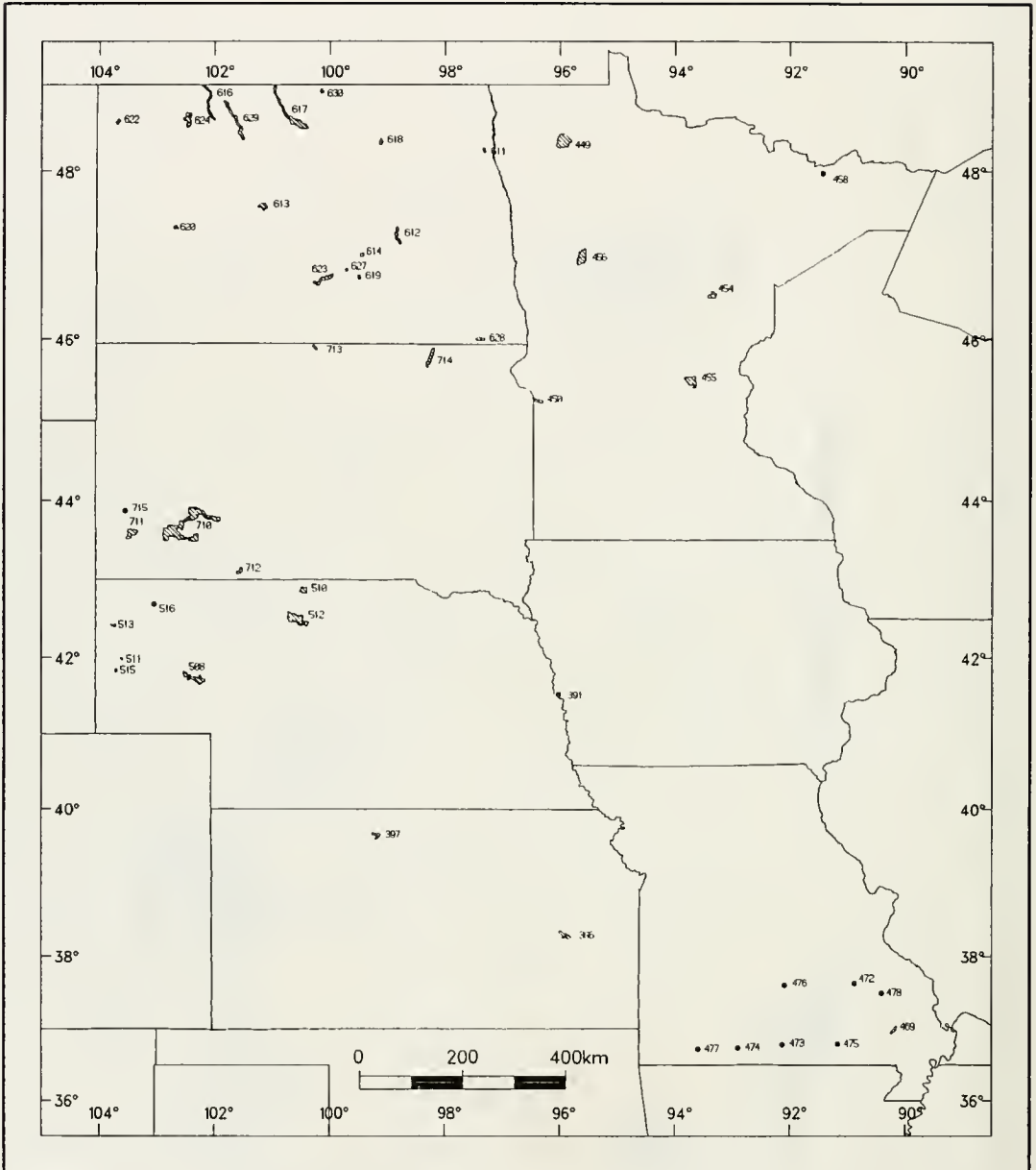




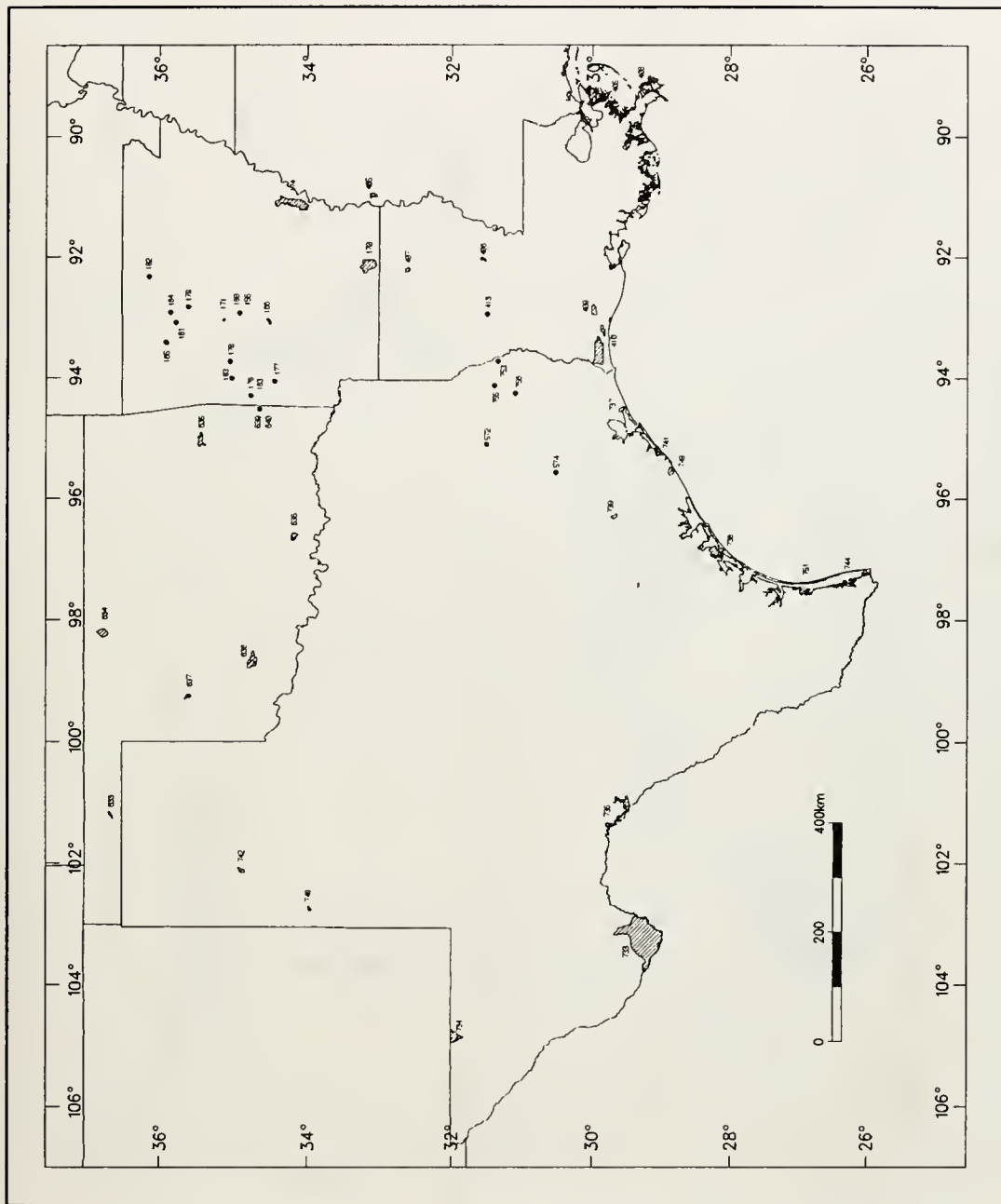
**Federally Protected Areas of the USA  
Arizona, New Mexico**



Federally Protected Areas of the USA  
Colorado, Utah

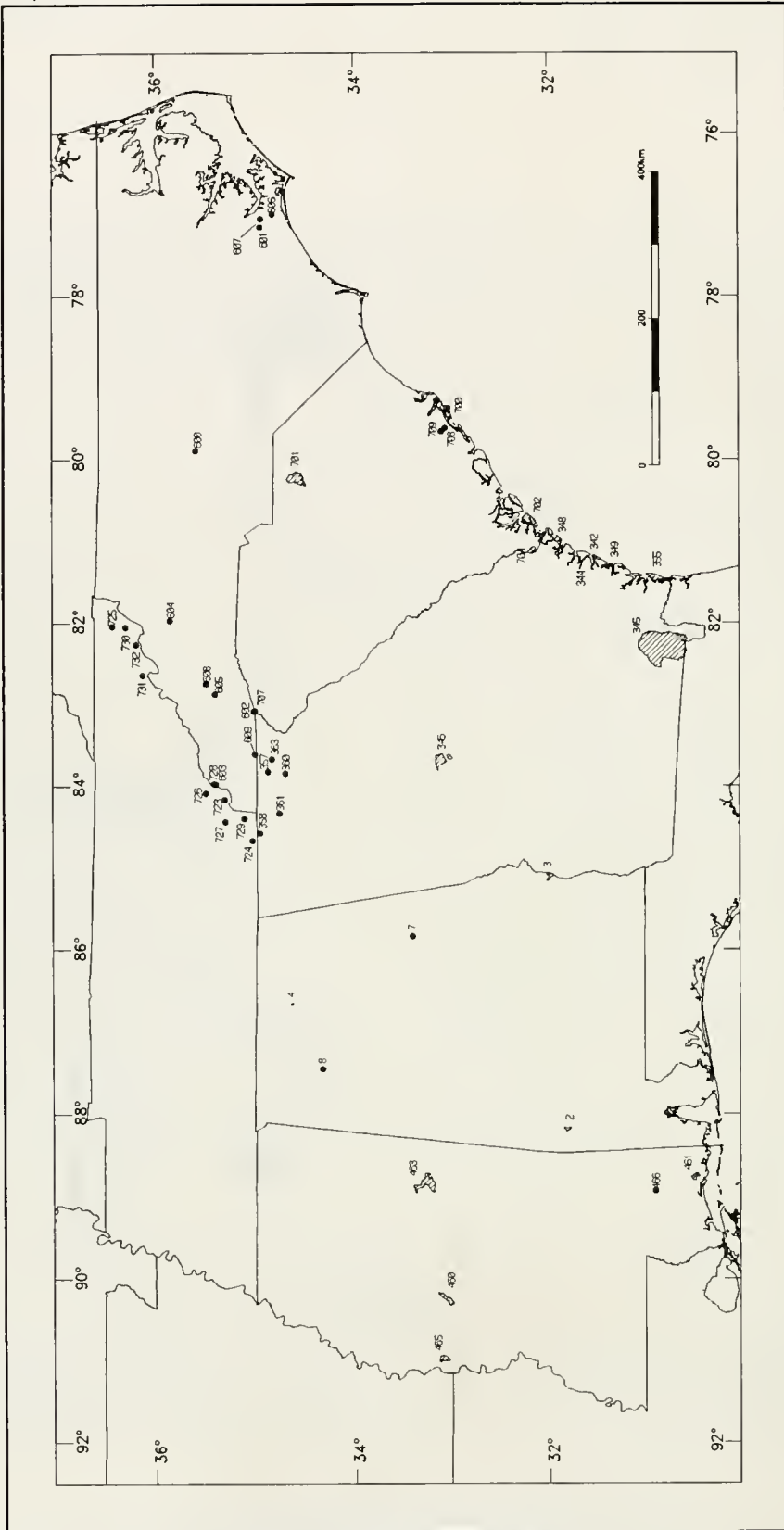


**Federally Protected Areas of the USA**  
Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota



**Federally Protected Areas of the USA  
Arkansas, Louisiana, Oklahoma, Texas**

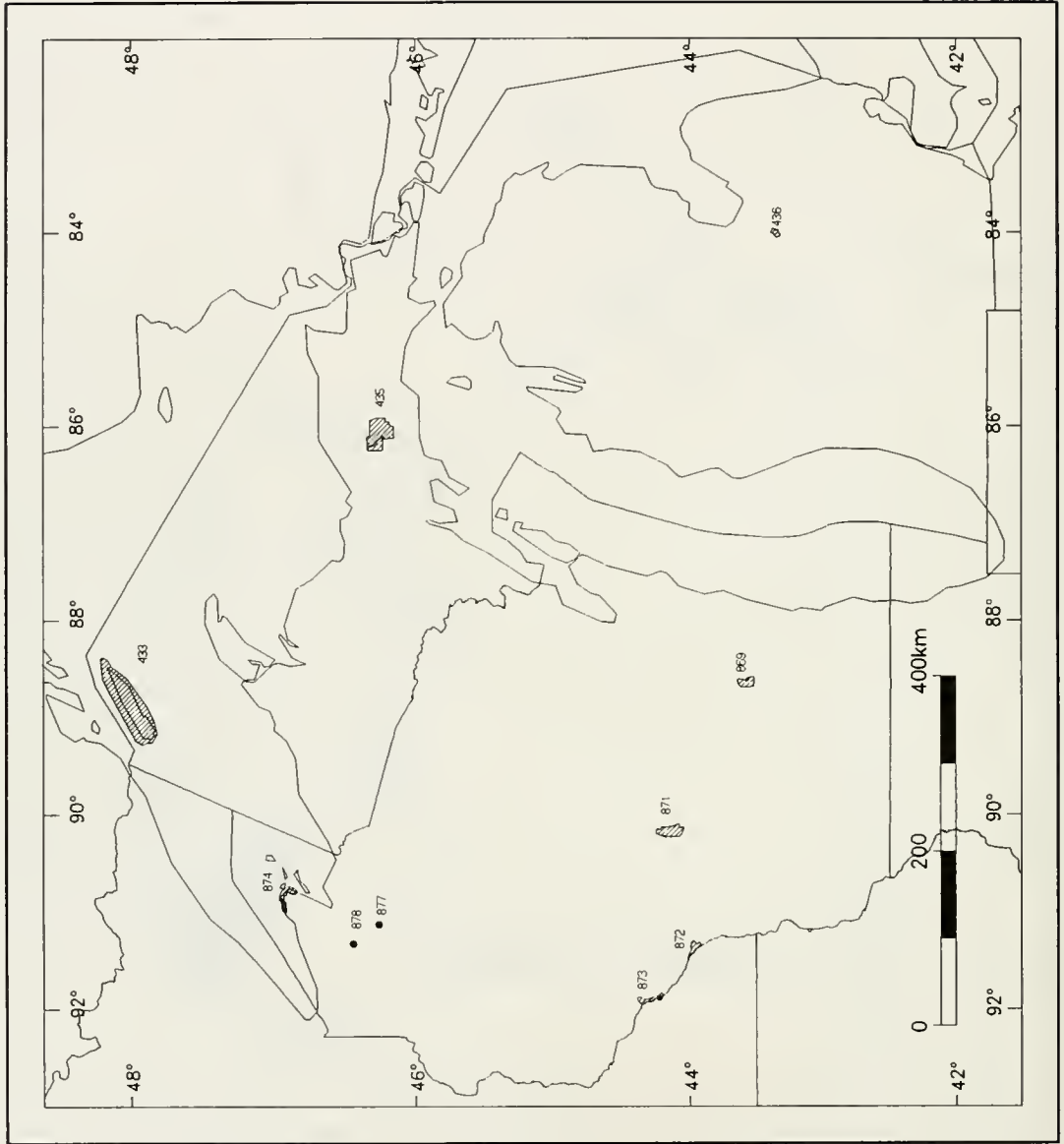




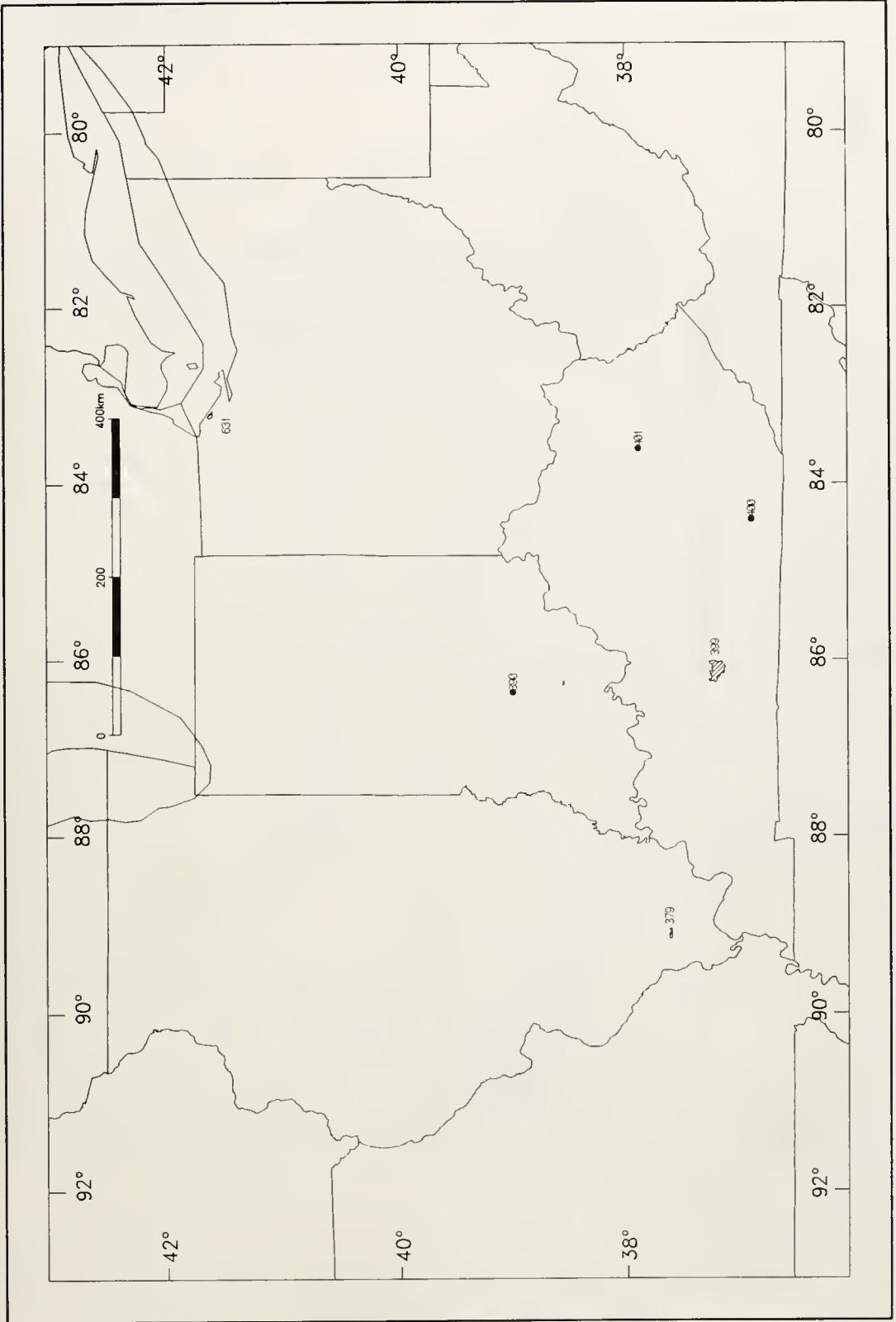
Federally Protected Areas of the USA  
Alabama, Georgia, Mississippi, North Carolina, South Carolina, Tennessee



**Federally Protected Areas of the USA  
Florida**

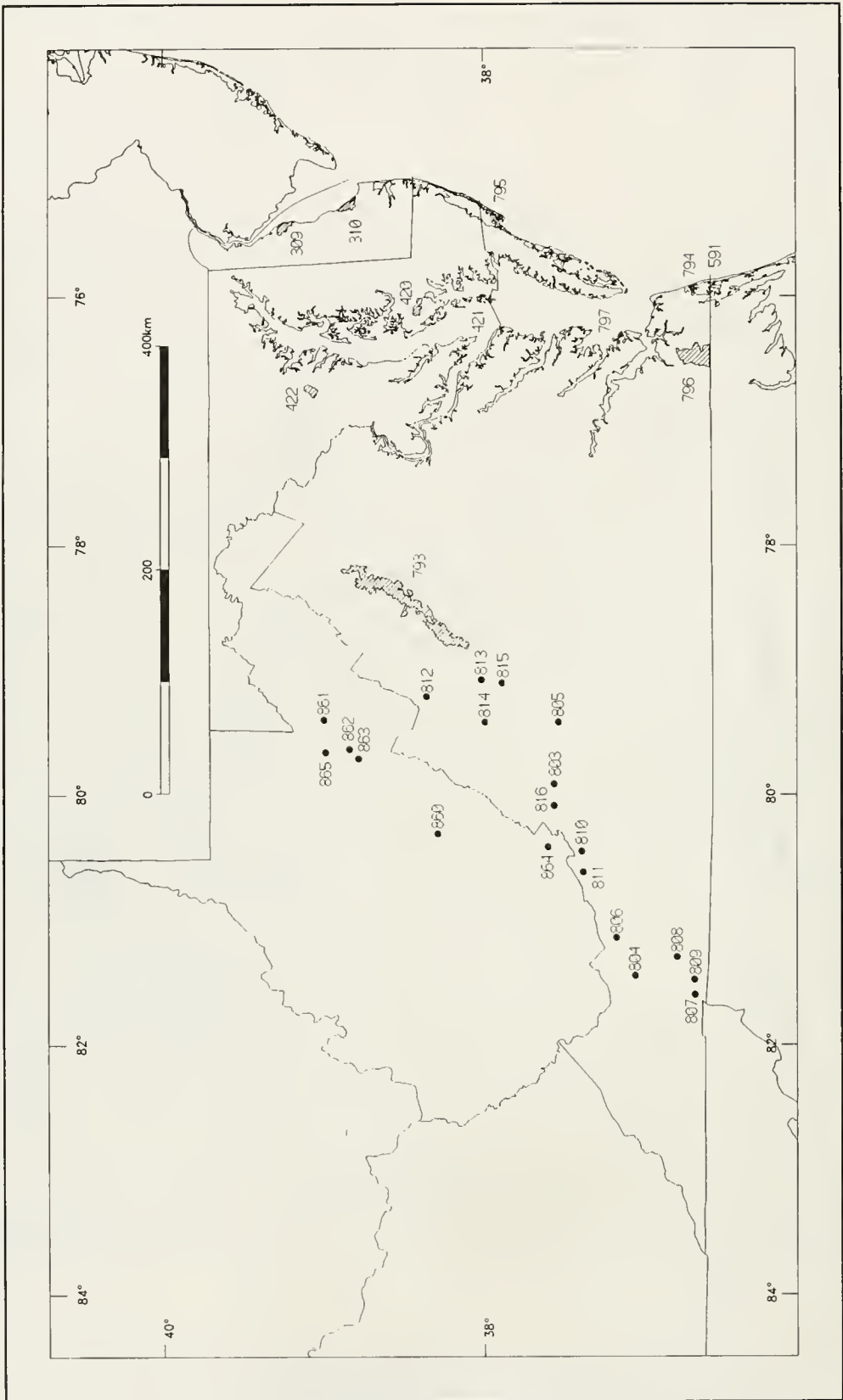


Federally Protected Areas of the USA  
Michigan, Wisconsin

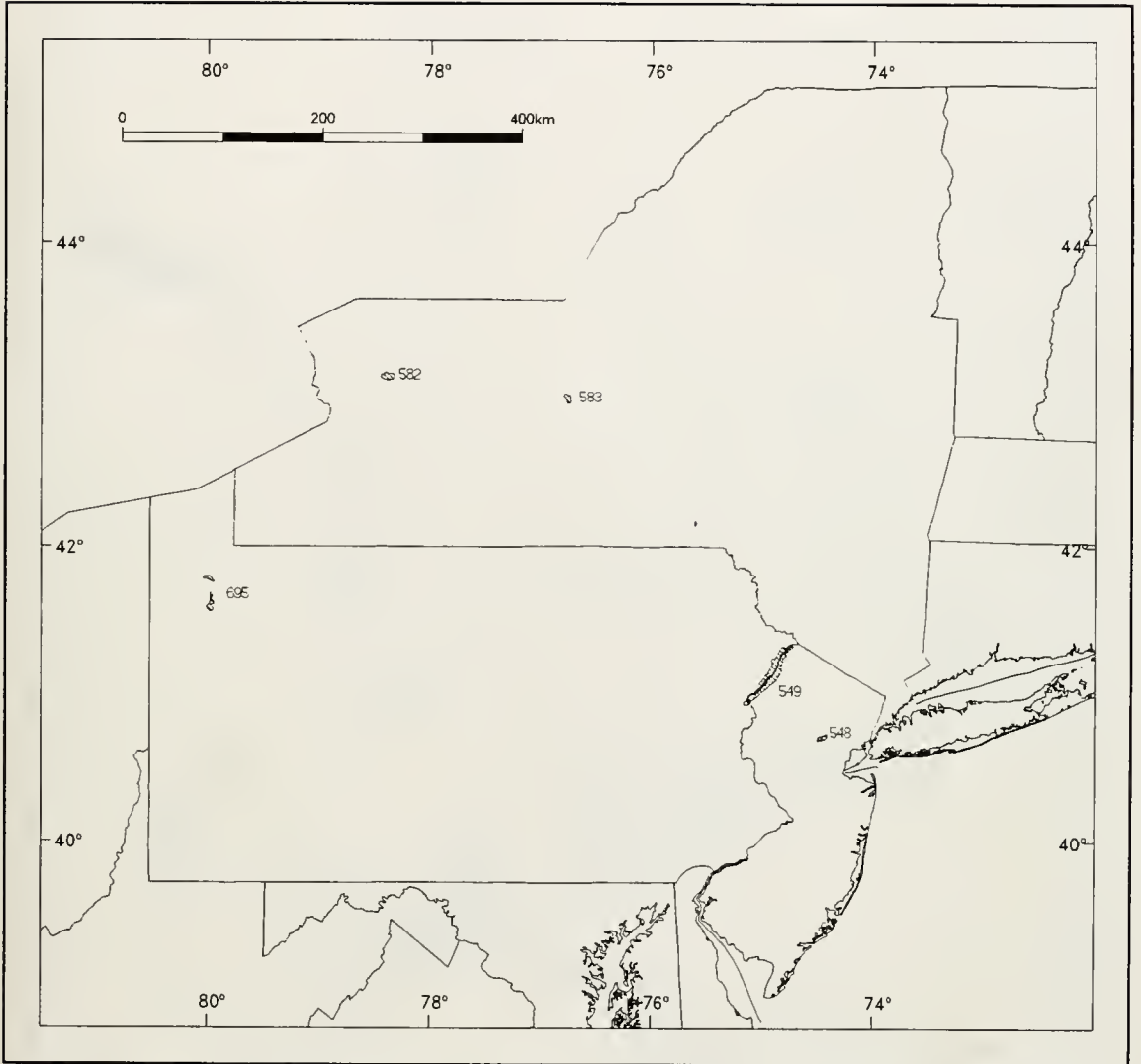


Federally Protected Areas of the USA  
Illinois, Indiana, Kentucky, Ohio

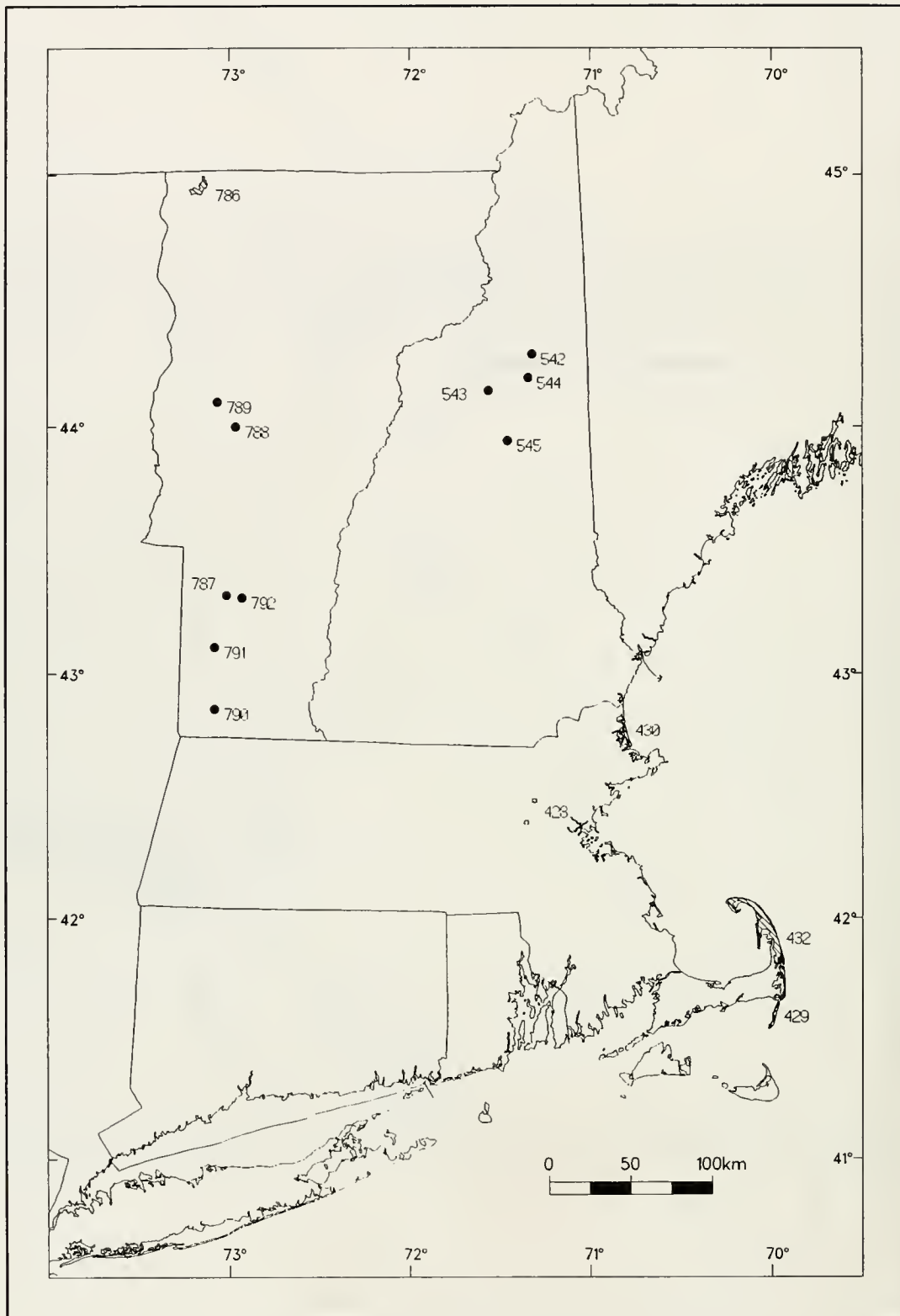




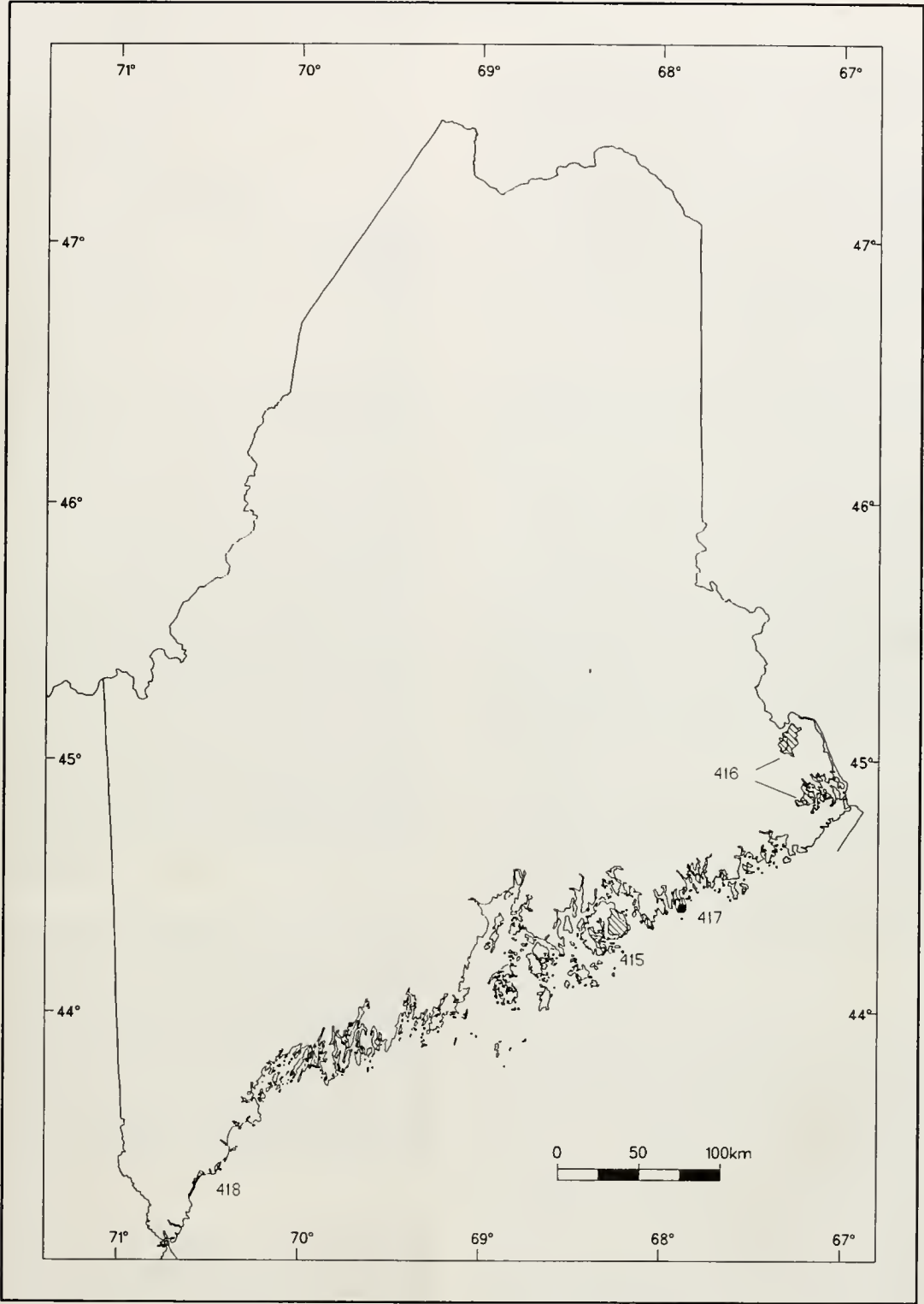
**Federally Protected Areas of the USA  
Delaware, Maryland, Virginia, West Virginia**



**Federally Protected Areas of the USA  
New York, New Jersey, Pennsylvania**



**Federally Protected Areas of the USA  
Connecticut, Massachusets, New Hampshire, Rhode Island, Vermont**



Federally Protected Areas of the USA  
Maine





# BELIZE

**Area** 22,965 sq. km

**Population** 191,000 (1991)

## **Economic Indicators**

GDP: US\$ 1,304 per capita (1987)

GNP: US\$ 1,720 per capita (1989)

**Policy and Legislation** Belize, formerly known as British Honduras, obtained independence from Britain in 1981, although it has been self-governing since 1964 (Van Rest, 1986).

Belize participates in the Tropical Forestry Action Plan (TFAP) of the FAO, an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. A country Action Plan was drawn up in 1989 with support from a number of international aid agencies. Much of the plan is devoted to economic development and maximising resource utilisation in a sustainable manner, through legislative changes, institutional strengthening and changes in management techniques. On conservation, the plan proposes several measures to counter the current deterioration of forests, including the establishment of an Office of Conservation within the Forest Department. This has now been established (S. Matola, pers. comm., 1992; O. Salas, pers. comm., 1992). Production of resource inventories is recommended so that gaps in the existing protected areas network can be highlighted (OFI, 1989). The UK Overseas Development Agency has taken over conservation aspects of the Action Plan a forest planning and management project was established in May 1992 to run for five years (S. Zisman, pers. comm., 1992).

The first piece of legislation concerning forest resource regulation and protection was the Forest Ordinance, 1927, revised in 1958. This provides for the establishment and management of forest reserves within which timber extraction is strictly regulated (Hartshorn and Green, 1985; US-AID, 1988). Forest reserves are established under individual decrees, and controlled timber extraction is permitted within them. Approximately 22% of the land in forest reserves is recognised unofficially as protection forest, which cannot be utilised except for selective fellings of minor importance.

The Crown Land Ordinance, 1924, revised in 1958, enabled the relevant Minister to categorise sites on an *ad hoc* basis, leading to the designation of a number of sites, sometimes known as crown reserves. These included a number of bird sanctuaries (see Annex) which have not been renotified under the more recent legislation (Zisman, 1989). The first crown reserve, Half-Moon Cay, was established in 1928.

The principal protected area legislation currently in effect is the National Parks System Act No. 5, 1981, which provides for the declaration by the government of national parks and other protected areas to be administered by the Chief Forest Officer. However, no regulations have been drawn up for the implementation of this legislation (US-AID, 1988). Definitions are given for four categories of protected area (see Annex) that are to be established by the Minister. The process whereby areas are delimited and developed as a protected area are given. Licences for construction and other activities within the area may be issued only by the Minister.

The final piece of legislation relating directly to protected areas is the Fisheries Ordinance, 1977, which enables the designation of marine nature reserves (see Annex). Further reference to these is covered under the Fisheries Amendment Act, 1983 (Zisman, 1989).

The Wildlife Protection Act No. 4, 1981 provides for the conservation, restoration, development and regulation of wildlife resources. Hunting regulations are detailed, and the Forest Department is authorised to ensure compliance with the regulations. Under this Act, all wild animals are protected from unregulated capture, while some 30 mammal species and all but six bird species are completely protected. A seven-year moratorium on harvesting wildlife for commercial purposes was due to expire in 1988. It has been extended, however, and is due to expire in December 1992 (US-AID, 1988; D. Rosado, pers. comm., 1991).

**International Activities** Belize is a member of the Caribbean Community (CARICOM). It is a member of the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources, and to the Central American Commission on Development and the Environment (CCAD).

Belize ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 6 November 1990, but no natural sites have been inscribed to date. Belize is not party to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), nor does it participate in the Unesco Man and the Biosphere Programme, although it is currently considering the advantages of joining these, as well as the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention).

A proposed agreement between Belize and Mexico has been drawn up concerning the protection of the

environment in the border areas between the two countries (D. Rosado, pers. comm., 1991). Efforts are also underway to establish an international protected area around Gran Petén between Mexico, Guatemala and Belize. Also known as the Azul Triangle, this is a vast and mostly uninhabited region, with numerous Mayan ruins. On the Belize side, some 85,000ha have already been established for conservation, and limited sustainable exploitation in the Rio Bravo Conservation Areas managed by the Programme for Belize. A further proposed international initiative concerns the Chiquibul/Mayan Mountain project between Guatemala and Belize.

**Administration and Management** The Forest Department within the Ministry of Natural Resources (formerly in the Ministry of Agriculture, Forestry and Fisheries) is nominally responsible for all protected areas in the country. In reality, the main burden of conservation work has been undertaken by non-governmental organisations (NGOs), notably the Belize Audubon Society (BAS), and also the Programme for Belize, a consortium of conservation organisations (US-AID, 1988). BAS has been given authority to manage the government reserves established between 1981 and 1990, in the absence of an appropriate government authority. The only categories not managed by BAS are forest reserves and the single marine nature reserve. BAS also has an important role in promoting environmental awareness, and identifying and promoting new sites for nature reserves. The Programme for Belize owns and manages over 85,000ha for conservation purposes. Another NGO, Coral Cay Conservation, has worked closely with the Ministry of Agriculture and Fisheries in surveying the coastline, including existing and proposed protected areas, and drafting up management plans (PFB, 1992).

The Forest Department is responsible for managing all forest reserves in the country. Around 62% of forested land is owned by the public sector, just under half of which comes under designation as 15 forest reserves (US-AID, 1988). This Department comprises a Chief Officer, three forest officers, three foresters, two conservation officers, 11 rangers, 20 forest guards and support staff. However, training facilities are lacking for staff, and none has received training in wildlife or parks management. Lack of adequate equipment and funding also restricts the effectiveness of the department (US-AID, 1988).

Responsibility for the administration of marine resources, including marine nature reserves, rests with the Fisheries Administrator in the Ministry of Agriculture and Fisheries (Zisman, 1989).

The government's decision to hand over policy and management responsibilities concerned with the protected areas sector is widely felt to be unacceptable. It is felt that a systematic approach to the conservation of the country's biodiversity is required, to ensure that all ecosystems are properly represented in the protected

areas system, while an administrative and managerial body within the public sector may be essential if external assistance in planning, research, training and management is to be effective. A Conservation Advisory Board was established in February 1989 to advise the Forest Department on matters relating to conservation and the Environment, but has no statutory powers, and is ineffective. Proposals put forward by the World Wildlife Fund-US for the establishment of a Conservation Division, or an Office of Conservation, within the Forest Department, were incorporated in the Forest Department Annual Report and in the Belize Tropical Forest Action Plan, and a Conservation Division has now been established, to manage some or all of the protected areas (S. Matola, pers. comm., 1992; O. Salas, pers. comm., 1992). WWF-US also proposed that some form of systems review should be undertaken, to identify areas of critical importance for inclusion in an expanded protected areas network (OFI, 1989; WWF-US, 1989; D. Rosado, pers. comm., 1991).

In 1992, the government of Belize approved in principle a Belize Revenue Generation Strategy for Protected Areas (O. Salas, pers. comm., 1992).

**Systems Reviews** Belize is the second smallest and the least populated country in Central America. It lies in the northern portion of the Mesoamerican land bridge, and shares its borders to the north with Mexico, and to the west and south with Guatemala. To the east there is a long coastline on the Caribbean Sea, with numerous offshore islands and coral cays. Many of these lie in a chain some 15-40km offshore, along the second largest barrier reef in the world, which is almost continuous for some 257km. The country can be subdivided into the level and low-lying northern half, which continues to the south along a coastal strip, and the Maya Mountains in the south central area of the country. The low-lying areas, which are continuous with the Mexican Yucatan Platform, are dominated by limestone topography, while the mountain range, which rises to 1,120m, is largely composed of metamorphosed sediments, with granitic intrusions. The country lies within the subtropics, and has a history of devastating effects of cyclones (Hartshorn *et al.*, 1984; US-AID, 1988).

Following the Holdridge (1967) classification system, and the work of Hartshorn *et al.* (1984), six life (ecological) zones have been described in Belize: subtropical moist forest, subtropical lower montane moist forest, subtropical lower montane wet forest, subtropical wet forest, tropical moist - transition to subtropical, and tropical wet - transition to subtropical. Mangroves are a major feature of the coastal and marine ecosystems (Hartshorn *et al.*, 1984; OFI, 1989). Coral reefs are highly developed and contain a typical Caribbean fauna (IUCN, 1988). The most recent estimates of forest cover suggest that closed broad-leaved forest covers some 74% of the land area, and open pine forest a further 5% (P. Simonetti, pers. comm., 1992).



More than 1,000 years ago the Maya civilisation was widespread, and extensive areas of the country were farmed. The decline of this civilisation led to the abandonment of many of these farms, and permitted forest regeneration. In most cases, this regeneration has reached the stage where it is widely regarded as climax vegetation (US-AID, 1988).

Although Belize is not noted among the Central American countries as having particularly high biodiversity, it is nonetheless very diverse, especially for its size, with approximately 4,000 species of flowering plants. The flora in the north is closely allied to that of the Yucatan Peninsula, which is thought to comprise up to 17% endemics. Another feature which raises the status of Belize as a country of considerable conservation importance is the fact that much of the habitat is undisturbed, and relatively unthreatened at present. Hence, populations are more stable here than in many other countries (Hartshorn *et al.*, 1984; WWF-US, 1989).

Belize is unique in tropical America in that the country's geopolitical identity is related directly to its forest resources. Settlement of the region in the mid-17th century was for cutting logwood, and for nearly three centuries the local economy depended on exported logs and imported food. By 1984 only 2% of land area was used for agriculture, of a maximum of 16% which is considered suitable for mechanised agriculture without large financial and technical investments (Hartshorn *et al.*, 1984).

The protected area system has its origins in a series of crown reserves, focusing on major sea-bird rookeries, and 15 forest reserves, established for timber exploitation rather than wildlife exploitation. The first crown reserve, Half-Moon Caye, was established in 1928. In 1977, seven tiny mangrove cays were established as crown reserves to protect rookeries, with administration entrusted to BAS. One of BAS's first projects was to raise funds to purchase the remaining privately-owned land on Half-Moon Caye, an important breeding ground for red-footed booby *Sula sula*. Half-Moon Caye Natural Monument was established in 1982. Similar initiatives by BAS have resulted in the creation of other protected areas, such as Crooked Tree Wildlife Sanctuary in 1984. The collective efforts of BAS, the Belize Centre for Environmental Studies, Programme for Belize, Belize Zoo and the government have consolidated the conservation system (Simons, 1988; S. Matola, pers. comm., 1992). Since 1981, five national parks have been established. By 1991 there were some 20 legally declared conservation areas, which covered some 10% of the total area (US-AID, 1988).

BAS has identified a further 15 sites for potential protection, including designating the barrier reef, associated cays and lagoons as a World Heritage site (Hartshorn *et al.*, 1984; US-AID, 1988).

The government is the largest land-owner in the country, and as such it has a strong influence on conservation. Some 21,323 sq. km, or 93% of the total national territory, is classified by the government as "forest land", over 60% of which is state-owned. Actually, this figure does not give an accurate reflection of current land use, as it contains a considerable area of open grassland and small farms which were not included in calculations. Within the state-owned forestry system there are 15 legally notified forest reserves that cover 6,368 sq. km, or 28% of total area. The majority of the land in these forest reserves is broad-leaved forest, although there is also some open woodland and pine. Approximately 22% of the land in these reserves is recognised unofficially as protection forest, a further 33% has been described as inaccessible. Despite this, however, a number of these reserves have lost forest to illegal agriculture, and at least one has been degazetted. None of the existing forest reserves has a formal management plan, and it is unclear to what extent they will contribute to conservation in the long-term (Hartshorn *et al.*, 1984; US-AID, 1988).

Tourism is growing exceptionally fast, and tourism in protected areas doubled between 1987 and 1989. Unless properly managed this could seriously threaten sites. However, tourism also presents a great potential source of revenue for a sector that is particularly short of funding. There is currently no legal mechanism to guarantee the capture of revenue from protected areas, although a WWF-US/Government of Belize project is looking into this (WWF-US, 1989).

Several innovative conservation projects have been implemented. For instance, in 1985, following a survey of the black howler monkey range, the 777ha Community Baboon Sanctuary was established, involving more than 60 private land-owners who have pledged to leave parts of their land undisturbed. Tourism has been especially encouraged in the area to provide jobs for local people (Simons, 1988). There are two other large private nature reserves: Shipstern Nature Reserve and Rio Bravo Conservation Area (Zisman, 1989).

Hartshorn *et al.*'s 1984 comprehensive review includes a chapter on natural resources and another on institutional and legal aspects of environmental issues. The chapter on natural resources comprises sections on forests, including forest reserves, and wildlands conservation including the status of conservation units.

#### Addresses

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title: Crown Land Ordinance  
(Section 6, Chapter 110)**

**Date:** 1924, revised 1958

**Brief description:** Chapter 110 provides the Minister with the power to establish sites, sometimes known as crown reserves, on an *ad hoc* basis. A number of these remain today as bird sanctuaries

**Administrative authority:** Belize Audubon Society

**Designations:**

**Bird sanctuary** No information is available concerning regulations, although Zisman (1989) states they may be considered as IUCN Management Category IV. All sites are small (between 0.4 and 21ha).

**Title: Fisheries Ordinance and Fisheries  
Amendment Act**

**Date:** 1977, Amendment 1983

**Brief description:** Section 9 (A) enables the designation of marine nature reserves

**Administrative authority:** Fisheries Unit, Ministry of Agriculture and Fisheries

**Designations:**

**Marine nature reserve** The hunting, killing or taking of certain species of marine mammals and crocodiles is prohibited. Only one site has been designated. This site was declared to prevent overfishing, and to protect the coral resources largely because of their value to tourism, fishing and as a genetic resource. The existing site has been zoned, with Zone (A) being closed to fishing and coral collecting, and two further zones where regulations are less strict.

**Title: The National Parks System Act No. 5**

**Date:** 25 November 1981

**Brief description:** Provides for the creation of national parks and other protected areas, which collectively comprise the National Parks System. Definitions for the different management categories to be employed, and prohibited activities common to all of them, are given.

**Administrative authority:** Chief Forest Officer, Forest Department, Ministry of Agriculture

**Designations:**

**National park** An area set aside for the protection and preservation of examples of natural or scenic value, considered to be of national significance, for the benefit and enjoyment of the public.

Entry is permitted only for scientific research, recreational or educational purposes, with prior authorisation from the Minister of Natural Resources.

**Nature reserve** An area set aside for the protection of biological communities or species, to allow the continuation of natural processes in an undisturbed state, and to ensure that ecologically representative examples of the natural environment are available for purposes of scientific research, education and the maintenance of genetic resources.

Entry is prohibited unless under the authority of the Ministry, and following regulations given in the legislation.

**Wildlife sanctuary** An area set aside for the protection of nationally significant species, or groups of species, biotic communities or physical features that require human manipulation for their continuing survival. Hunting or capture of wildlife, and the destruction of bird or reptile nests or eggs, are prohibited.

**Natural monument** An area set aside for the protection of nationally significant features of special interest or unique characteristics for the purpose of education, research and public enjoyment. Disruption of features of the national monument is prohibited, but the monument may be used for educational, interpretational and research purposes.

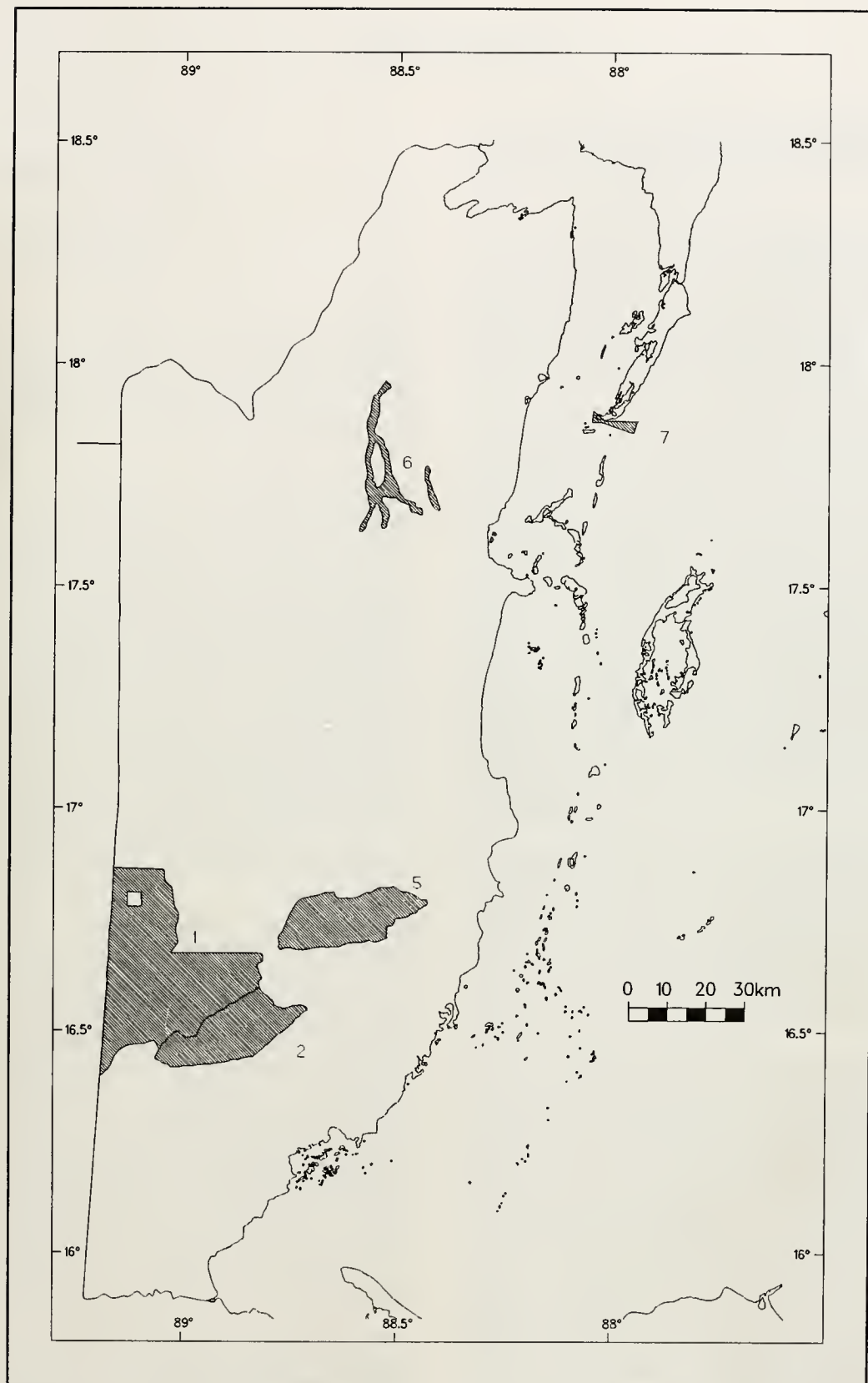
Activities prohibited in all four categories include: Hunting or capturing wildlife species, fishing, destroying or collecting floral specimens, and the construction of structures for permanent or temporary residence or other purposes.

The Minister may issue permits to appropriate organisations, scientists or suitably qualified professionals for the collection of specimens, at his discretion.

**Source:** Original legislation

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>National Parks</i> Chiquibul	II	107,607	1991
2	<i>Nature Reserves</i> Bladen Branch	I	39,256	1990
3	Rio Grande	IV	2,340	1968
4	Society Hall	I	2,729	1986
5	<i>Wildlife Sanctuaries</i> Cockscomb Basin	IV	102,400	1986
6	Crooked Tree	IV	1,470	1984
7	<i>Marine Nature Reserve</i> Hol Chan	II	411	1987
8	<i>National Monument</i> Half Moon Caye	II	3,925	1982
9	<i>Forest Reserves</i> Chiquibul	VIII	184,955	1991
10	Columbia River	VIII	44,789	1954
11	Commerce Bight	VIII	1,200	1989
12	Deep River	VIII	31,647	1991
13	Freshwater Creek	VIII	29,593	1960
14	Grants' Work A	VIII	3,439	1986
15	Machaca	VIII	2,300	1954
16	Manatee Lagoons	VIII	3,300	
17	Mango Creek	VIII	23,224	1987
18	Maya Mountains	VIII	52,124	1984
19	Mountain Pine Ridge	VIII	51,282	1920
20	Sibun	VIII	42,966	1987
21	Silk Grass	VIII	2,641	1920
22	Sittee River	VIII	37,938	1977
23	Swasey-Bladen	VIII	6,200	1958
24	<i>Archaeological Reserve</i> Caracol	IV	20,000	



Protected Areas of Belize





# COSTA RICA

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Area 50,900 sq. km

Population 3,015,000 (1990)

Natural increase 2.25% per annum

## Economic Indicators

GDP: No information

GNP: US\$ 1,780 per capita (1989)

**Policy and Legislation** Information on natural resource protection given in the Political Constitution of the Republic of Costa Rica (Constitución Política de la República) is currently not available. Two major strategies for the conservation and sustainable use of natural resources have been adopted (Bradley *et al.*, 1990).

Costa Rica participates in the FAO Tropical Forestry Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. In 1989, the government formulated its Forestry Action Plan (Plan de Acción Forestal para Costa Rica), to interpret the global designs of TFAP to suit national interests (Bradley *et al.*, 1990; MIRENEM, 1990). The Forestry Action Plan reviews the current situation of the forest sector, and proposes measures to make forest conservation more effective. These include increasing coordination between the numerous institutes involved in forest management; supporting the establishment of a coordinated national system of protected areas; and increasing scientific knowledge of forest resources, necessary to implement sustainable use programmes (MIRENEM, 1990).

The Conservation Strategy for Sustainable Development (Estrategia de Conservación para el Desarrollo Sostenible) (ECODES), completed in 1989 under the direction of the Ministry of Natural Resources, Energy and Mines (Ministerio de Recursos Naturales, Energía y Minas) (MIRENEM), marks a significant advance in governmental policies for natural resource protection (Quesada, 1990). The strategy provides a comprehensive review of the current situation of natural resource management, and establishes national guidelines for sustainable development: preserving genetic diversity; maintaining essential ecosystems; and ensuring sustainable natural resource use. In 1987, an Executive Secretariat (Secretaría Ejecutiva) was established within MIRENEM to supervise the formulation of ECODES, which took several years, and to execute its implementation (Bradley *et al.*, 1990; Quesada, 1990).

Natural resource regulation dates back to 1853 when hunting was prohibited close to human settlement (SPN, 1979). Law No. 13 of 10 January 1939 makes reference to national forests (bosques nacionales), and prohibits the enclosure of uncultivated land, and the destruction

or cultivation of mountain habitats. Areas of land 200m wide along the length of coasts, and 500m wide on either side of rivers are declared protected for forest conservation purposes (SPN, 1979).

The term national park (parque nacional) first appeared in legislation in Law No. 197 (1945), which prohibited forest exploitation for 200m on either side of the Panamerican Highway, and declared part of the remaining construction area as a national park. However, owing to economic problems, this law was never put into effect, and the first strictly protected natural area was not established until 1963 (SPN, 1979; Ugalde, 1992).

The promulgation of the Forestry Law (Ley Forestal) No. 4465 (1969) was a significant step for the effective establishment and management of protected areas (Ugalde, 1992). Under this law, the General Forestry Directorate (Dirección General Forestal) (DGF) was created within the Ministry of Agriculture and Livestock (Ministerio de Agricultura y Ganadería) (MAG), to be responsible for various categories of protected area. Definitions of these categories are to be given in the individual legislation providing for the creation of the each area. National parks and reserves are to be created by executive decree and, once established, their boundaries can be altered only by a Congressional Law (Ley de Congreso). Provision is made for the expropriation of privately-owned land for the creation of strictly protected areas where necessary, and penalties for infringements are given.

In order to implement the provisions of the 1969 Forestry Law with respect to protected areas, the DGF established within itself the Department of National Parks (Departamento de Parques Nacionales). In 1977, Law No. 6084 officially raised the status of this department to that of a separate general directorate within the MAG, known as the National Parks Service (Servicio de Parques Nacionales) (SPN) (SPN, 1979; Ugalde, 1992).

Wildlife resources are considered under the provisions of Law No. 6919 Wildlife Conservation Law (Ley de Conservación de Fauna Silvestre), 1984, which state the regulations governing hunting and fishing. It is the responsibility of the Wildlife Department (Departamento de Vida Silvestre) (DVS), under MIRENEM, to ensure compliance with the legislation. The Regulations to the Wildlife Conservation Law, Decree No. 15403, 1984 provide further details of wildlife protection, and list prohibited activities and penalties. Provision is made for the creation of the Coordinating Committee for Wildlife Conservation (Comité Coordinador de Conservación de Fauna Silvestre), comprising representatives from the various agricultural and environmental institutes including the National Parks Service, to supervise and assess activities relating to wildlife conservation.

In 1986, MIRENEM was established under Law No. 7152, specifically responsible for formulating national policies for natural resource protection and use. Both the DGF and the SPN became part of this new ministry upon its creation, and the Wildlife Department became the Wildlife Directorate, independent of the DGF (Ugalde, 1992).

In 1990, the Reformation of the Forestry Law (Reforma de la Ley Forestal) No. 7174 replaced the 1969 Forestry Law and its subsequent modifications. The responsibilities and structure of the DGF are detailed, and provision is made for the creation of the National Forestry Council (Consejo Forestal Nacional) to assess the activities of MIRENEM with respect to the protection, exploitation and administration of forest resources. Definitions are given for five categories of protected area (see Annex). Establishment requirements include a preliminary inventory, stated objectives and a management plan for each area, to be formulated by the DGF or the SPN.

There is no single piece of legislation uniting protected areas by stating national conservation objectives, and providing a legislative framework for a coherent national system (MIRENEM, 1990).

In 1991, MIRENEM submitted a project for a new law to the Legislative Assembly (Asamblea Legislativa), as part of the ongoing process of consolidating protected areas into a coordinated national system (MIRENEM, 1991a; Ugalde, 1992). The Project for a Law of the National System of Conservation Areas (Proyecto de una Ley del Sistema Nacional de Areas de Conservación) does not replace current legislation on protected area management, but is intended to implement a new management system for protected areas which will unify the national system to a greater degree, and in which local and private participation will be encouraged (MIRENEM, 1991a; Ugalde, 1992).

**International Activities** Costa Rica signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940 with subsequent ratification.

Costa Rica ratified both the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 23 August 1977, with one natural site inscribed in 1983, and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar

Convention) on 27 March 1992 and two sites have been listed. Costa Rica participates in the Unesco Man and the Biosphere Programme and two biosphere reserves were approved in 1982 and 1988.

In 1982 Costa Rica signed the Basic Convention for Creation of the Park (Convenio Básico de Creación

del Parque), a binational agreement with Panama for the creation, joint planning and administration of the La Amistad transfrontier park. Costa Rica and Nicaragua are also cooperating closely on the development of the binational protected areas system along the border between the two countries through the SIAPAZ project. A binational commission (comisión binacional) was established in October 1990, and Costa Rica and Nicaragua signed a cooperative agreement on 15 December 1990 for collaboration with frontier protected areas (áreas protegidas fronterizas).

Costa Rica, through the National Park Service participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres). This programme aims to coordinate the activities of participating countries, to assist in the implementation and functioning of a coherent and effective national system of protected areas in each country (FAO, n.d.).

**Administration and Management** The structure of protected areas and forestry administration has existed in its present form since the creation of MIRENEM, in 1986. By establishing a ministry specifically responsible for natural resources and the environment, such issues are afforded a relatively high status within government (Quesada, 1990).

MIRENEM incorporates those organisations that administer natural resources and protected areas: the General Forestry Directorate (DGF) and the National Parks Service (SPN), both formerly part of the Ministry of Agriculture (Ministerio de Agricultura) (MAG); and the Wildlife Directorate (Dirección de Vida Silvestre) (DVS), formerly a department within the DGF (MIRENEM, 1991b; Ugalde, 1992). The Responsibilities for protected area management are assigned to the DGF or the SPN according to management category; the DVS is responsible for wildlife, and does not administer protected areas (A.F. Ugalde, pers. comm., 1992).

The DGF, established in 1969, has a broad range of responsibilities for forest resource administration, including the management of forest reserves (reservas forestales), protective zones (zonas protectoras) and faunal refuges (Bradley *et al.*, 1990; A.F. Ugalde pers. comm., 1992). The principal aim of the areas managed by the DGF is the sustainable production of natural resources. Land within these areas may be privately owned, and the state is not obliged to acquire territory for the establishment of these categories (Ugalde, 1992).

The SPN, established as a separate directorate in 1977, manages national parks (parques nacionales), biological reserves (reservas biológicas) and national monuments (monumentos nacionales). It has the principal responsibility for formulating and implementing protected area management policies under the



supervision of MIRENEM (Bradley *et al.*, 1990; Ugalde, 1992). The principal objective of the areas administrated by the SPN is the conservation of national biodiversity and for this reason, land under these categories must be acquired by the state (Ugalde, 1992). In total, there are approximately 600 personnel working in protected area management (Ugalde, 1992).

There are numerous other organisations and institutions involved, directly or indirectly, in the protection and utilisation of forest resources. The DGF and the SPN are the two principal institutions responsible for coordinating and directing forest related activities (MIRENEM, 1990).

The National Forestry Council, created in 1990, is responsible for assessing the activities of forest resource use and protection activities of MIRENEM. It comprises the minister and viceminister of MIRENEM, the Director General of the DGF; the Minister of National Planning and Economic Policy (Ministro de Planificación Nacional y Política Económica); and presidents or representatives from several governmental and private institutions concerned with agrarian and environmental affairs.

The National Commission of Indigenous Affairs (Comisión Nacional Asuntos Indígenas) (CONAI) is responsible for a number of indigenous reserves (reservas indígenas) which play an important role in the conservation of forests and natural resources (Bradley *et al.*, 1990; MIRENEM, 1991a). Although CONAI does not directly define management policies for these reserves, it coordinates management activities with the various indigenous development associations and local groups (Bradley *et al.*, 1990).

There are seven privately-owned protected areas that cover 24,357ha, and constitute an important addition to the protected area network (MIRENEM, 1991b). These may be owned by universities, private individuals or institutions such as the Tropical Science Centre (Centro de Ciencias Topicales) (CCT), which manages Monteverde Cloud Forest Reserve, and the Organization for Tropical Studies (OTS), which manages La Selva Biological Research Station (Bradley *et al.*, 1990).

A number of other NGOs are working in conservation issues. Among the oldest and most active in protected area support are the National Parks Foundation (Fundación de Parques Nacionales) (FPN), the Neotropical Foundation (Fundación Neotrópica) and the National Biodiversity Institute (Instituto Nacional de Biodiversidad) (INBio) (Bradley *et al.*, 1990). The main objectives of FPN include promoting environmental education and working towards the establishment of an effective legal framework for environmental protection (Alfaro, pers. comm., 1986). The FPN is responsible for administering funds generated by debtfornture swaps in Costa Rica (Bradley *et al.*, 1990). In 1983, the FPN together with The Nature Conservancy, developed the Natural Heritage Programme (Programma de

Patrimonio Natural) to carry out biological inventories on endangered species and natural habitats in the country and to maintain a data base of information on the current situation of protected areas (Alfaro, pers. comm., 1986). The Fundación Neotrópica, is also involved in the Natural Heritage Programme, besides playing a broader role in education about protected areas. INBio, established in 1988, promotes environmental education and training of field personnel to work in protected areas (Bradley *et al.*, 1990). It also manages conservation databases.

Funding for protected areas is through state budgets, and funds generated by NGOs and foreign governments. Financial support from the government was greatest during the 1970s, but funds were reduced during the 1980s (Ugalde, 1992). In 1987 a debtfornture swap was established, by which the protected area system received significant financial support in the form of a bilateral government cooperation, and from international NGOs (Ugalde, 1992). Between 1987 and 1990 the state funds assigned to the SPN and the DGF, were US\$ 27 million, with a further US\$ 19 million from private foundations (Ugalde, 1992).

Problems in protected area management arise from a lack of coordination between the responsible institutes, and the lack of participation of local communities, combined with the absence of a clear legislative framework for implementing conservation objectives (MIRENEM, 1990). The existence of two principal administrative entities in charge of protected areas has resulted in an unnecessary duplication of effort (Ugalde, 1992). Also, a lack of funding results in inadequate staffing levels and inadequate training of personnel (MIRENEM, 1990).

There are noticeable differences in the effectiveness of protected area management under the various administrative authorities. Only national parks and biological reserves may be considered adequately protected and receiving effective management (Ugalde, 1992).

The new law proposed by MIRENEM in 1991 provides for the reorganisation of protected area administration. The SPN would be changed to the National Service for Conservation Areas (Servicio Nacional de Areas de Conservación) and vested with the responsibility for the management, planning and development of the new national system of protected areas (MIRENEM, 1991a; Ugalde, 1992). Management agreements may be established with NGOs. Local participation would be encouraged through the creation of the advisory National Council on Conservation Areas (Consejo Nacional de Areas de Conservación) and numerous Regional Councils (Consejos Regionales), which incorporate local people and enable group decisions to be taken (MIRENEM, 1991a). Significant developments in tourism in protected areas have also taken place (Ugalde, 1992).



**Systems Reviews** Costa Rica lies between two oceans, with a mountainous topography shaped by volcanic activity and an altitudinal range from sea level to 3,819m (MIRENEM, 1990). The entire country is tropical with a mean annual rainfall of 3300 mm (Bradley *et al.*, 1990). The interrelationship of geographical, physical and climatic features within a relatively small area has given rise to a large variety of environments and habitats. Studies indicate that over half a million species, equivalent to around 7% of the world's biodiversity, are found in the country (Bradley *et al.*, 1990; Quesada, 1990). Following the Holdridge (1967) classification system, 12 Life Zones and eight transitional zones have been identified. Two Life Zones, tropical moist forest and tropical wet forest cover almost 50% of the country (Bradley *et al.*, 1990; CCT, 1982; Ugalde, 1992).

There are great differences between the two coastlines. The Pacific coastline extends for 1,328 km, is characterised by a mixture of beaches, rocks, headlands, and peninsulas, and has extensive tracts of mangrove forest along the rivers and estuaries running into the Pacific Ocean. This coast is physically more diverse than the 212km of Caribbean coastline which consists mainly of deltas, canals, alluvial plains and freshwater swamps fronted by long barrier beaches (Bradley *et al.*, 1990; Quesada, 1990).

Three mountain ranges run northwest to southeast across the country. The Cordillera de Guanacaste in the northwest comprises five volcanic massifs reaching an altitude of 2,020m. The lowlands extending from the foothills of this range to the Caribbean coast cover around 20% of the total land area of the country (Bradley *et al.*, 1990; Quesada, 1990). Just below the Cordillera de Guanacaste lies the Central Cordillera, reaching altitudes of 3,432m, and, south of this range, the Cordillera de Talamanca extends almost to the Caribbean coast. Between the Cordillera Central and the Cordillera de Talamanca lies the Central Valley, the most densely populated region in the country. Around 52% of the population lives in the valley, an area that accounts for only 3.83% of the total national territory, and in which are situated the national capital and three provincial capitals (Bradley *et al.*, 1990; Quesada, 1990).

The economy is based on agriculture. Indiscriminate deforestation for agriculture and timber production has left many areas in a fragile situation, particularly the heads of water basins and water sources (MIRENEM, 1990; Bradley *et al.*, 1990). Between 1950 and 1987, forest coverage was reduced from 53% to 29%, much of which now lies within the network of protected areas. However, forest resources in Costa Rica are severely threatened by overexploitation, and in 1987 the government declared a moratorium on industrial forest activities in order to allow forest recuperation (MIRENEM, 1990).

The first effectively managed protected area was established in 1963 (Ugalde, 1992). Since then, the development of a protected area system has been relatively rapid, and Costa Rica has the second greatest proportion of territory under protection in Latin America. By January 1992, the National System of Protected Wildlands (Sistema Nacional de Areas Silvestres Protegidas), under the administration of MIRENEM, comprised 70 areas covering 1 million ha, equal to 21% of the total national territory (Ugalde, 1992).

Around 11% of the total national territory is under absolute protection with management categories that prohibit the extraction of natural resources. Forest reserves and protective zones account for the remaining 10.2% (Bradley *et al.*, 1990; Quesada, 1990). Indigenous reserves cover 6.6% of the country area, giving a total of 28% of the total land area under protection (MIRENEM, 1991b). Protected areas incorporate 19 of the 20 Life Zones identified in the country (MIRENEM, 1991b; Ugalde, 1992). Estimates of the proportion of forested land within the protected area system vary from 65% (MIRENEM, 1990) to 86% (Ugalde, 1992).

The effectiveness of protected areas is limited by the lack of strategic planning, and the extent of privately-owned land (MIRENEM, 1990). Land tenure has become an increasingly serious problem in the past few decades. National parks continue to contain private property within their boundaries (MIRENEM, 1991a; Ugalde, 1992). Since the mid-1960s a combination of population growth and private land ownership has exacerbated land shortage, and agricultural expansion and migration into protected areas has had a severe impact (Bradley *et al.*, 1990; MIRENEM, 1991a). This migration process is encouraged indirectly by the Agrarian Development Institute (Instituto de Desarrollo Agrario) (IDA), which recognises squatters' rights, and provides for compensation for eviction (Bradley *et al.*, 1990).

The majority of protected areas are not of sufficient size to fulfil their conservation objectives, and they are all inadequately developed, from basic protection activities to facilities for personnel and visitors (MIRENEM, 1990; Ugalde, 1992). Protected areas are assigned a low level of national importance. Natural resources are not considered part of the national capital, and are not included in economic analyses, resulting in a lack of information about their economic potential and the extent of deterioration they have suffered so far (Ugalde, 1992). As the areas are not utilised to their full economic potential, there is a significant lack of benefits for local populations and conflicts often arise (Ugalde, 1992). As a combined result of these factors, protected areas have become biogeographically isolated (MIRENEM, 1990; Ugalde, 1992).

In an attempt to halt this isolation process, and to better coordinate conservation activities, MIRENEM has proposed a restructuring of the entire protected area

system: the National System of Conservation Areas (Sistema Nacional de Areas de Conservación) (SINAC) (MIRENEM, 1991a). This involves regrouping protected areas into conservation areas (areas de conservación) as the basic management unit, which will integrate local communities to a greater extent (Bradley *et al.*, 1990; Ugalde, 1992). A conservation area consists of a grouping of protected wildlands, contiguous or close to each other, which are divided for managerial purposes into zones according to their ecological characteristics and the presence of neighbouring communities (Bradley *et al.*, 1990; Ugalde, 1992). The areas have one or more strictly protected core zone owned by the state, surrounded by zones that allow sustainable development and use of natural resources, under private ownership, and is similar to the concept of the biosphere reserve (Bradley *et al.*, 1990; Ugalde, 1992).

So far, eight conservation areas have been identified, each comprising a collection of national parks, other protected areas, forest reserves, and in some cases indigenous reserves. A further four satellite areas, that owing to their geographic isolation cannot form part of a conservation area, are also to be included in SINAC (Bradley *et al.*, 1990; MIRENEM, 1991a). The system is to be implemented and administered by the National Service for Conservation Areas, currently the SPN, with the collaboration of NGOs and local communities (MIRENEM, 1991a; Ugalde, 1992). SINAC was created by four governmental institutions involved in protected area management (the DGF, SPN, DVS, and CONAI), and is more a result of independent work by these institutions and conservationists than of formal longterm planning (MIRENEM, 1991a).

The consolidation of the system into conservation areas will require the creation of corridors and protection of additional small areas not included in the system at present. However, around 7% of the land included in SINAC is still privately owned and must be purchased (MIRENEM, 1991b). Consolidation is intended to take place during the five years after the 1991 proposal for the new law. Details on the degree of implementation are not available.

#### Addresses

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title (English title):** **Reforma a la Ley Forestal (Reform of the Forestry Law), No. 7174**

**Date:** 28 June 1990

**Brief description:** Replaces the Forestry Law (Ley Forestal) No. 4465 of 1969 and its subsequent modifications. Gives details of the structure, function and objective of the General Forestry Directorate (Dirección General Forestal) and provides for the creation of the National Forestry Council (Consejo Forestal Nacional) as a high level organization to assess the activities of the Ministry of Natural Resources, Energy and Mines (Ministerio de Recursos Naturales, Energía y Minas) (MIRENEM) with respect to the protection and utilization of forest resources. The national forest estate is defined and regulations for forest resource use given. Definitions for five management categories of protected area and the prerequisites for their establishment are also given. These areas form part of the national forest estate.

**Administrative authority:** The Dirección General Forestal (General Forestry Directorate) (DGF) is responsible for managing forest reserves; protective zones and wildlife refuges. The National Parks Service (Servicio de Parques Nacionales) (SPN) is responsible for managing national parks and biological reserves. Both institutes are within the Ministry of Natural Resources, Energy and Mines (Ministerio de Recursos Naturales, Energía y Minas) (MIRENEM).

**Designations:**

**Parque Nacional (National Park)** An area containing one or more ecosystems that have not been transformed by human activity, or to a minimal extent, in which floral or faunal species, geomorphological formations, and habitats are of special scientific or recreational interest, or which contain landscape of outstanding national scenic beauty.

The area is set aside for the protection and conservation of natural beauty, flora and fauna of

national importance with the aim of allowing public access and enjoyment under supervision and subject to regulation.

It is the responsibility of the highest authority in the country to take adequate measures to remove and prevent, as soon as possible, exploitation or occupation within the entire area to affect the protection of the species or structures for which the area was established.

Exploitation of natural resources is prohibited.

**Reserva Biológica (Biological Reserve)** An area comprising forest and forested land whose principle use is the conservation, study and research of wildlife and the habitats in which it lives.

Exploitation of natural resources is prohibited.

**Zona Protectora (Protective Zone)** An area comprised of forest and land suitable for forests, in which the principle objective is the protection of soil, the regulation of water resources and the conservation of the environment and water basins.

Exploitation of natural resources is permitted only with prior authorization from the DGF and is subject to regulations given in the legislation.

**Reserva Forestal (Forest Reserve)** An area comprising forest whose primary function is the production of timber, and by those forested lands which are naturally particularly suitable for these aims.

Exploitation of natural resources is permitted only with prior authorization from the DGF and is subject to regulations given in the legislation.

**Refugio Nacional de Vida Silvestre (National Wildlife Refuge)** An area comprising forest and land whose primary function is the protection, conservation, augmentation and management of floral and faunal species.

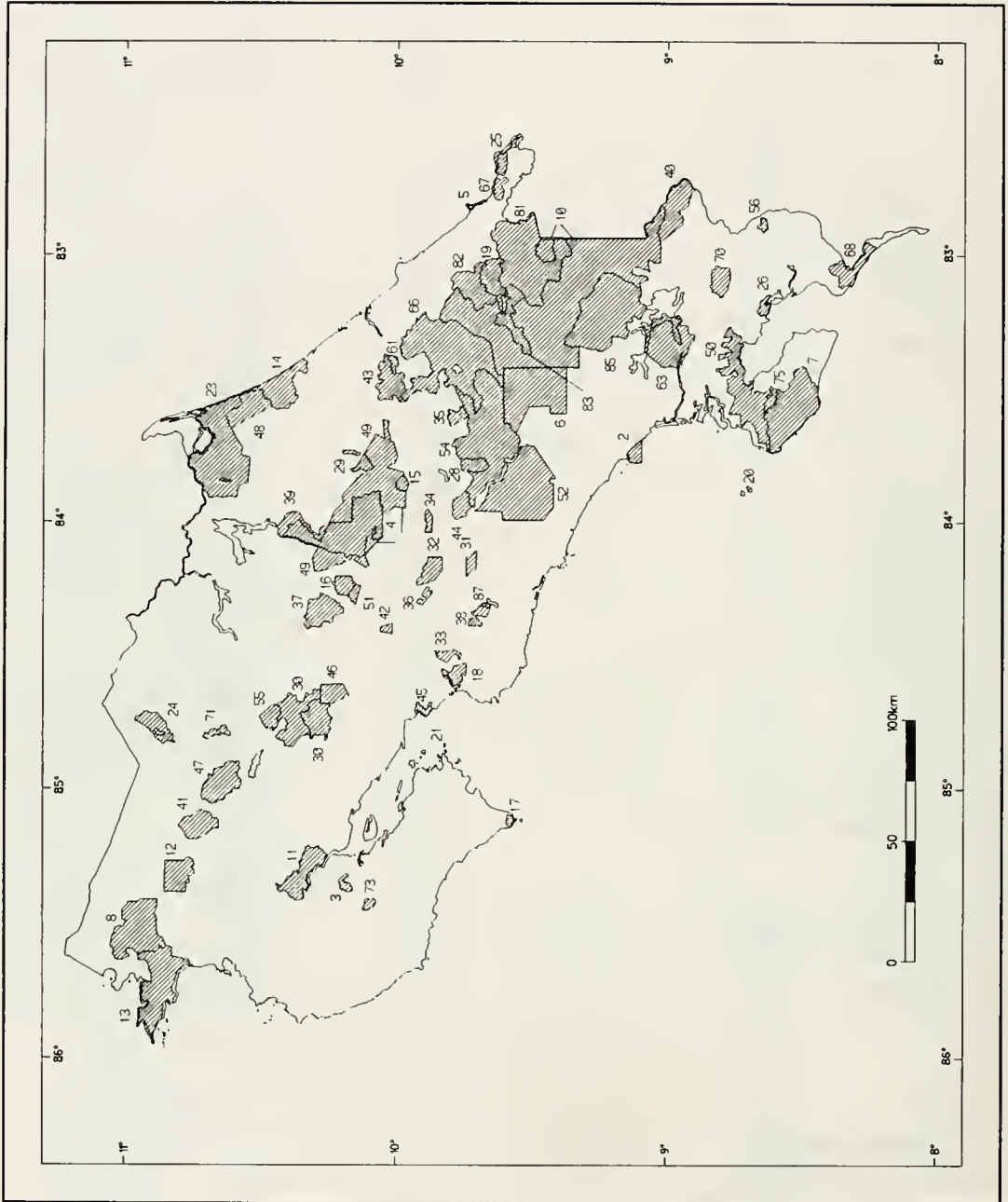
Exploitation of natural resources is permitted only with prior authorization from the DGF and is subject to regulations given in the legislation.



## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Arenal	II	2,000	1991
2	Ballena	IV	4,200	1990
3	Barra Honda	V	2,295	1974
4	Braulio Carrillo	II	44,099	1978
5	Cahuita	V	1,067	1970
6	Chirripó	II	50,150	1975
7	Corcovado	II	54,568	1975
8	Guanacaste	II	32,512	1991
9	Isla del Coco	II	2,400	1978
10	La Amistad (Talamanca)	II	193,929	1982
11	Palo Verde	II	13,228	1982
12	Rincón de la Vieja	II	14,083	1973
13	Santa Rosa	II	37,217	1971
14	Tortuguero	II	18,946	1975
15	Volcán Irazú	V	2,309	1955
16	Volcán Poás	I	15,600	1971
<i>Biological Reserves</i>				
17	Cabo Blanco	I	1,172	1963
18	Carara	I	4,700	1978
19	Hitoy-Cerere	I	9,154	1978
20	Isla del Caño	IV	200	1978
21	Islas Guayabo y Negritos	I	143	1973
22	Lomas Barbudal	IV	2,279	1986
<i>Faunal Refuges</i>				
23	Barra del Colorado	IV	98,000	1985
24	Caño Negro	IV	9,969	1983
25	Gandoca y Manzanillo	IV	9,449	1985
26	Golfito	IV	1,350	1985
27	Isla Bolanos	IV	100	1981
28	Tapantí	IV	6,080	1982
<i>Protection Zones</i>				
29	Acuíferos de Guácimo y Pocosí	VIII	4,270	1987
30	Arenal	VIII	18,325	1991
31	Carraigres	VIII	4,000	1976
32	Cerros de Escazú	VIII	7,060	1976
33	Cerros de Turubares	VIII	2,340	1983
34	Cerros de la Carpintera	VIII	2,000	1976
35	Cuencas del Río Tuis	VIII	4,095	1986
36	El Rodeo	VIII	2,222	1976
37	Juan Castro Blanco	VIII	14,258	1968
38	La Cangreja	VIII	1,937	1984
39	La Selva	VIII	2,815	1982
40	Las Tablas	VIII	19,602	1981
41	Miravelles	VIII	11,670	1991
42	Río Grande	VIII	1,500	1976
43	Río Pacuare	VIII	13,060	1991
44	Río Sombrero - Río Navarro	VIII	6,440	1984
45	Río Tivives	VIII	2,368	1986
46	San Ramón	VIII	7,800	1991
47	Tenorio	VIII	17,650	1991
48	Tortuguero	VIII	13,000	1990

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Forest Reserves</i>			
49	Cordillera Volcánica Central	VIII	61,542	1975
50	Golfo Dulce	VIII	67,287	1978
51	Grecia	VIII	2,000	1973
52	Los Santos	VIII	62,000	1975
53	Manglares	VIII	35,000	1977
54	Río Macho	VIII	69,604	1964
55	Volcán Arenal	VIII	5,256	1969
	<i>Anthropological Reserves</i>			
56	Abrojos	VII	1,480	1978
57	Alto Chirripó	VII	77,973	1976
58	Alto Pacuare	VII	1,336	
59	Awari	VII	1,332	
60	Bajo Chirripó	VII	18,783	1976
61	Barbilla	VII	2,077	1982
62	Boruca	VII	12,470	1956
63	Boruca-Terraba	VII	31,983	1957
64	Cabagra	VII	27,860	1956
65	China Kicha	VII	2,459	
66	Chirripó	VII	75,824	1976
67	Cocles	VII	3,538	
68	Conte Burica	VII	11,910	1977
69	Corina	VII	1,555	
70	Coto Brus	VII	7,500	1976
71	Guatuso	VII	2,743	1976
72	La Estrella	VII	13,616	
73	Matambú	VII	1,710	1976
74	Nimari Bukiri	VII	7,439	
75	Osa	VII	1,700	1985
76	Rey Curré	VII	10,620	1985
77	Salitre	VII	11,700	1956
78	Sibuju Norte	VII	2,195	
79	Talamanca - Bribri	VII	43,690	1976
80	Talamanca - Cabécar	VII	22,729	1976
81	Talamanca	VII	62,253	1976
82	Tayni	VII	13,616	1976
83	Telire	VII	16,260	1976
84	Térraba	VII	9,350	1956
85	Ujarras Salitre-Cabagra	VII	56,561	1957
86	Ujarráz	VII	19,040	1956
87	Zapatón	VII	2,855	1981
	<i>Biosphere Reserves</i>			
	Reserva de la Biósfera de la Amistad	IX	584,592	1982
	Cordillera Volcánica Central	IX	144,363	1988
	<i>Ramsar Wetlands</i>			
	Caño Negro	R	19,800	1992
	Palo Verde	R	9,969	1992
	<i>World Heritage Sites</i>			
	Cordillera de Talamanca-La Amistad	X		1977



Protected Areas of Costa Rica

# EL SALVADOR

Area 20,935 sq. km

Population 5,252,000 (1990)

Natural increase 2.47% per annum

## Economic Indicators

GDP: No information

GNP: US\$ 1,070 per capita (1989)

**Policy and Legislation** There are currently no official national policies regarding the utilisation and protection of natural resources and the environment in El Salvador. A national forestry plan and a conservation policy are required (Núñez *et al.*, 1990).

The main legislation concerning forest resources is the 1973 Forestry Law (*Ley Forestal*), Decree No. 268, although this is now outdated in many respects (Núñez *et al.*, 1990). The object of the Forestry Law is to regulate the conservation, rational use and management of forest resources on a sustainable basis to ensure the continuation of forest industries. Reforestation, the control of erosion and the establishment of national forests and parks are all in the national interest. Provision is made for the creation of the Forestry and Wildlife Service (*Servicio Forestal y de Fauna*), known simply as the Forestry Service (*Servicio Forestal*), within the Ministry of Agriculture and Livestock (*Ministerio de Agricultura y Ganadería*) (MAG), to be responsible for all forest resources and implementation of forestry legislation.

The Forestry Law also provides for the creation of various categories of protected areas: protective zone (*zona protectora*), forest reserve (*reserva forestal*), national park (*parque nacional*) and equivalent reserves (*reserva equivalente*), which may be established by decree. Private land may be expropriated for the creation of protected areas where necessary. These areas are to be administered by the Forestry Service, and the exploitation of forest resources within them is strictly regulated. However, detailed definitions of the different categories and details of the regulations governing their management are not given and no regulation to the Forestry Law has been formulated (Núñez *et al.*, 1990).

Ministerial Decree No. 236 of April 1981 raised the status of the National Parks and Wildlife Section (*Sección de Parques Nacionales y Vida Silvestre*) from a department within the Forestry Service to that of a service itself, creating the first institute specifically responsible for protected area management. All mandates included in the Forestry Law regarding national parks and wildlife management are transferred to the National Parks and Wildlife Service (*Servicio de Parques Nacionales y Vida Silvestre*).

Although the 1981 Basic Land Reform Law (*Ley Básica de Reforma Agraria*) does make provision for the

protection of natural areas (Serrano, 1992), there is no comprehensive law providing regulations for the establishment and management of national parks and equivalent reserves. Such a law was drafted in 1980 but has never reached the appropriate authority, and there are no current high level governmental proposals to revise legislation (Alvarez, 1992; Núñez *et al.*, 1990). Protected areas are created by individual decrees. However, only two natural areas currently have specific legislation providing for their declaration as national parks: Decree 53 (1987) established Montecristo National Park, a cloud forest along the joint border with Honduras and Guatemala; and Decree 20 (1989) established El Imposible National Park near the Pacific coast in western El Salvador.

There are five other protected natural areas which, although lacking specific individual decrees, have been acquired by the government through agrarian reform, and their ownership has been transferred to the Natural Resources Centre (*Centro de Recursos Naturales*) (CENREN) which is the Ministry of Agriculture and Livestock (*Ministerio de Agricultura y Ganadería*) (MAG) unit within which is found the National Parks and Wildlife Service. In addition, approximately 40 small areas totalling 13,000ha were reserved in the name of CENREN as part of the land reform process which began in 1980, but lack both individual decrees and formal transfer of land ownership to CENREN.

**International Activities** El Salvador signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940 and ratified it later. It participates actively in the Central American Commission on Environment and Development (*Comisión Centroamericana del Ambiente y Desarrollo*).

El Salvador has not ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) nor the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), neither does it participate in the Unesco Man and the Biosphere Programme, although several areas have been proposed (Benítez *et al.*, 1992). El Salvador participates in the FAO Tropical Forestry Action Plan, but no funds for work are yet available (J.M. Alvarez, pers. comm., 1992).

El Salvador, through the National Parks and Wildlife Service, participates in the FAO Latin American Network (*Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Áreas Protegidas, Flora y Fauna Silvestres*). This programme aims to coordinate



the activities of participating countries, to assist in the implementation and functioning of a coherent and effective national system of protected areas in each country (FAO, n.d.).

It is hoped that projects can soon get underway for joint management initiatives between El Salvador, Honduras and Nicaragua for the shared mangrove estuaries and coastal zone of the Gulf of Fonseca (J. Barborak pers. comm., 1992). In 1987 the governments of El Salvador, Honduras and Guatemala signed an agreement to create a trinational cloud forest biosphere reserve El Trifinio or Brotherhood Biosphere Reserve (Reserva de la Biósfera La Fraternidad) in the mountainous region where the three nations meet. Formal efforts are also under way to elaborate a cooperative management plan for the reserve, which would include Montecristo National Park, and to obtain official recognition as an international biosphere reserve (Mardones, 1988; Ugalde and Godoy, 1992).

El Salvador has received very limited international financial and technical assistance for its conservation programmes during the past decade. The major Salvadorian Environment Programme (Programa del Medio Ambiente Salvadoreño) (PROMESA), which is to be carried out by US-AID and includes support for coastal parks and reserves, is currently in the design phase (J.M. Alvarez, pers. comm. 1992). An increase in international aid is expected to come from the current biosphere reserves and trinational park projects (Benítez *et al.*, 1992). The Nature Conservancy has included El Imposible National Park in their "Parks in Peril Program", and will start work on this national park with Eco Activo 20-30 in the near future. The consortium Paseo Pantera (Wildlife Conservation International and Caribbean Conservation Corporation) is working with Eco Activo 20-30 and AMAR on a proposal for work in El Imposible National Park and Barra de Santiago Wildlife Refuge and the areas in between for submission to US-AID (J.M. Alvarez, pers. comm. 1992).

**Administration and Management** The first protected area was established for recreational purposes on privately-owned land that was donated to the Salvadorean Institute of Tourism (Instituto Salvadoreño de Turismo) (ISTU). Therefore, the ISTU was the first institute with managerial responsibilities of this nature (Alvarez, 1992; Núñez *et al.*, 1990).

Following the 1973 legislation, natural resources were the responsibility of the Forestry Service under the Ministry of Agriculture and Livestock (MAG). In 1974 a unit was created within the Forestry Service to manage protected areas, which became known as the National Parks and Wildlife Unit (Unidad de Parques Nacionales y Vida Silvestre) (Alvarez, 1992). The new unit conducted inventories, identified areas throughout the country for protection and undertook various activities regarding wildlife management. It comprised two sections: National Parks and Equivalent Reserves (Sección de Parques Nacionales y Reservas Equivalentes), and

Wildlife (Sección de Vida Silvestre). In 1981, the status of the unit was formally raised to that of a service (Alvarez, 1992).

Protected areas are the responsibility of the National Parks and Wildlife Service (Servicio de Parques Nacionales y Vida Silvestre) (SPNVS), which is itself directly dependent on the Natural Resource Centre (Centro de Recursos Naturales) (CENREN) within the MAG. It comprises two specific departments: the Natural Areas Department (Departamento de Areas Naturales) in charge of managing natural ecosystems; and the Wildlife Department (Departamento de Vida Silvestre), responsible for a wide variety of activities including the study, protection and management of all native faunal species (Alvarez, 1992; Núñez *et al.*, 1990).

Towards the end of the 1970s, the SPNVS was managing five areas but its activities were severely limited by the inability to buy additional land for restoration and protection. The agrarian reform of 1981-1982 significantly changed this situation by expropriating over half of the potential protection forest in El Salvador in the first phase of the reformation. This increased both the size of the areas under protection and the effectiveness of their administration (Alvarez, 1992; Núñez *et al.*, 1990). Five other protected natural areas, although lacking specific individual decrees, have been acquired by the government through agrarian reform, and their ownership has been transferred to CENREN (Benítez *et al.*, 1992). A large number of other small areas were identified at the same time for protection but there are no plans or budgets available for their management (Alvarez, 1992).

In addition to the area managed by the SPNVS, the Salvadorean Institute of Tourism (ISTU) manages two small reserves, Deininger National Park and Cerro Verde National Park (Benítez *et al.*, 1992). Non-governmental organisations (NGOs) may also play an important part in protected area management. There are over 20 conservation-directed NGOs. Several are involved in promoting the creation and management of a number of small parks, and in developing environmental education and buffer zone management around existing protected areas (Benítez *et al.*, 1992). In 1991, an agreement was signed between the MAG and an NGO, the Active 20-30 Salvadorean Ecological Foundation (Fundación Ecológica Salvadoreña Activo 20-30), known as Eco Activo 20-30 or FESA, for the cooperative management of El Imposible National Park (Alvarez, 1992; Benítez *et al.*, 1992). Eco Activo 20-30 is concentrating on raising money to purchase land for the consolidation of this national park. The Foundation was created in 1990 and is the only NGO involved in protected area management (J.M. Alvarez, pers. comm. 1992). The SPNVS continues to manage and administer the park, but it receives support from Eco Activo 20-30. This is the first agreement of its kind between a governmental authority and an NGO (Alvarez, 1992). Another NGO,

Friends of Trees (Amigos del Arbol) (AMAR), assists in protection of Barra de Santiago Wildlife Refuge.

Problems in protected area management stem from the lack of appropriate legislation, which impedes the implementation of an effective administrative infrastructure (Alvarez, 1992; Núñez *et al.*, 1990). Official regulations are not specified for the management of national parks and equivalent reserves, and there are no definitions or regulations stated in the legislation to provide specific management guidelines (Núñez *et al.*, 1990). The effectiveness of the SPNVS has also been impeded by the division of the country into four administrative regions by CENREN (Alvarez, 1992; Núñez *et al.*, 1990). Following this regionalisation, funding for the SPNVS at the operational level such as wardens, was reduced. The SPNVS also lost direct authority over field personnel which become dependent on the respective regional divisions of CENREN (Alvarez, 1992; Núñez *et al.*, 1990). This has made it increasingly difficult for the government to administer widely-dispersed, small areas, and the return of centralised administrative authority to the SPNVS has been suggested (Núñez *et al.*, 1990).

**Systems Reviews** El Salvador is the smallest mainland nation in the Western Hemisphere (Benítez *et al.*, 1992). The high population density (300 people per sq. km) has resulted in an advanced state of deforestation, and reforestation projects are very limited. Less than 12% of the country is forested, and only 3% remains in its natural state (Benítez *et al.*, 1992; Núñez *et al.*, 1990; SPNVS, 1987). Excessive exploitation of natural resources has taken place since the colonial era, and, as a result, around 80% of the natural vegetation has been destroyed, and around 77% of the country has been seriously affected by soil erosion (Anon., n.d.; SPNVS, 1987).

Very little research has been carried out on biodiversity, and there are no inventories of national wildlife or plant species (Núñez *et al.*, 1990). Owing to its small size and more limited altitudinal and climatic variability than neighbouring nations, and the fact that it only adjoins one ocean, El Salvador has the lowest biodiversity in the Central American region (Benítez *et al.*, 1992). Altitudes do not exceed 2,730m, and the most distinctive topographic characteristic of the country is the rugged and broken landscape resulting from volcanic activities (Anon., n.d.). A thin coastal plain, interrupted by mountains and deep fissures, runs parallel to the Pacific Ocean. The volcanic soils of the coastal plain are rich, and commercial agriculture is extensive in the region.

In contrast, the soils of the coastal mountains just inland from the plain are poor, and this region has suffered severe erosion and environmental degradation. The northern region of the country, where the highest mountains are located on the border with Honduras, is also characterised by extensive deforestation and soil erosion (Anon., n.d.). Following the Holdridge (1977) classification system of natural habitats, six life zones are found within the country.

The conservation of natural areas began with the donation to the Salvadorean Institute of Tourism (ISTU) in 1972 of 704ha of privately-owned land covered with secondary forest, (Alvarez, 1992). Although the primary objective of the area was recreational, the written agreement with ISTU specified that the natural conditions of the area were not to be altered. Towards the end of the 1970s, five protected areas were under the administration of the Ministry of Agriculture and Livestock.

International tourism has been quite limited for the past decade due to civil strife. Owing to its degraded habitats and small size, it is the Central American nation least likely to become a major international ecotourism destination in coming years (Benítez *et al.*, 1992).

Lack of public awareness is a considerable problem for conservation. Hunting and fishing are not regulated, as a result of the lack of national policy and legislation (Núñez *et al.*, 1990). Owing to the small size of remaining natural habitats and the severe pressure on them by neighbouring communities, many native plant and animal species have become extinct over the past few decades. Particularly noticeable is the disappearance of species that require large areas of pristine habitat, or are susceptible to intense hunting pressure, such as jaguar, harpy eagle, and scarlet macaw (Benítez *et al.*, 1992).

The establishment of protected areas is not taking place fast enough to offset the continuous destruction of the natural environment. The main limiting factors are the lack of financial resources and governmental support. The majority of the areas identified for conservation purposes are without any form of protection, and only four have park wardens (Núñez *et al.*, 1990). Of 47 properties expropriated for nature conservation during the 1981 agrarian reform, only one is being administered by SPNVS; the rest are affected by agriculture, hunting, firewood gathering and construction of houses (Serrano, 1992). None has facilities for recreation or tourism, which limits the number of visitors and hence public awareness.

Classification of natural areas is vague, and the scarcity of studies on biogeographic regions in the country or species present inhibits the identification of priority areas for protection (Núñez *et al.*, 1990). Because of widespread civil strife during the past decade, combined with the small size and relative lack of international importance of most of its protected areas, El Salvador has received very little international financial and technical assistance for its conservation programmes. Much of the international support which has arrived in recent years has been diverted to the war rather than to more profitable activities (Serrano, 1992). A minimum of 14,000ha still needs to be bought for administration by SPNVS (at a total cost of some US\$ 10.5 million) in order to produce a representative system of national parks (Serrano, 1992).



Fortunately, IUCN and WWF have maintained support and, with their assistance, CENREN has been planning a coordinated national wildlands system since 1988 which will soon be completed (Benítez *et al.*, 1992). A major new programme for conservation activities including park management is now being planned by US-AID which includes support for coastal parks and reserves. Support from the European Community is hoped for through the trinational Trifinio project, and from several donors through the Central American Tropical Forestry Action Plan for the Gulf of Fonseca mangrove project (Benítez *et al.*, 1992).

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**ANNEX**  
**Definitions of protected area designations as legislated,**  
**together with authorities responsible for their administration**

**Title : Ley Forestal (Forestry Law),**  
**Decree No. 268**

**Date:** 1973

**Brief description:** States the regulations governing forest use to ensure the conservation, improvement and development of forest resources in a sustainable manner. Provides for the establishment, by decree, of various categories of protected areas, but does not give detailed definitions of these nor regulations governing their management.

**Administrative authority:** The Servicio Forestal (Forestry Service) within the Ministry of Agriculture (Ministerio de Agricultura)

**Designations:**

***Parque Nacional (National Park)*** An area of forested land that, owing to its location, natural scenic beauty, flora and fauna of national importance, or other circumstances, merits protection as a national park.

It is in the public interest to protect such areas as national parks. Public access is permitted under authorised official supervision.

Within the area, forest resources may be exploited only by the Forestry Service.

***Reserva Equivalente (Equivalent Reserve)*** An area of forested land protected for scientific and recreational purposes, in the public interest

Public access is permitted under authorised official supervision.

Within the area, forest resources may be exploited only by the Forestry Service.

***Zona Protectora (Protective Zone)*** An extension of forested land which is protected for its importance in maintaining and regulating water resources, to improve the living conditions of the local populations in the area and for other suitable reasons such as the presence of rivers, streams or lakes

Natural resources may be exploited in the zone, within the regulations established in the respective legislation providing for the creation of the area. Specific characteristics of the area must also be taken into account.

***Reserva Forestal (Forest Reserve)*** A forested area maintained in its complete state for future exploitation

The area may be mountainous, of low productivity owing to infertile or rocky soil, or an area where the protection of forest cover is considered essential for the following reasons: production of forest products; regulation of water resources; development of projects and works involving water resources; for the protection of agricultural land to prevent soil erosion; and for general use

The area may comprise state-owned or privately-owned land.

The Ministry of Agriculture may at any time, declare permanent forest reserves for the supply of forest products required by the government, for works or public services.

**Source:** Original legislation

**SUMMARY OF PROTECTED AREAS**

Map ref.	National/international designations Name of area	IUCN Management Category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Cerro Verde	IV	6,500	1981
2	El Imposible	II	5,600	1983
3	Montecristo	IV	3,893	1979
	<i>Wildlife Refuges</i>			
4	Barra de Santiago	IV	2,200	1983
5	El Jocotal	IV	1,200	1978





Protected Areas of El Salvador

# GUATEMALA

Area 108,889 sq. km

Population 9,197,000 (1990)

Natural increase 2.88% per annum

## Economic Indicators

GDP: No information

GNP: US\$ 910 per capita (1989)

## Policy and Legislation

A commitment to preserve the environment is made in the Political Constitution of Guatemala (Constitución Política de Guatemala) which declares it in the national interest to conserve, protect and improve the natural heritage of the country. For this purpose, the state shall establish inalienable protected areas. The conservation of forest resources and reforestation activities are of national priority (Detlefsen *et al.*, 1991).

Guatemala participates in the Tropical Forestry Action Plan (TFAP) of the FAO, an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. In 1991, Guatemala formulated its Forestry Action Plan (Plan de Acción Forestal para Guatemala) (PAFG), to interpret the global designs of TFAP to suit specific national interests (Detlefsen *et al.*, 1991; Ministerio de Agricultura, Ganadería y Alimentación, pers. comm., 1991). The Office for Formulation of the Forestry Action Plan for Guatemala (Oficina de Formulación del PAFG) was established for this reason and has drawn up the basic document which includes several recommendations and details of projects to increase the effectiveness of the forestry sector in Guatemala (Ministerio de Agricultura, Ganadería y Alimentación, pers. comm., 1991). The PAFG stresses the importance of protecting forest resources and includes the conservation of forest ecosystems, reduction of deforestation and promotion of reforestation activities among its objectives. However, national policies on forest conservation, management and recuperation have been unclear and inconsistent (Detlefsen *et al.*, 1991).

The first natural resource legislation was the 1921 Forestry Law (Ley Forestal) (Detlefsen *et al.*, 1991). Provision for establishing protected areas was first made in the Forestry Law of 1945, but the first protected areas, designated as national parks, were not actually created until 1955 (Nations *et al.*, 1988).

Several modifications to the forestry legislation were passed subsequently, but all previous acts are replaced by the 1989 Forestry Law (Ley Forestal) Decree No. 7089, currently in effect. This law was passed in response to the increasing degradation of forests, and states the importance of protecting and renovating forest resources while improving their administration and utilisation. Under provision of the 1989 Forestry Law,

a new forestry institute, the General Forestry Directorate (Dirección General de Bosques) (DIGEBOS) was created, replacing former forestry authorities. DIGEBOS is responsible for managing and administering forest resources in compliance with national conservation objectives. All extraction concessions must gain the approval of the conservation authorities before they may be issued by DIGEBOS. However, DIGEBOS often grants concessions without consulting conservation authorities such as CONAP (J.C. Godoy, pers. comm., 1992) (see Administration and Management). The 1989 Forestry Law prohibits the destruction of rare or protected tree species, and the extraction of forest resources from within protected areas, except where specifically authorised, and penalties are given. Resource guards (guardarecursos) ensure compliance with forestry regulations. Regulations to the 1989 Forestry Law were passed in 1990, but further details are not available.

In the past, policies on the trade and development of wildlife resources have not been conducive to their protection (Detlefsen *et al.*, 1991). However, a major step in wildlife protection was taken in 1989 with the Forestry Law and new protected area legislation (see below). Both these laws comprise a significant policy of regulation of forest and wildlife resources (Detlefsen *et al.*, 1991).

The first organisation specifically responsible for environmental issues, the National Environment Commission (Comisión Nacional del Medio Ambiente) (CONAMA), was created under provision of Decree No. 6886 Law for the Protection and Improvement of the Environment (Ley de Protección y Mejoramiento del Medio Ambiente), 1986. The law attempts to reduce pollution, and restrictions are placed on the construction of buildings for industrial or other purposes. Provision is made for the establishment of conservation units and the government is to create an unified national system of protected areas. Environmental impact studies for industrial projects become obligatory, though these are rarely carried out in practice (J.C. Godoy, pers. comm., 1992). CONAMA is responsible for assessing and coordinating environmental activities throughout the country.

A significant step towards increasing the number and effectiveness of conservation units was the passing of Decree No. 4-89, the Law of Protected Areas (Ley de Areas Protegidas), in 1989. Under provision of this decree, an extensive national system of conservation units in the country was created, the Guatemalan System of Protected Areas (Sistema Guatemalteco de Areas Protegidas) (SIGAP). All existing areas previously managed as protected areas but lacking legal notification were legalised and incorporated into SIGAP, together with those areas already legally established. A total of

44 new sites was declared under special protection (protección especial), to be designated appropriate management categories upon their delimitation, and incorporated into SIGAP. However, by 1992, none of these 44 sites had been legally declared or incorporated into SIGAP, and none managed. The Law of Protected Areas names six different management categories together with objectives and selection criteria (J.C. Godoy, pers. comm., 1992).

Also declared protected are: 3km of both oceans measured out from the high tide line; 200m around all lake shores; 100m on each side of navigable rivers; and 50m on each side of water sources and springs. Protected areas under private ownership are officially recognised, provided that the area is managed according to the terms and regulations of the law. Regulations are given for natural resource use within protected areas. Prohibited activities include hunting, and collecting or destroying specimens of fauna or flora. However, both Law No. 6886 and Law No. 4-89 lack regulations which would allow for fines for breaches of the law (J.C. Godoy, pers. comm., 1992).

The Law of Protected Areas also makes provision for the creation of the National Council for Protected Areas (Consejo Nacional de Areas Protegidas) (CONAP) as a means of increasing the efficiency of protected area management. CONAP is responsible for formulating and implementing a national conservation strategy, and has the ultimate responsibility for the direction and management of SIGAP. Protected areas may be managed by a number of different institutions but their activities are assessed and coordinated by CONAP. An Executive Secretariat (Secretaría Ejecutiva) executes the policies and objectives of CONAP.

The Regulation to the Protected Area Law (Reglamento de la Ley de Areas Protegidas), Governmental Accord No. 75990 (1990), provides definitions for the terms used in the Law of Protected Areas, and details the processes involved in the selection, establishment and declaration of protected areas. Definitions for the 15 management categories to be employed in SIGAP are given (see Annex). Inventories are to be conducted for those areas previously established by law, and management plans are obligatory for all areas.

Two laws in 1990 provided for the creation of the largest protected areas to date in Guatemala: Decree No. 590 which declared a significant portion of the forest in the Department of Petén as a biosphere reserve; and Decree No. 4990 declaring a second new biosphere reserve in the eastern lowlands (Godoy and Castro, 1990). Implementation of the two major environmental laws in effect today, the 1989 Forestry Law and the 1989 Law of Protected Areas, is hindered by the lack of human and financial resources (Detlefsen *et al.*, 1991). In order to achieve their stated objectives, strengthening of the institutions involved, and increased coordination between the public and private sectors, is required. Strategies need to be formulated to develop educational

programmes and involve local communities in forest conservation and management to a greater degree (Detlefsen *et al.*, 1991).

**International Activities** Guatemala signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940 and ratified it later. Guatemala ratified both the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 16 January 1979 with one natural site inscribed to date, and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 26 June 1990 with one site listed. Guatemala participates in the Unesco Man and the Biosphere Programme with one biosphere reserve internationally recognised in 1990.

Guatemala participates in the Latin American Network of Technical Cooperation in National Parks, Other Protected Areas, Flora and Wildlife (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres) of the FAO. This programme aims to coordinate the activities of participating countries to assist in the implementation and functioning of a coherent and effective national system of protected areas in each country (FAO, n.d.).

In 1987 the governments of Guatemala, Honduras and El Salvador signed an agreement to create a trinational cloud forest biosphere reserve El Trifinio or Brotherhood Biosphere Reserve (Reserva de la Biósfera La Fraternidad) in the mountainous region where the three nations meet. Efforts are now underway to elaborate a cooperative management plan for the reserve that will integrate the local populations of all three nations, and to obtain official recognition as an international biosphere reserve (Mardones, 1988; Ugalde and Godoy, 1992). Projects have also been proposed for a binational protected area Chiquibul/Maya Mountain between Guatemala and Belize, and a network of protected areas in the Gran Petén region involving cooperation between Guatemala, Mexico and Belize (Ugalde and Godoy, 1992).

**Administration and Management** There are currently around 60 institutions whose activities are directly or indirectly related to protected areas and wildlife. Of these, 29 are state or independently owned, and the rest are national and international non-governmental conservation organisations (Detlefsen *et al.*, 1991).

The National Environment Commission (CONAMA) was created in 1986 as a dependency of the President, and is responsible for assessing and coordinating all activities related to the protection and improvement of the environment. CONAMA has been instrumental in



creating an Environmental Commission (Comisión del Medio Ambiente) within the National Congress to assess environmental issues at a high level within the government (Nations *et al.*, 1988).

The first institute specifically vested with responsibility for protected areas is the National Council for Protected Areas (CONAP). Established in 1989, the aim of CONAP is to create a high level governmental institution with sufficient autonomy that it may be entirely dedicated to the administration of the national system of protected areas (Godoy, 1990). CONAP is directly dependent on the President of the Republic (Presidencia de la República) and it sits on the Coordinating Council of CONAMA (Consejo Coordinador). Protected areas may be managed directly by CONAP or by other organisations or individuals through a legal agreement with CONAP and under its supervision. CONAP coordinates the activities of the various institutions in order to comply with national conservation objectives. Vigilance within protected areas and the enforcement of regulations is the responsibility of CONAP and the resource guards (Guardarecursos), and authorisation for activities permitted within protected areas must be issued by CONAP.

CONAP comprises representatives from the different institutions with protected area management responsibilities: CONAMA; the Forest Directorate (Dirección de Bosques); the Guatemalan Tourism Institute (Instituto Guatemalteco de Turismo) (INGUAT); the Institute of Anthropology and History (Instituto de Antropología y Historia) (IDAEH); the National Agrarian Transformation Institute (Instituto Nacional de Transformación Agraria); the Centre for Conservation Studies (Centro de Estudios Conservacionistas) (CECON); the Association of Municipalities (Asociación de Municipalidades); the National Council for Urban and Rural Development (Consejo Nacional de Desarrollo Urbano y Rural); three delegates from non-governmental conservation organisations and one representative from the Committee of Agricultural Associations (Comité de Asociaciones Agrícolas), a total of 14 individuals (Detlefsen *et al.*, 1991; Godoy, 1990).

The policies of CONAP are implemented by an Executive Secretariat (Secretaría Ejecutiva), which comprises departments of research, studies and planning; execution, development and control; and administration. An Executive Secretary (Secretario Ejecutivo) assigned by the President of the Council is responsible for directing the activities of the Executive Secretariat.

Forests are presently the responsibility of the General Directorate of Forests and Wildlife (Dirección General de Bosques y Vida Silvestres) (DIGEBOS), created in 1989 and replacing the former National Forestry Institute (Instituto Nacional Forestal) (INAFOR). DIGEBOS is part of the Ministry of Agriculture, Livestock and Food (Ministerio de Agricultura,

Ganadería y Alimentación) (MAGA). At the local level, it is represented in eight administrative regions of the country, but its financial management is centralised and the distribution of funds often does not reflect the true requirements of the regions (Detlefsen *et al.*, 1991). Around 1,915 personnel are employed by DIGEBOS, of which 1,550 are unqualified manual labourers. Forest and conservation authorities work closely together. Concessions for forest extraction issued by DIGEBOS must first be approved by CONAP and CONAMA. Forests within protected areas are not the direct responsibility of DIGEBOS but are managed by, or under the supervision of, CONAP (Detlefsen, *et al.*, 1991).

Because of inadequate government support for protected areas, a large number of non-governmental organisations (NGOs) are involved in protected area administration. The Defenders of Nature Foundation (Fundación Defensores de la Naturaleza) manages Sierra de las Minas Biosphere Reserve, and the Interamerican Foundation for Tropical Investigation (Fundación Interamericana de Investigación Tropical) (FIIT) manages another area. The Ecodesvelopment and Conservation Foundation (Fundación para el Ecodesarrollo y la Conservación) (FUNDAECO) and the Mario Dary Rivera Foundation (Fundación Mario Dary Rivera) are each carrying out sustainable development projects in one protected area. Other NGOs working with rural communities in and around protected areas are: Friends of the Forest (Asociación Amigos del Bosque), Guatemalan Natural History Society (Asociación Guatemalteca de Historia Natural), Environment Defence Association (Asociación Prodefensa del Medio Ambiente), Association for Research and Social Studies (Asociación de Investigación y Estudios Sociales) (Así Es), and the Centre for Conservation Studies (Centro de Estudios Conservacionistas) (CECON).

Since the creation of CONAP, significant improvements in protected area management have been initiated, but these are still not sufficient to bring about the effective planning and administration of the areas. One limiting factor is the lack of human resources to implement the conservation legislation, and the lack of adequate training and qualification for such personnel. Only 68 personnel are employed directly in the management of protected areas. Only six areas have management plans, and more than 80% have still not resolved problems concerning land ownership; although most legally declared protected areas are stateowned, many lack official boundaries. There is little or no infrastructure and many areas are isolated within their regions. An analysis of the 54 areas declared legally protected reveals critical problems in their administration and financing, and a lack of managerial capacity to put protection measures into effect (Detlefsen *et al.*, 1991).

Additionally, there is a serious lack of communication between CONAP and DIGEBOS. DIGEBOS often grants licences for timber extraction within the 44 areas under special protection by Law No. 489 without



consulting CONAP. This makes the creation of new protected areas and the formulation of a national strategy for the conservation of forest resources difficult (J.C. Godoy, pers. comm., 1992).

**Systems Review** The topographical variation within Guatemala, and its geographical location as a bridge between two continents with coastlines on two oceans, gives rise to one of the richest biodiversities in Latin America (Nations *et al.*, 1988). Guatemala has an altitudinal range from sea level to 4,000m and, following the Holdridge life zone classification system, 14 life zones occur in the country (Detlefsen *et al.*, 1991; URL y ICATA, 1984). Two distinct biogeographic realms are identified: the lowlands of the Petén and Caribbean region are Neotropical, while the interior highlands and high Pacific mountains are classically Nearctic. This combination gives rise to a high degree of biodiversity, with representative wildlife and flora from each realm, and of endemism (Detlefsen *et al.*, 1991; Nations *et al.*, 1988).

Guatemala may be divided roughly into four main regions according to physical biogeographic characteristics: the Pacific coastal plain; the Pacific mountain chain; the Interior Highlands; and the Petén and Caribbean lowlands (Nations, *et al.*, 1988). The Pacific coastal plain was entirely forested, until the 1940s, but the region has undergone great environmental transformation into pastures and swamps as a result of agricultural development. Cattle ranching is concentrated on the fertile, volcanic soils of this region (Nations and Komer, 1984). Mangrove forests found along the coast have been seriously degraded by intensive shrimp production, salt extraction and fuelwood production (Nations, *et al.*, 1988).

The Pacific mountain chain consists of a chain of 33 volcanoes running parallel to the Pacific Ocean. Forests are found at the base of the mountains, giving way to cloud forest higher up. These highland montane forests have around 70% endemism amongst animal species, but, as a result of colonisation, wood timber extraction and agriculture, they represent some of the most endangered ecosystems in the country (Nations *et al.*, 1988). The interior highlands reach altitudes of 4,000m, and are quite heavily populated. This region has also suffered environmental degradation from agricultural practices.

The Petén and Caribbean lowlands in the northeast are the most sparsely populated region, in the country. The Department of Petén contains the largest tracts of undisturbed tropical forest, and one of the largest remaining in Central America (Nations *et al.*, 1988). However, the Department of Petén is threatened by the imminent construction of a road connecting the region with the capital city, and providing access to neighbouring Belize through the forested lowlands of Petén. This will also open the area up to oil exploration (Anon., 1991). The total forest cover is around 40% of

total land area, and protection forests account for 13% of this coverage (Detlefsen *et al.*, 1991).

Unequal exploitation of natural resources has been a feature of the nation's history. Much land was converted into banana plantations around the turn of the century to satisfy foreign markets. As a result of land reformations, there is a severe shortage of land available for the Guatemalan peasantry, giving rise to overpopulation in many areas and colonisation into previously undisturbed rain forest regions. In recent years the government, through the National Institute of Agrarian Transformation (Instituto Nacional de Transformación Agraria) (INTA), has embarked on a largescale colonisation programme which relocated around 60,000 people to the northern forest region, with a further 100,000 proposed (Colchester, 1991). Migration to forest areas often results in inappropriate land use and degradation of forest ecosystems (Detlefsen *et al.*, 1991).

The first protected areas were established in 1955 with the declaration of 10 national parks (Godoy and Castro, 1990; Nations *et al.*, 1988). Between 1955 and 1988, a total of 52 conservation areas were declared, but the majority of these areas did not meet international criteria for protected areas and were ineffectual (Godoy and Castro, 1990; Nations *et al.*, 1988). Several management categories were employed in this first step towards creating a system of protected areas, such as wild reserve (*reserva silvestre*), multiple use reserve (*reserva de uso múltiple*) and national monument (*monumento nacional*).

The unification of protected areas into a national system took place in 1989 as a result of the Law of Protected Areas (Godoy, 1990). The Guatemalan System of Protected Areas (SIGAP) was created as a union of all protected areas throughout the country, whether previously established by law or not. SIGAP incorporates six reserves administered by CECON that had been without legal support, declaring them legally established, and has raised the status of 26 small areas managed by various other institutes to a higher level of legal protection. Finally, 44 new sites were declared areas of special protection (*áreas de protección especial*) to be studied and legally declared under the appropriate management categories at a later date (Godoy, 1990). At the same time, the National Council of Protected Areas (*Consejo Nacional de Areas Protegidas*) (CONAP) was established to coordinate protected area management.

With the creation of SIGAP, protected area coverage increased from less than 0.01% to around 2.22% of total land area. With the incorporation of the new areas, coverage will reach between 8 and 14%, and encompass nine of the 14 Holdridge life zones (Detlefsen *et al.*, 1991; Godoy, 1990). Around 44.4% of the protected areas in SIGAP are located in the Department of Petén (Detlefsen *et al.*, 1991). The national system employs 15 different management categories, grouped into six types based on the common characteristics (Godoy and

Castro, 1990). The oldest management category in use is cultural monument (monumento cultural), and over half of the present protected areas are classified as such. However, as the primary objective of this category is the protection of national archaeological remains, the flora and fauna in the majority of areas has suffered severe degradation (Detlefsen *et al.*, 1991).

A regional network of protected areas has been proposed for the Department of Petén, the Integrated System of Protected Areas in Petén (Sistema Integrado de Areas Protegidas de El Petén) (SIAP). At the time of development of the national system, Petén was recognised as being of high priority for conservation efforts owing to its important forest ecosystems and the increasing rate of their destruction (Godoy and Castro, 1990). SIAP will comprise three national parks; five forest reserves; six wildlife refuges; four archaeological monuments; two biotopes; four natural monuments; one biological reserve; one experimental station; and one biosphere reserve, and management objectives are given for each area. These areas have been proposed in an order of priority for development and instigation of protection measures. Implementation of the system will be the responsibility of the institutions that comprise CONAP, together with the municipalities of the region. SIAP aims to encourage a decentralisation of CONAP to improve the coordination of protected area administration at the regional level (Godoy and Castro, 1990). The extent of implementation of this proposed system is not known.

Despite significant improvements in protected area coverage and coordination, as a result of the creation of SIGAP and CONAP, the effective conservation of ecosystems, with the exception of a few areas, has not been achieved. SIGAP is characterised by a lack of human and financial resources which impede the achievement of protection objectives, a situation that has worsened in recent years (Detlefsen *et al.*, 1991). Many areas have been legally declared protected but no funds have been assigned to them in order to implement this protection.

One of the major threats to protected areas is the exploitation of floral and faunal resources by neighbouring local communities. Many of the areas do not have physically defined limits, and are not protected from uncontrolled exploitation, primarily hunting and timber extraction. Around 35% of protected areas have human settlements within their boundaries, and more than 80% do not have buffer zones and are surrounded by agricultural communities. The administration and planning of protected areas needs to be strengthened to integrate conservation and tourism practices to a greater extent, to allow local populations to benefit from the existence of such areas (Detlefsen *et al.*, 1991).

## Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title (English title):** Reglamento de la Ley de Areas Protegidas (Regulation to the Protected Areas Law), Acuerdo Gubernativo No. 75990

**Date:** 22 August 1990

**Brief description:** Provides further details governing the establishment and functioning of the Guatemalan System of Protected Areas (Sistema Guatemalteco de Areas Protegidas) (SIGAP) and the National Council for Protected Areas (Consejo Nacional de Areas Protegidas) (CONAP), both of which are created under provision of the Protected Areas Law (Ley de Areas Protegidas), Decree No. 489 of 7 February 1989. Definitions are given for the management categories to employed in SIGAP.

**Administrative authority:** The protected areas that form SIGAP may be managed by a number of different institutions or private individuals, but the ultimate responsibility for supervising, directing and coordinating the national system lies with the National Council for Protected Areas, (Consejo Nacional de Areas Protegidas) (CONAP).

**Designations :**

Protected areas management categories conform to six major groups:

**Parque Nacional (National Park); Reserva Biológica (Biological Reserve)** Area of relatively large extension essentially unaltered by human activities, that contains ecosystems, populations or samples of flora or fauna species of scientific

importance and/or national or international interest, whose ecological processes have been allowed to continue with the minimum interference. The area is to be managed for the protection, conservation and maintenance of natural biological processes and biodiversity in an unaltered state, so as to be available for scientific research, environmental monitoring, education and limited ecological tourism activities. Visitors will have access to certain parts of the area under special conditions, for education, cultural and recreation purposes. Prohibited activities include the extraction of timber, hunting and mineral exploration and exploitation. Collecting or destroying floral or faunal specimens is also prohibited unless for scientific research purposes and with prior authorisation from the respective administration authority and approved by CONAP. No new human habitation is allowed except where necessary for administrative purposes. Where habitation already occurs, methods to integrate these populations with the objectives of the area are sought. If this is not possible, relocation of the communities to other suitable areas is to take place.

**Biotopo Protegido (Protected Biotope); Monumento Natural (Natural Monument); Monumento Cultural (Cultural Monument); Parque Histórico (Historical Park)** Area that generally contains one or more example of outstanding natural beauty, archaeological or historical remains, or other natural examples of national or international importance. The ecosystems may not necessarily be in an intact state, and the size of the area depends on the example or specimen that

is to be protected. The area is to be managed for conservation purposes and its ecosystems maintained to as near a natural state as possible. Limited recreation, tourism, education and scientific research activities are permitted.

***Area de Uso Múltiple (Multiple Use Area); Manantial (Spring); Reserva Forestal (Forest Reserve); Refugio de Vida Silvestre (Wildlife Refuge)*** Relatively large area, generally covered by forest. May contain zones appropriate for the sustainable production of timber, water, floral and wildlife resources without adversely affecting the ecosystems of the area. The area may have been altered by human intervention, but still retains a large portion of its natural habitat. The area may be under public or private ownership. Management objectives are to ensure the sustainable use of water, forest, plant, wildlife, or marine resources. Conservation may be oriented primarily to support economic activities with zones of strict conservation within the area, or it may be a primary objective in itself. The importance of economic and social objectives must always be maintained, and environmental education and ecological recreation is stressed. Planning and management of the area must ensure that all exploitation is carried out in a sustainable manner to maintain the continuing productivity of the area. Where insufficient management plans exist, to ensure sustainability exploitation of any sort is prohibited except for the traditional exploitation by local indigenous communities until such a plan is implemented.

***Area Recreativa Natural (Natural Recreation Area); Parque Regional (Regional Park); Rutas y Vías Escénicas (Scenic Paths and Roads)*** Area where conservation activities are required to protect natural communities or wild species, but the emphasis is on educational and recreational

functions. Generally, the area contains scenic qualities and some attraction for the general public, and is easily accessible. Minimum alteration or modification of the natural habitat is permitted. The area may be under private or public ownership. Regional parks are usually under municipal ownership. Management objectives are aimed at recreation and education.

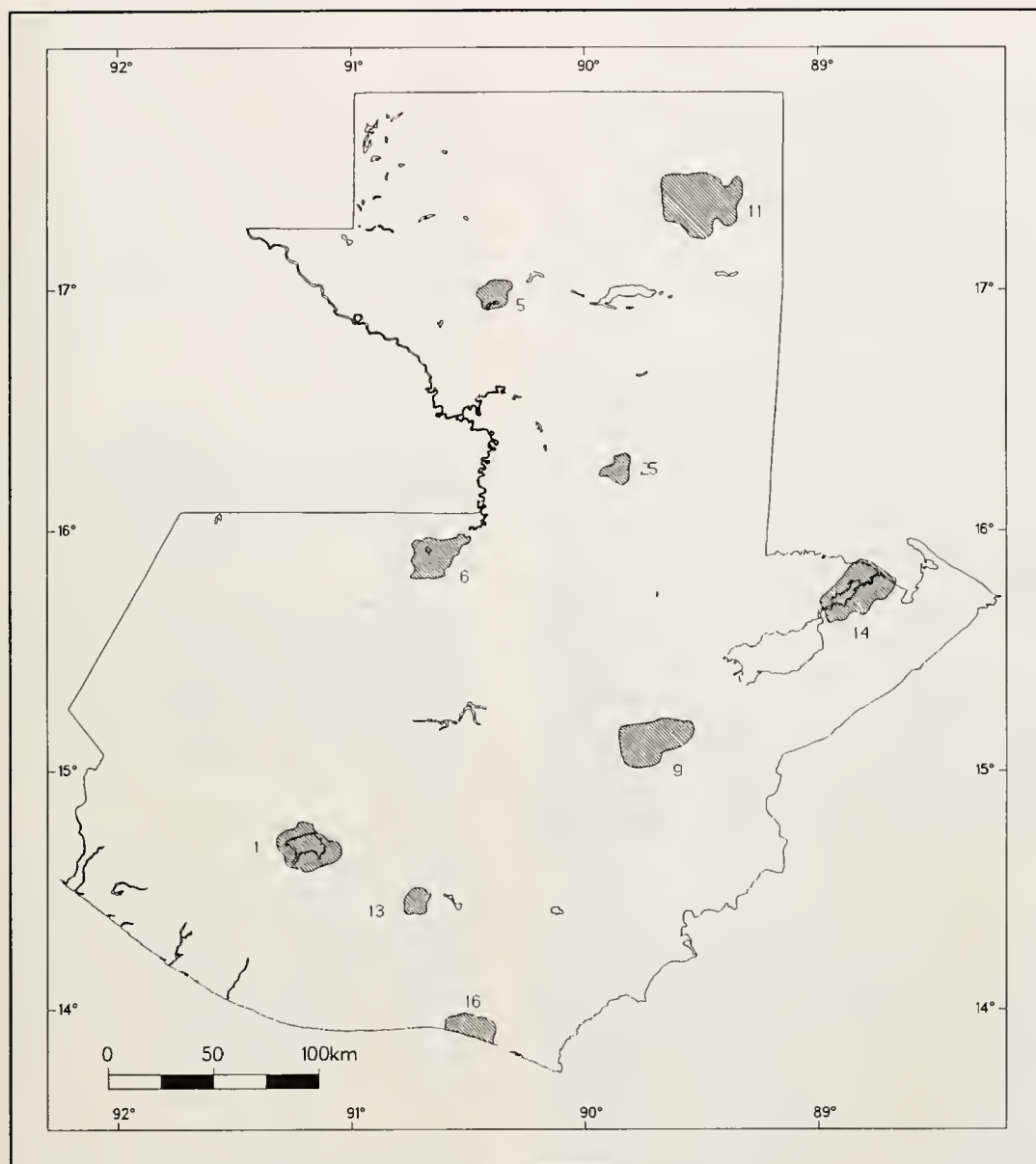
***Reserva Natural Privada (Private Natural Reserve)*** Area that is owned by a private individual or organisation, whose owners have voluntarily dedicated the area to conservation purposes. The area is legally established and is recognised by the state. Management objectives are to ensure the continuance of natural conditions required to protect significant species or groups of species, ecosystems, or cultural or environmental examples on the private property. In very exceptional cases, the production of renewable natural resources may occur, but it is of secondary importance to the management objectives. The size of the area depends on the proposal by the owner who maintains his rights to the area and is responsible for its management.

***Reserva de la Biósfera (Biosphere Reserve)*** Area of global importance with respect to its natural and cultural resources. All the areas in this category must be previously approved by the Unesco Man and the Biosphere committee. The principal management objective of this area is to allow various land uses and sustainable natural resource use with emphasis on traditional activities, as well as effect strict conservation in the nuclear core of the area. Scientific research is permitted. The areas provide important sites for environmental monitoring and facilities for environmental education, training and controlled tourism. Criteria for selection, and zoning within the area are as given by the Unesco programme.



## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Atitlán	VIII	54,773	1955
2	Bahía de Santo Tomás	V	1,000	1956
3	El Rosario	VIII	1,031	1980
4	El Tigre	II	350,000	1990
5	Lacandón	II	200,000	1990
6	Laguna Lachua	II	10,000	1978
7	Mirador/Dos Lagunos/Río Azul	II	147,000	1990
8	Río Dulce	VIII	7,200	1955
9	Santa Rosalía	VIII	1,000	1956
10	Sipacate-Naranjo	IV	2,000	1969
11	Tikal	II	57,400	1957
12	Trifinio	II	4,000	1987
13	Volcán de Pacaya	III	2,000	1963
	<i>Biotopes</i>			
14	Chocón-Machacas	IV	6,265	1981
15	Mario Dary Rivera (Quetzal)	IV	1,173	1976
16	Monterrico	VIII	2,800	1977
17	San Miguel - El Zotz	IV	42,000	1989
18	Biotopo Universitario para la Conservación del Quetzal	IV	1,153	1977
	<i>Forest Reserves</i>			
19	Area de Uso Múltiple R.B.M.	VIII	650,000	1990
20	Area de Uso Múltiple R.S.M.	VIII	34,000	1990
21	Franja Transversal del Norte	VIII	1,200	1981
22	Río Chixoy	VIII	28,000	1980
23	Río Salama	VIII	63,124	1956
	<i>Cultural Monuments</i>			
24	Aguateca	III	1,709	1987
25	Ceibal	III	2,100	1984
26	Dos Pilas	III	3,166	1987
27	Machaquilla	III	2,000	1974
	<i>Biosphere Reserve</i>			
28	Sierra de las Minas (Zona Núcleo)	I	105,700	1990
	<i>Biosphere Reserve</i>			
	Maya	IX	1,000,000	1990
	<i>Ramsar Wetland</i>			
	Laguna del Tigre	R	48,372	1990
	<i>World Heritage Site</i>			
	Parque Nacional Tikal	X	57,400	1979



Protected Areas of Guatemala



# HONDURAS

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Area 112,088 sq. km

Population 5,138,000 (1990)

Natural increase 3% per annum

## Economic Indicators

GDP:

GNP: US\$ 900 per capita (1989)

**Policy and Legislation** The 1982 constitution declares all natural resources to be state property, and the rational use of such resources to be in the national interest. The National Development Plan (Plan Nacional de Desarrollo) includes amongst its objectives the rational use of natural resources in order to ensure their continuity. The state is obliged to conserve the environment, is responsible for imposing regulations on natural resource use, and is empowered to create protected areas.

The Advanced Council of Economic Planning (Consejo Superior de Planificación Económica (CONSUPLANE) has produced the National Conservation Strategy which states that a National System of Protected Areas (Sistema Nacional de Areas Protegidas) must be established (Campanella *et al.*, 1982; Barborak *et al.* 1984).

Current forest policy dates back to 1986 and was formulated in accordance with the National Development Plan. Its aim is to ensure the continuity of forest resources through rational exploitation, conservation, and improvement of forest resources by means of current forestry legislation and the application of social integration projects by the national forestry administration.

There is no systematic organisation of environmental legislation. Provisions for environmental protection and natural resources occur in a number of different legislative acts, such as the Water Law (Ley de Aguas) (1927) which regulates the use of public water resources; the current Fishing Law (Ley de Pesca), Decree No. 154 (1959) which protects marine wildlife and ecosystems; and the Mining Code (Código de Minería) Decree No. 143 (1968) which merely mentions hunting or reserved zones (zonas vedadas o reservadas) to protect forest, archaeological or zoological heritage.

The first regulations for the establishment of protected areas are given in the Forestry Law (Ley Forestal) Decree 85 (1971), which declares the Secretariat of Natural Resources (Secretaría de Recursos Naturales) responsible for the development of national parks and equivalent reserves, and establishes a methodology for their selection and development. However, detailed definitions of the different management categories are not given. Forest exploitation and commercialisation are to be rationalised, and multiple-use forest reserves incorporating recreational activities and environmental

protection are encouraged. Forested areas within the national forest estate are classified according to use, and all forested land for 250m on either side of any water source and for 150m around lakes and on either side of rivers and streams is protected.

Decree-Law No. 103 (1974) provided for the establishment of the Honduran Forest Development Corporation (Corporación Hondureña de Desarrollo Forestal) (COHDEFOR), and the nationalisation of the forest industry and all trees with economic value. The objectives of COHDEFOR include ensuring rational use of forest resources and integrating forestry practices into the national economy. One of the principal projects of COHDEFOR, the Social Forestry System (Sistema Social Forestal), is described.

Decree No. 123 (1974) provided for the creation of the General Directorate for Forest Resources and Wildlife (Dirección General de Recursos Forestales y Vida Silvestre) (RENARE) within the Secretariat of Natural Resources (Secretaría de Recursos Naturales), to be vested with forest protection and conservation responsibilities, including the management of national parks and other protected areas. However, owing to the lack of political support, RENARE never undertook these functions effectively, and natural resource protection has remained the responsibility of COHDEFOR (Yates, 1987). The exact distribution of responsibilities for protected areas and natural resources is ambiguous. Decree No. 74-91 (1991) dissolves RENARE and transfers its responsibility for protected areas to the Department of Natural Areas and Fauna (Departamento de Areas Silvestres y Fauna) within COHDEFOR (J. Trinidad, pers. comm., 1992). Details of this recent decree are not currently available.

Protected area establishment and forest resource regulation are governed by the General Forestry Regulation, Resolution No. 634 (Reglamento General Forestal, Acuerdo No. 634) of 9 April 1984, which details the principles of the 1971 Forestry Law and of Decree No. 103 providing for the creation of COHDEFOR. The national forest estate is defined, and details of the forest classification system of the 1971 forestry law are given (see Annex). National forested areas are divided into protected forest zones (zonas protegidas forestales) for protection purposes; zones of forestry interest (zonas de interés forestal) for productive purposes; and non-classified forest areas (areas forestales no-clasificadas). Provision is made for the creation of national parks, natural monuments and other protected areas (collectively known as protected forest zones), and the processes for their selection and establishment are set out. Private land may be expropriated for their establishment.



In 1987, the Cloud Forest Law (*Ley de Bosques Nublados*) Decree No. 87-87 was passed. This law declares the protection of cloud forest ecosystems to be in the national interest, and provides for the creation of 11 national parks, eight wildlife refuges and 18 biological reserves in cloud forest areas. All these areas are to be administered by the Ministry of Natural Resources through RENARE, in coordination with various other institutions and local authorities. Around each area a permanent protected zone (*zona protegida a perpetuidad*) is established, within which no agricultural activities are permitted, buffer zones, in which regulated activities are permitted. However, Decree No. 87-87 is incomplete as no details of the above management categories are given in the law and no regulations relating to it have been passed.

Problems arise from a marked lack of environmental legislation and inconsistency among the existing legislative acts applying to natural resources (Yates, 1987). There is no legislation that would allow for the formulation of an environmental planning system; for delimiting the responsibilities of the various governmental and non-governmental institutions involved in natural resource management; and for establishing a national system of protected areas with coordinated management. Although the Forestry Law provides for the creation of various categories of protected areas, the definitions are unclear and do not bear relation to internationally accepted definitions (Yates, 1987). There is no legislation providing for wildlife management.

In all the areas of natural resource management except forestry new laws have been proposed. Two projects to revise environmental legislation were proposed and discussed in 1985 in collaboration with the FAO. The Project for the Law for the Protection of the Environment and Natural Resources (*Anteproyecto de Ley de Protección del Medio Ambiente y de los Recursos Naturales*) was formulated to coordinate all provisions relating to the environment into one legal instrument. The Project for the General Fishing Law (*Proyecto de Ley General de Pesca*) is intended to revise the 1959 fishing legislation, and contains provisions for protected marine zones (Rendón, 1986). However, of these proposed laws, only that for the creation of the Department of Natural Areas and Fauna has come into effect yet.

**International Activities** Honduras is one of the few countries in the Americas that has not signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention). Honduras ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 8 June 1979 with one natural site inscribed to date, and it participates in the Unesco Man

and the Biosphere Programme with one reserve accepted in 1980.

Honduras, through the National Secretariat for Natural Resources (*Secretaría de Recursos Naturales*), participates in the Latin American Network of Technical Cooperation in National Parks, Other Protected Areas, Flora and Wildlife Programme of the FAO (*Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres*). This programme aims to coordinate the activities of participating countries, to assist in the implementation and functioning of a coherent and effective national system of protected areas in each country (FAO, n.d.). Honduras participates in the FAO Tropical Forestry Action Plan (TFAP).

In 1987 the governments of Honduras, Guatemala and El Salvador signed an agreement to create the trinational cloud forest biosphere reserve *El Trifinio* or *La Fraternidad* in the mountainous region where the three nations meet. Efforts are now being made to elaborate a cooperative management plan for the reserve that will integrate the local populations of all three nations, and to obtain official recognition as an international biosphere reserve (Mardones, 1988; Ugalde and Godoy, 1992).

The Honduran and Nicaraguan governments have initiated projects for a joint management agreement for a large tract of land along this border. A similar agreement has been proposed between Honduras, Nicaragua and El Salvador for the shared mangrove estuaries and coastal zone of the Gulf of Fonseca (J. Barborak, pers. comm., 1992; Ugalde and Godoy, 1992).

**Administration and Management** Current legislation states that the Secretariat of Natural Resources (*Secretaría de Recursos Naturales*) is responsible for natural resources. The control and exploitation of forest resources and the administration of natural areas are the responsibility of COHDEFOR, a semi-autonomous institute responsible for implementing national forest policies in coordination with national development plans (J. Trinidad, pers. comm., 1992). In practice, natural resources have been managed by the various governmental sectors with interest in a particular resource, and responsibility is divided accordingly.

RENARE was intended to manage activities relating to the protection and conservation of fish, wildlife and the environment, including protected areas. However, owing to the lack of political support or interest, RENARE never undertook any of these functions. Although many laws providing for the creation of individual protected areas cite RENARE as the institute responsible for implementing the legislation and managing the area, in effect this was not carried out (Yates, 1987). This has resulted in the various institutions previously in charge of natural resources continuing their activities with little or no coordination

between them. Now that COHDEFOR takes sole responsibility for protected areas, the situation may improve (J. Trinidad, pers. comm., 1992).

Since 1991, COHDEFOR has been responsible for formulating and implementing national policies and laws regarding the protection, conservation and management of wildlands and wildlife; promoting and coordinating scientific research activities; encouraging the participation of urban and rural populations in conservation activities; and developing a National System of Protected Wildlands (Sistema Nacional de Areas Silvestres Protegidas) (Muñoz, 1991; J. Trinidad, pers. comm., 1992).

In 1991, the first restructuring of COHDEFOR took place with the creation of the Protected Areas Section (Sección de Areas Protegidas) and the Wildlife Section (Sección de Vida Silvestre) within the Department of Natural Areas and Fauna. As part of a plan to develop projects to strengthen current protection measures, seven priority protected areas were identified for immediate support, in five different forestry regions (Muñoz, 1991).

At the national level, COHDEFOR comprises nine forestry regions (regiones forestales) throughout the country (Anon., 1988). As part of its forest conservation programme COHDEFOR, has implemented the Social Forestry System, as detailed in the 1984 General Forestry Regulations, by which local rural populations are directly responsible for many aspects of forest management. The object of the Social Forestry System is to increase the effectiveness of forest protection, generate employment and improve the standard of living within local rural populations around forested regions. COHDEFOR formulates action plans and strategies in conjunction with the local cooperatives, and lends assistance as necessary. Local groups participate in the activities of the State Forestry Guard (Guardia Forestal Estatal) which is responsible for vigilance and regulation enforcement in forested areas.

The Honduran Institute of Anthropology and History (Instituto Hondureño de Antropología e Historia) (IHAH) manages the Ruinas de Copán Natural Monument (Barborak *et al.*, 1984), and the Universidad Nacional Autónoma de Honduras manages Cuero y Salado Wildlife Reserve (M. Durón, pers. comm., 1992).

There are a number of non-governmental organisations (NGOs) working in conservation. One of the most active, longest established and influential is the Honduran Ecology Association (Asociación Hondureña de Ecología) (AHE) which supports and promotes the establishment and maintenance of protected areas through publications and public awareness campaigns (Cruz, 1986). Since 1985, the AHE has been directly involved with managing El Tigre National Park in coordination with park personnel (AHE, 1987). The AHE formulated the proposal to protect cloud forest regions, and it was through the work of this NGO that 37 cloud forest areas were declared as national

parks, wildlife reserves and biological reserves under the 1987 legislation. The Cuero y Salado Foundation (Fundación Cuero y Salado) runs research and conservation projects in the Cuero y Salado Wildlife Refuge.

Problems in natural resource administration arise from the lack of public awareness of conservation organisations and the lack of training and motivation. There is a considerable amount of ambiguity regarding the distribution of responsibilities, and a marked lack of collaboration between the respective institutions involved in natural resource management, precluding effective protected area management (Yates, 1987).

**Systems Reviews** Honduras is the second largest country in Central America and the most mountainous, with over 75% of the land having a gradient greater than 20% (Campanella *et al.*, 1982). The only flat areas are the narrow coastal plains along the Caribbean Sea and the Gulf of Fonseca in the Pacific Ocean, and a few interior valleys (AHE, 1987; Campanella *et al.*, 1982). The country is divided naturally into four geographically distinct regions: the highlands; interior valleys; lowlands of the Caribbean; and the lowlands of the Pacific (Campanella *et al.*, 1982).

The Caribbean lowlands account for around 16.4% of total land area and, together with the valleys connecting the Caribbean coastal plains, they constitute the most fertile soils' in Honduras (Campanella *et al.*, 1982); banana and palm cultivation is extensive. The most eastern part of the region, and extending down into Nicaragua, is collectively known as La Mosquitia or the Mosquito Coast. It is characterised by natural pine forest plains interspersed with tropical forests, and has the richest biodiversity and the lowest population density in the country with a long history of indigenous civilization (Campanella *et al.*, 1982; Herlihy and Herlihy, n.d.). Río Plátano Biosphere Reserve was established in 1980 in this region to protect both natural resources and local populations of Miskito, Pech and Garifuna Indians. However, colonisation into the area has become an increasing threat to the integrity of the natural ecosystems and the indigenous communities (Herlihy and Herlihy, n.d.).

The highlands of the interior account for 81.7% of total land area. The dominant vegetation is pine forest which makes the soil acid and unsuitable for agriculture. Since colonial times, cattle ranching has been the primary economic activity in the region (Campanella *et al.*, 1982). The soils of the interior valleys are more fertile, and intensive cultivation of vegetables and sugar occurs.

The Pacific lowlands along the Gulf of Fonseca are bordered by mangrove forests and narrow coastal plains. Cattle ranching, cotton, sugar and vegetable production are extensive in this region (Campanella *et al.*, 1982). Around 60% of the total population of Honduras lives in rural regions and 40% in urban areas (Anon., 1988).



The marine influence, the mountainous topography and the various soil types have given rise to a great variety of ecosystems. Using the Holdridge (1967) classification system, eight different life zones are found in the country. The humid and very humid life zones of the Caribbean slopes cover over 75% of total area (Campanella *et al.*, 1982).

The development of protected areas has been a slow process (Cruz, 1986). A significant advance was made with the passing of the 1987 legislation and subsequent protection of a number of cloud forest areas. However, the lack of national environmental policy and planning, and the absence of coherent legislation providing for standardisation of protected area management has precluded the creation of a coordinated national protected area system (Yates, 1987).

The estimated total coverage of protected areas is around 3 million ha, or 27% of country area (COHDEFOR, n.d.). A more accurate and widely-accepted figure for percentage coverage is 22.6% (COHDEFOR, n.d.; S. Midente, pers. comm., 1992). No systematic review of the current situation of protected areas is currently available.

The protected area categories employed are not clearly defined in the legislation, which causes some confusion over protection and management of the areas. For example, forest reserves (reservas forestales) may also be referred to as protected forest zones (zonas forestales protegidas), reserved forest zones (zonas forestales reservadas), and protected and reserved zones (zonas protegidas y reservadas). Without a precise definition in the legislation creating protected areas, different uses of the same category result from total protection in one area to temporary protection for future exploitation in another (Cruz, 1986; Yates, 1987).

Protected area management is further hindered by the lack of adequate administrative legislation providing for the effective functioning of governmental organisations. There is a great need for new legislation to clarify the situation, and to assign responsibilities to specific institutions (Yates, 1987). However, COHDEFOR is now beginning to operate under modern legislation and this situation may be improving (see Policy and Legislation).

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title :** Reglamento General Forestal (General Forestry Regulation), Resolution No. 634

**Date:** 17 July 1984

**Brief description:** Develops the principles of the 1971 Forestry Law (Ley Forestal) and the 1974 Law for the Honduran Forestry Development Corporation (Ley de la Corporación Hondureña de Desarrollo Forestal) (COHDEFOR). The structure and function of COHDEFOR is given. The national forestry estate is classified according to use, and regulations are detailed. Provision is made for the creation of national parks and other protected areas as part of the national forest estate, and definitions are given.

**Administrative authority:** COHDEFOR is responsible for implementing provisions of the legislation including the administration and management of protected areas.

**Designations:**

**CLASSIFIED FOREST AREA  
(AREA FORESTAL CLASIFICADA)**

**Protected Forest Zone (Zona Forestal Protegida)**  
An area of public or private forest declared to be of great importance for the conservation of the natural habitats, water or soils. - The following areas are particularly to be considered for designation as protective forest zones: mountains and springs; water sources; water basins; areas around lakes and water resources, permanent and temporary water courses; forested areas that merit classification as national parks or other protected spaces. The following protected areas are considered to be protected forest zones:

**Parque Nacional (National Park)** An area of exceptional natural beauty, forest cover or natural ecosystems particularly primitive ecosystems, unaltered by human activity, to be protected for

its floral or faunal species richness. - Access to the area and exploitation of natural resources are strictly regulated.

**Monumento Natural (Natural Monument)** . Those natural formations, accidents or elements such as outstanding trees, caves or waterfalls, that are located in forested areas whose natural characteristics merit it special protection. -

**Sitio Natural de Interés Nacional (Natural Site of National Interest)** A natural area with defined limits that, although it does not meet the necessary conditions to be declared a national park, it merits protection to ensure that it remains in its natural state.

In all protected forest zones including national parks and natural protected spaces, no activities are permitted that would alter the vegetation, wildlife, scenery or soil, or decrease water resources unless specified in the management plans approved by the state forest administration. In national parks and natural protected spaces recreational activities are permitted only with prior authorisation from COHDEFOR. Construction of buildings for touristic purposes is permitted only on cooperative agreement between COHDEFOR and the Honduran Tourism Institute (Instituto Hondureño de Turismo). Scientific investigation is the only other activity permitted within the areas.

**Zone of Forestry Interest (Zona de Interés Forestal)**  
An area of public or private forest classified according to its relevant economic interest particularly for extraction activities.

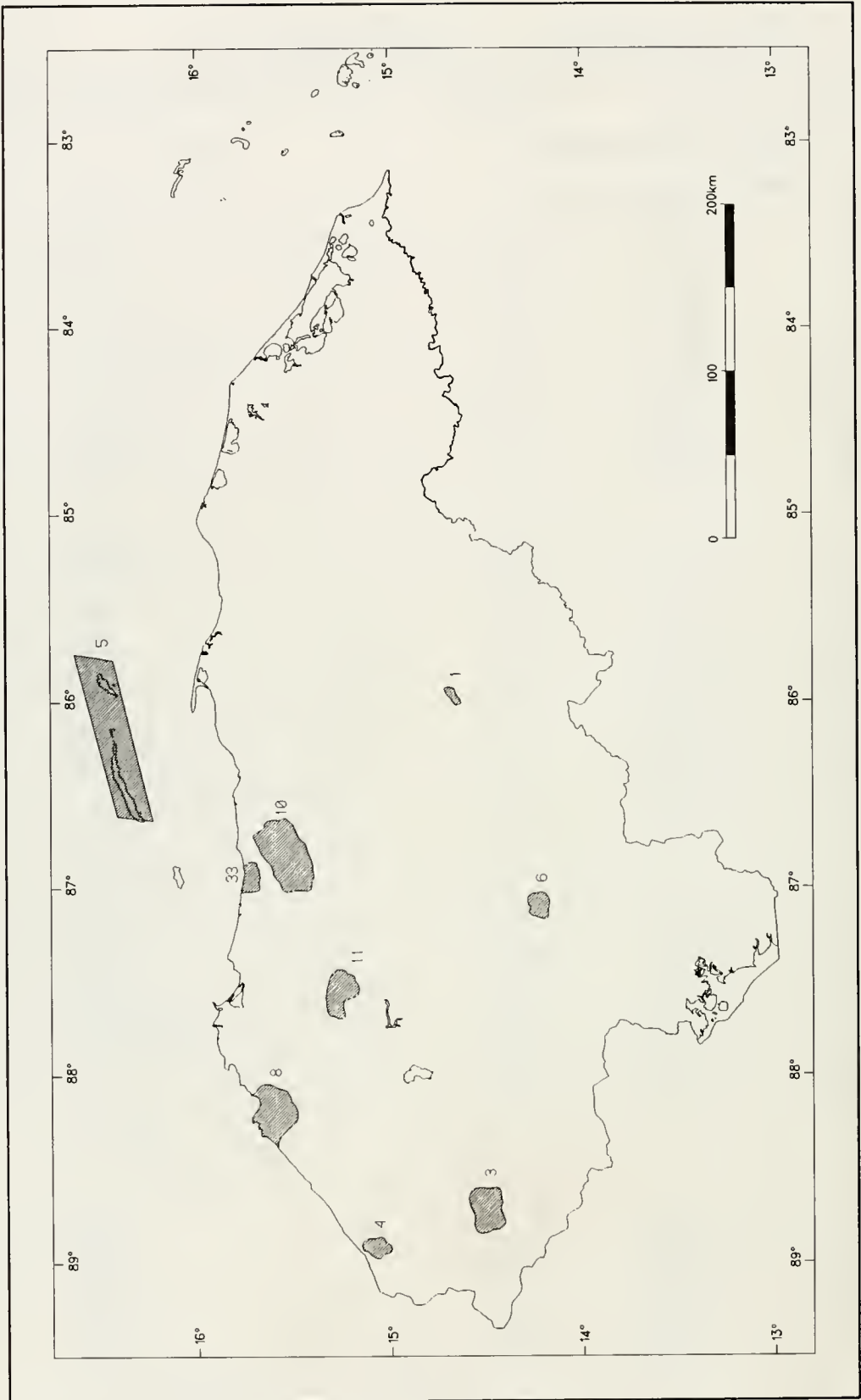
**NON-CLASSIFIED FOREST AREA  
(AREA FORESTAL NO CLASIFICADA)** A private or publicly owned forested area not included in either of the above categories, the function of which has not yet been determined.



## Summary of Protected Areas of Honduras

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Agalta	II	62,400	1987
2	Azul Meambar	II	20,000	1987
3	Celaque	II	27,000	1987
4	Cerro Azul	II	15,000	1987
5	Islas de la Bahía	II	29,416	
6	La Tigra	II	7,550	1980
7	Montaña de Comayagua	II	18,000	1987
8	Montaña de Cusuco	II	18,000	1987
9	Montaña de Yoro	II	15,000	1987
10	Pico Bonito	II	112,500	1987
11	Pico Pijol	II	11,400	1987
12	Santa Barbara	II	13,000	1987
13	Trifinio	II	5,400	1987
<i>Biological Reserves</i>				
14	El Chiflador	IV	1,000	1987
15	El Chile	IV	12,000	1987
16	El Pital	IV	3,800	1987
17	Guajiquiro	IV	7,000	1987
18	Guisayote	IV	7,000	1987
19	Lancetilla	IV	1,681	1987
20	Misaco	IV	4,600	
21	Montecillos	IV	12,500	1987
22	Opalaca	IV	14,500	1987
23	Volcán Pacayita	IV	9,700	1987
24	Yerba Buena	IV	3,600	1987
25	Yuscarán	IV	2,300	1987
<i>Wildlife Refuges</i>				
26	Corralitos	IV	5,500	1987
27	El Armado	IV	3,500	1987
28	Erapuca	IV	5,600	1987
29	La Muralla	IV	6,093	1987
30	Mixcure	IV	8,000	1987
31	Montaña Verde	IV	8,300	
32	Montaña de Puca	IV	4,900	1987
33	Ríos de Cuero y Salado	IV	8,500	1988
34	Texiguat	IV	10,000	1987
<i>Protected Area</i>				
35	Jardín Botánico de Lancetilla	IV	1,253	1978
<i>Forest Reserves</i>				
36	Agalteca	II	100,000	1966
37	El Cajón	VIII	33,696	
38	Guanaja	VIII	5,400	1969
39	Golfo de Fonseca	VIII	50,000	1958
40	Olancho	VIII	1,000,000	1966
41	Sierra de Omoa	VIII	8,315	
<i>Multiple Use Reserves</i>				
42	Cerro Guanacaure	VIII	1,000	
43	Lago de Yojoa	VIII	34,628	1971

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Biosphere Reserve</i> Reserva de la Biósfera Río Plátano	IX	500,000	1980
	<i>World Heritage Site</i> Reserva de la Biósfera Río Plátano	X	500,000	1982



Protected Areas of Honduras

# NICARAGUA

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**Area** 139,000 sq. km

**Population** 3,871,000 (1990)

Natural increase 3.19% (1990)

## **Economic Indicators**

GDP: No information

GNP: US\$ 800 per capita (1987)

**Policy and Legislation** Prior to the 1979 revolution, Nicaragua had no national conservation objectives or policies, nor any institutional framework to implement or support environmental protection (Anon., 1989; Hartshorn and Green, 1985). Only since 1990, with the end of the war, have protected areas been properly planned and supported by adequate administration and infrastructure (Nietschmann, 1990).

Nicaragua participates in the FAO Tropical Forestry Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. Further details on the extent of implementation of the TFAP in Nicaragua are required.

Until recently, natural resource legislation was orientated towards exploitation, with little or no provision made for conservation. For example, the Law of Conservation, Protection and Development of the Nation's Forest Resources (*Ley de Conservación, Protección y Desarrollo de las Riquezas Forestales del País*), Decree No. 1381, 1967 deals almost exclusively with timber extraction and the granting of concessions. The first protected area, a wildlife refuge, was established by decree in 1958, and the first national park was legally established in 1971. However, with no national policy to support their protection, these areas were largely ineffectual (Anon., 1989).

Following the 1979 revolution, a new policy of natural resource management was implemented with the Law of Creation of the Nicaraguan Institute of Natural Resources and the Environment (*Ley de Creación del Instituto Nicaragüense de Recursos Naturales y del Ambiente*) (IRENA) of 24 August 1979. This law provided for the creation of the first institute specifically responsible for managing natural resources, and vested it with the responsibility of formulating a national environmental policy to ensure their protection and rational use. The institute is also responsible for recommending new environmental legislation. Natural resources are declared part of the state heritage, available to all Nicaraguans, to allow the development of the country and to improve the quality of life (Anon., 1989).

Also in 1979, the Law for the Establishment of the National Parks Service (*Ley de Creación del Servicio de Parques Nacionales*), Decree No. 340 of 25 October

provided for the creation of the National Parks Service (*Servicio de Parques Nacionales*) (SPN) within IRENA. The SPN is specifically responsible for the establishment and management of protected areas.

These principles of natural resource protection were incorporated into the new political constitution (*constitución política*) approved in June 1987, the first constitution in the history of the country to include provisions for the rational use and protection of the environment. The state, through the relevant institutions, is responsible for the execution of national conservation objectives (Anon., 1989).

In 1983, a number of legislative acts provided for the creation of a total of 17 protected areas in the Pacific region: Decree No. 1194 of 3 February provided for the establishment of a national park (*parque nacional*); Decree No. 1294 of 12 August provided for a wildlife refuge (*refugio de vida silvestre*); and Decree No. 1320 of 19 September 1983 declared a further 14 areas protected under the transitional category of nature reserves (*reservas naturales*) (Anon., 1989).

Decree No. 527 of 23 April 1990 formalised the creation of a network of protected areas in the south-eastern region on the border with Costa Rica. These comprise the Nicaraguan component of the International System of Protected Areas for Peace (*Sistema Internacional de Areas Protegidas para la Paz*) known as SI-A-PAZ, first proposed in 1974 (Castiglione, 1990).

Three decrees passed in 1991 provided for the protection of further areas of natural habitat. Decree No. 42-91 declared protected remnant montane ecosystems in the central part of the country, pine forests of the Caribbean coast and volcanic craters of the Pacific slope mountains, including the Pacific estuaries declared as natural reserves under the 1983 Decree (Cedeño *et al.*, 1992). IRENA is empowered to define the limits and assign a management category for each area, and to provide detailed regulations for natural resource protection once the area is established. Decree No. 43-91 provided for the creation of a biological reserve in the north-east along the Honduran border to protect islands, reefs, sea turtles, coastal wetlands and the indigenous Miskito community, traditional inhabitants of the region. Decree No. 44-91 declared a substantial area in the north of the country protected as a national natural resource reserve (*reserva nacional de recursos naturales*), along the Coco River which separates Nicaragua and Honduras. This is the second largest reserve in Nicaragua and includes a wide range of habitats varying from lowland rain forest to cloud forest (Cedeño *et al.*, 1992). IRENA is responsible for managing the reserve, and establishing regulations for natural resource use. Prohibited activities include commercial exploitation of forest resources;



destruction of flora and fauna; and disorganised colonisation that threatens indigenous communities.

There is no single, unifying law that gives definitions of the management categories of protected areas used in Nicaragua. Regulations and prohibitions pertaining to each area are given in the individual legislation providing for the creation of the area. During preparations for the creation of protected areas in the Caribbean region, it was noted that the existing management categories needed modification to suit specific conditions (Anon., 1989). Only three categories were available for use, two permanent (national park and wildlife refuge) and one transitional (natural reserve).

Most protected areas have been established in "holding categories", such as resource reserve (*reserva de recursos*) and natural reserve (*reserva natural*) (Cedeño *et al.*, 1992). Detailed planning exercises for each of these areas, such as the one already under way for Miskito Cays Wildlife Refuge, will eventually define core conservation areas, multiple use zones and anthropological reserves (Cedeño *et al.*, 1992).

Since 1990, IRENA has produced a national plan for strengthening and consolidating Nicaragua's protected area system (Nietschmann, 1990). Details are not available.

**International Activities** Nicaragua signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940 and ratified it in 1946. It actively participates in the Central American Commission on Environment and Development (*Comisión Centroamericana de Ambiente y Desarrollo*) (CCAD).

Nicaragua accepted the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 17 December 1979, but no natural sites have been inscribed to date. Nicaragua is not party to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), neither does it participate in the Unesco Man and the Biosphere Programme.

Through cooperative agreements, Nicaragua and Costa Rica are working closely on the development of the binational protected areas system along the Nicaragua-Costa Rica border through the SI-A-PAZ project. A binational commission (*comisión binacional*) was established in October 1990, and an agreement signed by Nicaragua and Costa Rica on 15 December 1990 for collaboration with frontier protected areas (*áreas protegidas fronterizas*). It is hoped that similar projects can soon get underway with the Honduran government for lands along the joint border with that country, and with both Honduras and El Salvador for the

shared mangrove estuaries and coastal zone of the Gulf of Fonseca (Cedeño *et al.*, 1992; Castiglione, 1990).

During the past decade, Nicaragua was subjected to an economic blockade, and international assistance for conservation activities was extremely limited. However, in the past two years this situation has improved, and major new projects are foreseen with assistance from groups including IUCN, WWF, Cultural Survival, Wildlife Conservation International, Caribbean Conservation Corporation, the MacArthur Foundation; and bilateral donors, including the Nordic countries, the US, and Germany, and others (Cedeño *et al.*, 1992; B. Nietschmann, pers. comm., 1992).

**Administration and Management** In the absence of a ministry or agency responsible for natural resources and the environment prior to 1979, the Central Bank (*Banco Central*) was assigned responsibility for the two national parks and one natural reserve created during the Somoza regime (Anon., 1989; Hartshorn and Green, 1985).

The Nicaraguan Institute of Natural Resources and the Environment (IRENA), established in 1979, was the first institute specifically responsible for managing natural resources. IRENA was created to formulate and implement a national conservation policy, to ensure the protection and sustainable exploitation of national natural resources (Anon., 1989). In practice, IRENA has broad responsibilities for natural resource management, including administration of protected natural areas (Cedeño *et al.*, 1992). By the end of the 1980s, IRENA had suffered an 85% cut in staff, and was demoted to a sub-unit under the Ministry of Agriculture and Agrarian Reform (*Ministerio de Agricultura y Reforma Agraria*); few of its conservation programmes remained. Even after the war, despite good management, progress has been slow due to lack of foreign government support (Nietschmann, 1990).

Within IRENA, the National Parks Service (*Servicio de Parques Nacionales*) (SPN) was created by decree in 1979 as the technical division of the national park system (Cedeño *et al.*, 1992). The SPN is responsible for conducting studies to select areas requiring protection, and for the implementation of IRENA's policies with respect to the development and administration of protected areas for scientific, educational, recreational and touristic purposes (Anon., 1989; *Comisión IRENA-CORFOP, n.d.*).

Following the regionalisation policy initiated after 1979, protected area administration at the local level is the responsibility of regional delegations of IRENA. IRENA's management policy is to include the participation of local populations to achieve conservation objectives (Anon., 1989). For example, Miskito Cays Biological Reserve will be managed cooperatively by IRENA, the regional autonomous government for north-west Nicaragua and the Miskito indigenous communities. An inter-institutional

commission was established recently to coordinate its planning and management. An indigenous, non-governmental environmental organisation, Mikupia, has been set up by the Miskitos to take direct responsibility for and benefit from reserve management (Cedeño *et al.*, 1992). Management involves the participation of 15,000 Miskito people in 23 coastal communities (Nietschmann, 1991).

The NGO conservation movement is arguably still the weakest in Central America, but with recent changes in government it will no doubt become increasingly important. However, with the exception of Mikupia, NGOs are not involved directly in protected area management (Cedeño *et al.*, 1992). The Nicaraguan Association of Biologists and Ecologists (Asociación de Biólogos y Ecólogos Nicaragüense) (ABEN) is dedicated to promoting the protection of natural resources and the environment, and has gained political influence. ABEN monitors national environmental activities and represents the nation's concerns internationally (Karliner and Faber, 1986). The Environmental Network for Nicaragua (ENN), established in 1988, is an NGO working from outside the country to gain support for the government's activities, in environmental protection.

IRENA maintains a limited institutional presence in seven areas of the protected area system. Protection efforts are concentrated in these areas, and personnel numbers range from one to 20, with basic equipment and infrastructure in a few of the areas. On-site administration staff and facilities are only in place at two areas (Cedeño *et al.*, 1992).

The problems facing protected area management include not only the lack of public awareness and political support and the over exploitation of natural resources, but specific problems arose as a result of the long guerrilla war. Certain regions of the country were inaccessible until recently, and the entire nation was isolated in the international sphere, preventing potential financial and technical support for environmental issues (Anon., 1989).

**Systems Reviews** Nicaragua is the largest Central American country, and, after Belize, the nation with the lowest population density (Cedeño *et al.*, 1992). The longest river, the two largest freshwater lakes and the richest volcanic soils in Central America are found here. The lowland tropical rain forests in the south-eastern corner of the country, and similar forests across the border in north-eastern Costa Rica, comprise the largest and wettest lowland rain forest remaining around the entire Caribbean rim, and the largest area of tropical rain forest north of Amazonia (Nietschmann, 1990). Likewise, the coastal lagoons, pine savannas, and wetlands of the north-east, together with similar areas across the border in Honduras, are the largest and best preserved examples of such ecosystems in the region (Cedeño *et al.*, 1992; Karliner, 1987). Nicaragua has the widest continental shelf and stretch of coral reefs in the

Caribbean, and the most extensive seagrass pastures in the Western Hemisphere (Nietschmann, 1990).

The country comprises three distinct biogeographic regions: Pacific, Central and Caribbean (Anon., 1989). The Pacific region is the most densely populated area of the country, and the major economic and productive activities take place here, including intensive agriculture and cattle ranching. It has the most severely degraded ecosystems and presents the most environmental problems (Anon., 1989). The remaining natural areas, for the most part small remnant dry forests on the higher slopes of volcanoes, and coastal mangroves, are fragmented, and degraded. Only the mangrove estuaries of Estero Real in the Gulf of Fonseca are largely intact (Cedeño *et al.*, 1992).

The Central region is mountainous, but does not exhibit great altitudinal range. The largest tract of undisturbed tropical humid forest in Central America is located in the Caribbean region, the eastern third of the country (Anon., 1989; Cedeño *et al.*, 1992). This sparsely populated area is the traditional homeland of the Miskito indigenous people.

In spite of its distinction of being the largest Central American nation, Nicaragua has somewhat lower total biological diversity than neighbouring countries in the region. This is due primarily to its lower altitudinal diversity and absence of isolated high mountain ranges. For the same reasons, endemism rates are also lower (Cedeño *et al.*, 1992). However, this may also be due to the relative paucity of scientific research in Nicaragua (B. Nietschmann, pers. comm., 1992).

Nicaragua's environment has a history of exploitation and destruction. In the early 20th century, US timber, banana and mining companies began to exploit the nation's natural resources indiscriminately (Karliner and Faber, 1986). During the 43 years of the Somoza family's rule, environmental degradation increased severely. During the 1950s and 1960s, the area of land planted with cotton increased four-fold, and pesticide contamination was serious. In the 1960s and 1970s the spread of cattle ranching gave rise to one of the world's highest rates of deforestation. Trade in endangered species was rife (Nietschmann, 1990). As a result of these changes, displaced peasants migrated to the rain forest regions (Karliner, 1987). Around 30% of the country's tropical rain forests were destroyed during the 1970s alone (Karliner and Faber, 1986). In this context, the war may have relieved pressure on natural resources: tight firearms control reduced hunting, cattle were slaughtered and sold, timber could not be moved, production from ecologically damaging gold mines suffered, and exploitative foreign projects were abandoned or shelved (Nietschmann, 1990). In fact, as fighting subsided, the Caribbean region began to be heavily exploited by foreign fishing boats. Only since 1990 has the government been seriously dedicated to the conservation of natural resources: IRENA has been restructured and is under new direction, but lack of



international government funds makes progress slow (Nietschmann, 1990).

The first natural protected area was a wildlife refuge, established in 1956, and the first national park was declared in 1971. However, both areas were protected only in name, and no research or management activities were implemented (Anon., 1989; Cedeño *et al.*, 1992). Shortly before the revolution, the National Registrar (Catastro Nacional) initiated studies to identify and select potential areas for protection throughout Nicaragua, which resulted in the creation of a second national park in 1979.

IRENA began the development of a network of protected areas across the country called the National System of Protected Wildlands (Sistema Nacional de Areas Silvestres Protegidas) (SINASIP). This included a nationwide study to identify priority areas; define a system of management categories including those of transitory nature; and collect information to allow for new protected area legislation to be formulated. By 1983, the preliminary identification study was completed, and 35 areas had been selected for protection, covering 13.28% of total land area (Anon., 1989). The proposed national system was divided into three sub-systems, according to the three distinct biogeographic regions in the country, and the Pacific region was identified as being of the highest priority (Anon., 1989).

In 1983, the Pacific sub-system of SINASIP was initiated by the declaration of 17 protected areas, covering 1.1% of national territory and including a previously established national park. By 1987, of the 17 areas described, three were designated permanent management categories and were actively managed, and 14 were protected under the transitory category of natural reserve (reserva natural) and awaiting management plans (Anon., 1989).

Nicaragua, through IRENA, participates in the FAO Latin American Network Programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres). This programme aims to coordinate the activities of participating countries, to assist in the implementation and functioning of a coherent and effective national system of protected areas in each country (FAO, n.d.).

In 1991 two major new reserves were created: a biological reserve (reserva biológica) to protect islands, reefs, sea turtles and coastal wetlands and the Miskito Indian culture in the north-east along the Honduran border; a resource reserve (reserva de recursos), the second largest single reserve in Nicaragua along the Coco River, which separates Nicaragua and Honduras, to protect a wide range of habitats ranging from lowland rain forest to cloud forest. Also in the same year, a decree provided initial protection as resource reserves to remnant montane ecosystems of the central part of the

country, pine forests of the Pacific coast and volcanic craters of the Pacific slope (Cedeño *et al.*, 1992).

The past decade of civil war severely limited tourism in Nicaragua. With the end of the war, a major boom is now expected. However, only one park currently has minimal tourism infrastructure (Cedeño *et al.*, 1992).

Major threats to the protected area system include lack of on-site protection and management in most areas; the growing colonisation threat, particularly to wildlands in the eastern half of the country, by former Sandinista soldiers and Contra guerillas who are now living in large numbers in forested lands; fires and overuse of mangrove forests along the dry and highly deforested Pacific slope; and uncontrolled logging and poaching in eastern parks and reserves (Cedeño *et al.*, 1992).

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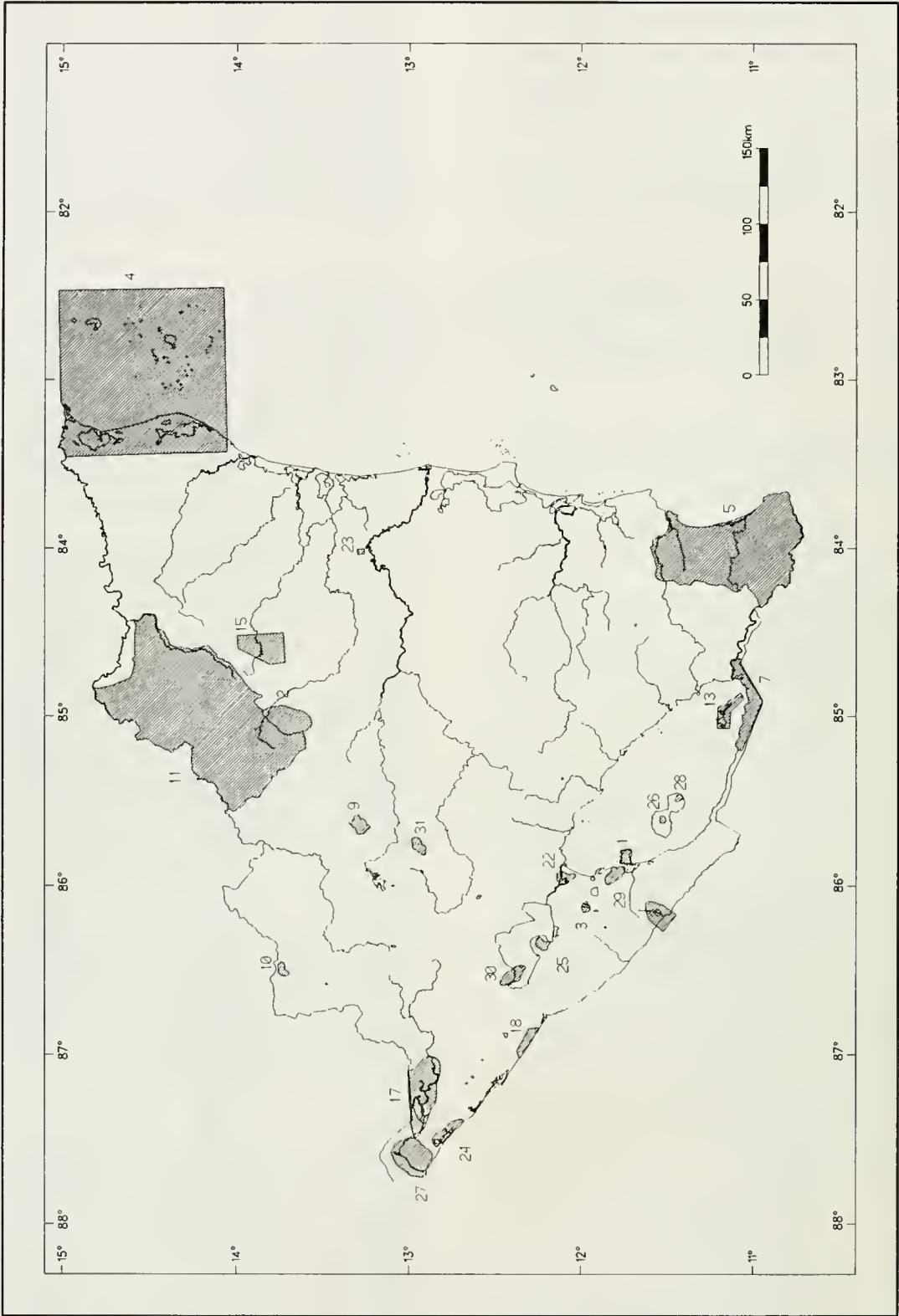
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## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Archipiélago Zapatera	II	10,000	1983
2	Saslaya	II	11,800	1971
3	Volcán Masaya	II	5,500	1978
<i>Biological Reserves</i>				
4	Cayos Miskitos	IV	502,654	1991
5	Río Indio Maíz	I	295,000	1990
<i>Wildlife Refuges</i>				
6	La Flor	VI	1,500	1983
7	Los Guatusos	IV	10,000	1990
8	Río Escalante-Chococente	IV	4,800	1983
<i>Wildland Areas</i>				
9	Macizos de Peñas Blancas	VI	7,000	1976
10	Pinares de Dipilto	VI	1,500	1983
<i>National Natural Resource Reserve</i>				
11	Bosawas	VIII	800,000	1991
<i>National Natural Reserve</i>				
12	Alamikamba	IV	2,100	1991
13	Archipiélago de Solentiname	IV	8,500	1990
14	Castillo de la Inmaculada	IV	1,500	1990
15	Cerro Bana Cruz	IV	19,700	1991
16	Cordillera Maribios	VI	34,460	1983
17	Estero Real	IV	38,725	1976
18	Isla Juan Venado	IV	4,500	
19	Isla de Ometepe	IV	3,700	
20	Laguna Mecatepe	III	1,050	
21	Laguna de Apoyo	IV	2,100	
22	Laguna de Tisma	IV	7,000	1983
23	Makantaka	IV	2,000	1991
24	Padre Ramos	IV	4,826	1990
25	Península Chiltepe	VI	1,800	1983
26	Volcán Concepción	VIII	2,200	
27	Volcán Cosiguina	IV	12,420	1976
28	Volcán Maderas	IV	4,000	1983
29	Volcán Mombacho	VI	2,847	1983
30	Volcán Momotombe y Momotombito	VI	8,500	1983
31	Yucul	VI	4,826	1990





Protected Areas of Nicaragua

## PANAMA

**Area** 75,517 sq. km

**Population** 2,400,000 (1990)  
**Natural increase:** 1.90% (1990)

### **Economic Indicators**

**GDP:** US\$ 2,337 (1987)  
**GNP:** US\$ 2,239 per capita (1987)

**Policy and Legislation** No national conservation policy has been officially adopted in Panama to date. However, the National Plan for Environmental Protection and Rehabilitation 1989–2000 (Plan Nacional para Protección y Rehabilitación Ambiental) includes measures to integrate environmental issues into national development (Illueca, 1988).

Panama participates in the FAO Tropical Forest Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. The Forestry Action Plan for Panama (Plan de Acción Forestal de Panamá) was developed in 1990 to interpret the global designs of TFAP to suit specific national needs, and is an integral component of the National Plan for Environmental Protection and Rehabilitation 1989–2000 (Illueca, 1988). Objectives of the action plan include revising current environmental legislation; coordinating the activities of all organisations involved in forest resource protection; and promoting training programmes for the forest service to increase the effectiveness of protection. Several projects are proposed, including recommendations to reinforce forest and protected area management. Details of the extent of implementation of the projects are not known.

The General Forestry Law No. 39, 1966 establishes all forest land as the property of the state, and declares the conservation, improvement and rational use of forest resources to be in the national interest. Three classes of forest reserves are identified: production forest (bosque de producción), protection forest (bosque de protección) and special forest (bosque especial). The latter category includes national parks, reserves and other protected area, as the definition provides for the declaration of special forest reserves for scientific, educational, historic, touristic, recreational or other reasons (Annex). Private land may be expropriated for protected areas.

National parks, reserves and other categories of protected area are declared and modified by means of separate legal instruments which establish management objectives for the area and provide general regulations governing its use. Most protected areas have been created by executive decree, although a few were created by congressional law and two wildlife refuges were created by municipal ordinances. All but two areas, El Copé National Park and Chepigana Forest Reserve, have

clear limits defined in the legislation providing for their creation.

Law No. 12, 1973 created the first institute specifically responsible for natural resources in Panama, the National Directorate of Renewable Natural Resources (Dirección Nacional de Recursos Naturales Renovables) (RENARE), and established its general functions regarding wildlands conservation. Law No. 21, 1986 converted RENARE into the current National Institute of Natural Renewable Resources (Instituto Nacional de Recursos Naturales Renovables) (INRENARE).

There is no legislation unifying protected areas, although plans for a national system have been proposed. INRENARE is currently drafting comprehensive new protected areas legislation which would standardise the management of all protected areas as part of an integrated system.

**International Activities** Panama signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940 and ratified it later.

Panama ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 3 March 1978 and two sites are listed; and ratified the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 26 November 1990 with one site listed; and participates in the Unesco Man and Biosphere programme with one site declared as a biosphere reserve. Through the Panama Tropical Forestry Action Plan, new projects are being designed with the Spanish International Cooperation Agency, the World Bank, and other donors.

Panama, through INRENARE, participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres). This programme aims to coordinate the activities of participating countries, to assist in the implementation and functioning of a coherent and effective national system of protected areas in each country (FAO, n.d.).

On a regional level, Panama is actively involved in the Central American Commission on Environment and Development (Comisión Centroamericana de Ambiente y Desarrollo) (CCAD). Many projects in protected areas are supported by international agencies: Unesco in the case of World Heritage sites and biosphere reserves, IUCN and Paseo Pantera in Bocas del Toro, WWF in La Amistad, Bastimentos, and Darién, and TNC and US-AID on a national level. In 1982 Panama signed the

Basic Convention for Creation of the Park (Convenio Básico de Creación del Parque), a binational agreement with Costa Rica for the creation, joint planning and administration of the transboundary park La Amistad. Assistance for this project comes from the Organisation of American States (OAS) and Conservation International (CI). CATIE and FAO have provided considerable technical assistance and training opportunities.

**Administration and Management** The first governmental national parks department was established in 1968, primarily to administer Altos de Campana National Park. Under current legislation, all natural resources are the responsibility of INRENARE, whose objectives include formulating and implementing national environmental and forestry policies.

Administrative responsibilities are divided between the respective directorates within INRENARE. Forest resources, particularly extractive and commercial activities, are managed by the National Directorate for Forest Development (Dirección Nacional de Desarrollo Forestal) which replaces the former Forestry Service. National parks, other protected areas and wildlife resources are managed by the National Directorate of Protected Areas and Wildlife (Dirección Nacional de Areas Protegidas y Vida Silvestre). Despite this broad mandate, the institution has a relatively small staff, including guards in the field who undergo a two-month training course but generally lack equipment, transport and funding (Candanedo and Barborak, 1992).

Based on their management objectives and legal framework, several protected areas are managed with the collaboration of other organisations. This occurs in the case of Portobelo National Park, in collaboration with the Panamanian Institute of Tourism (Instituto Panameño de Turismo) (IPAT), and Barro Colorado National Monument in collaboration with the Smithsonian Tropical Research Institute. The Water and Electricity Institute (Instituto de Recursos Hidrológicos y Electrificación) (IRHE) provides support for management of La Fortuna Reserve. Barro Colorado has been the site of continuous and intensive ecological research since the early 1900s (Leigh *et al.*, 1983), and is one of the best studied natural areas in the tropics.

The National Indigenous Institute for Social Anthropology (Instituto Indígena Nacional de Antropología Social), created in 1958, divided indigenous populations for administrative purposes into areas known as *comarcas*. The Kuna and Embera peoples have authority for managing their own largely forested *comarcas*, or indigenous reserves, in coordination with government authorities. However, these two are the only *comarcas* that have been established legally, and many are without defined limits (Candanedo and Barborak, 1992). The Kuna communities of San Blas Comarca have designated 60,000ha of their 320,000ha indigenous reserve as a specially protected area, even though this reserve has no

specific legislative designation, and are also proposing the whole area as a biosphere reserve. The Kuna have a well-trained team of wildland rangers and professionals and have benefited from considerable international technical and financial assistance (Archibold, 1990, 1991; Houseal and Archibold, 1988). In 1983 the Study Project for the Management of Kuna Wildlands (Proyecto de Estudio para el Manejo de Areas Silvestres de Kuna Yala) (PEMASKY) was established to support the Kuna in managing their reserve. They now advise other Indian groups in Panama and other Neotropical nations on improving land management by indigenous peoples. Unfortunately, their success has not been matched by that of the other major indigenous groups of Panama, the Embera-Wounan and Guaymi, which nevertheless still maintain control over important predominantly forested areas of the country (Candanedo and Barborak, 1992).

Several national non-governmental organisations (NGOs) are quite active in supporting protection and management of protected wildlands. These include the National Association for the Conservation of Nature (Asociación Nacional para la Conservación de la Naturaleza) (ANCON), which helps to raise funds for park and buffer-zone management, and is home to the national conservation data centre (CDC), and the National Parks and Environment Foundation (Fundación P.A.N.A.M.A.) which consists of 24 NGOs whose aim is to assist in the development of a protected area system. The University of Panama also assists INRENARE, particularly regarding research in protected areas.

The highest priority of government and NGO agencies involved in protected areas is to improve the management and protection of existing parks and reserves. However, some additional protected areas have been proposed. These include an indigenous territory for the Guaymi Indians in western Panama, several island parks and reserves (Las Perlas, Isla Coiba), and a reserve in the Serranía de Maje mountains of eastern Panama. Another priority is to establish definite boundaries for El Copé National Park, the limits of which are defined in the decree creating this potentially large area.

**Systems Reviews** Owing to its tropical setting, location on the Central American land bridge, and altitudinal and climatic variability, Panama has very high biological diversity for its size. Some 218 species of mammals, 929 of birds, 226 of reptiles, and 170 of amphibians are found in the country, together with diverse coastal and marine ecosystems, including the largest mangrove estuaries in Central America along the Pacific coast, and important reef complexes along the Caribbean coast. It is home to an estimated 8,000-9,000 vascular plants, including 1,226 endemic taxa (Davis *et al.*, 1986). Endemism is highest in the highlands along the Costa Rican and Colombian borders; for this same reason, most endemic species are shared with these neighbours.



Topographically, Panama comprises four regions: western Panama, dominated by the Cordillera de Talamanca extending down from Costa Rica in a southeasterly direction; central lowlands bisected by the Canal; the eastern region characterised by a series of coastal ranges; and the narrow Caribbean lowlands on the Caribbean coast (Hartshorn, 1981). Following the Holdridge (1967) ecological classification system, 12 life zones are found in Panama. More than 75% of the country is located in just three zones: tropical moist, including extensive areas of tropical moist forest along the Caribbean coast and in the eastern Darién region; premontane wet; and rain forest (Hartshorn, 1981). Other important forest types include tropical dry forest along the Pacific coast, small areas of montane wet forest and subalpine páramo along the higher ridges near the Costa Rican border, and lower montane wet forests in much of the western highlands.

With a population density of 31.2 persons per sq. km, and a growth rate of just 2.1% annually, Panama is less densely populated and has a lower population growth rate than neighbouring countries. However, destructive landuse practices, particularly extensive grazing on marginal lands, have led to large losses of forest cover (Heckadon and McKay, 1982), amounting to approximately 1% of remaining forest cover annually. Natural forests now cover around 3.2 million ha or under half of the total national territory, of which 1.2 million ha are production forest and 2 million ha protection and conservation forest, including national parks and reserves (INRENARE, 1990b). The three categories of forest reserves (Annex) are collectively managed as the National Forest Management System (Sistema de Manejo de Bosques Nacionales) (INRENARE, 1990a, 1990b).

Barro Colorado Island has functioned as a biological reserve since 1923 and is thus the oldest continuously managed and protected wildland in the Central American region. It was established as a natural monument by the 1977 Torrijos-Carter Treaty on the Panama Canal.

Efforts to plan and create a national protected areas system date back to the 1960s. By the late 1970s, substantive plans and proposals were made for priority parks and reserves and the protected areas system with the assistance of IUCN, FAO and CATIE (IUCN, 1976; see IUCN (1982) for information on a number of specific early management plans; Dalfelt and Morales, 1978). Most protected areas have been established since the beginning of the 1980s, and most have at least annual operational plans. A national protected areas system plan was produced in the mid-1980s with assistance from US-AID (Houseal, 1985). At present, protected areas collectively comprise the System of National Parks and other Protected Wildlands (Sistema de Parques Nacionales y otras Areas Silvestres Protegidas) (SPNASP), but there is no law which unifies them as such (INRENARE, 1990a). INRENARE is currently

drafting the relevant legislation to provide for a comprehensive system.

Nearly 20% of the territory is included in SPNASP, excluding indigenous reserves (Palacios, pers. comm., 1992). Strictly protected national parks, wildlife refuges and natural monuments cover just over 1 million ha, or 13.4% of the country. Forest reserves, recreational parks and protection forests, all less strictly protected, cover 332,000 ha or 4.25% of the country. SPNASP covers a considerable percentage of the remaining natural areas of the country (Candanedo and Barborak, 1992; Palacios, pers. comm., 1992). In addition, a water production reserve is managed for forest protection but is not part of SPNASP.

Major threats confront most protected areas, including insufficient budgets and personnel; illegal activities such as poaching, illegal timber harvest, and fire in drier areas; shipment of narcotics; looting of archaeological sites; and encroachment by landless farmers. Exploration for oil has taken place in a number of areas and poses a threat to certain protected areas. A large oil exploration project planned by Texaco for the Bocas del Toro region was recently cancelled, but the possibility of activities being transferred to the Darién region remains (Santos, 1991).

Protected areas in general are also insufficiently used for educational programmes and research, and the potential economic benefits of ecotourism for the national economy and local communities around parks has yet to be realised. To provide a firm longterm financial basis for protecting and managing the nation's protected areas, an international debtswap is currently being negotiated with US-AID and The Nature Conservancy to help set up a permanent endowment fund to be managed by a new foundation (Fundación Natura) recently established for that specific purpose.

Tourism in protected areas is still quite limited, as are park visitor facilities, even though some protected areas near Panama City, such as Altos de Campana National Park, Soberanía National Park, and Barro Colorado Island National Monument, are very accessible. However, as part of the general boom in naturebased tourism occurring throughout the Central American region, visitation is expected to increase substantially in the near future. As part of a new US-AIDfunded national conservation project, major investments in basic infrastructure are planned for the protected areas system over the next decade (Candanedo and Barborak, 1992).

#### Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title : Decreto Ley No. 39 Ley General Forestal (Decree Law No. 19 General Forestry Law)**

**Date:** 29 September 1966

**Brief description:** Declares it in the national interest to protect, conserve, renew and rationally utilise forest resources in the country. General forest regulations are stated. Provision is made for the classification of forest into three categories of forest reserve, details of which are given.

**Administrative authority:** The Servicio Forestal (Forestry Service) within the Ministerio de Agricultura, Comercio y Industria (Ministry of Agriculture, Commerce and Industry) is assigned responsibility for the administration of this Decree-Law.

#### Designations :

**Reserva Forestal (Forest Reserve): Bosque Productivo (Production Forest)** A forested area declared suitable for the production of forest products. The main objective of the area is the generation of an annual or periodic income by the exploitation of its forest resources.

Exploitation within the area is permitted only with prior approval of the Forest Service.

**Bosque Protectivo (Protection Forest)** A forested area which, by virtue of its situation or other specific characteristics, is important for regulating water systems; protecting soils, crops, roads, agricultural developments, river banks, streams and other water resources; preventing soil erosion and landslides; protecting and providing habitat for species of flora and fauna which are declared important.

Protection forests may only be worked for improvement purposes.

**Bosque Especial (Special Forest)** All those forested areas maintained for scientific, educational, historic, touristic or recreational purposes. Land must be state owned and may be purchased for the establishment of such an area.

This category includes public parks and woods, national parks, biological reserves, recreational areas, trees lining roads and associated stands and coppices.

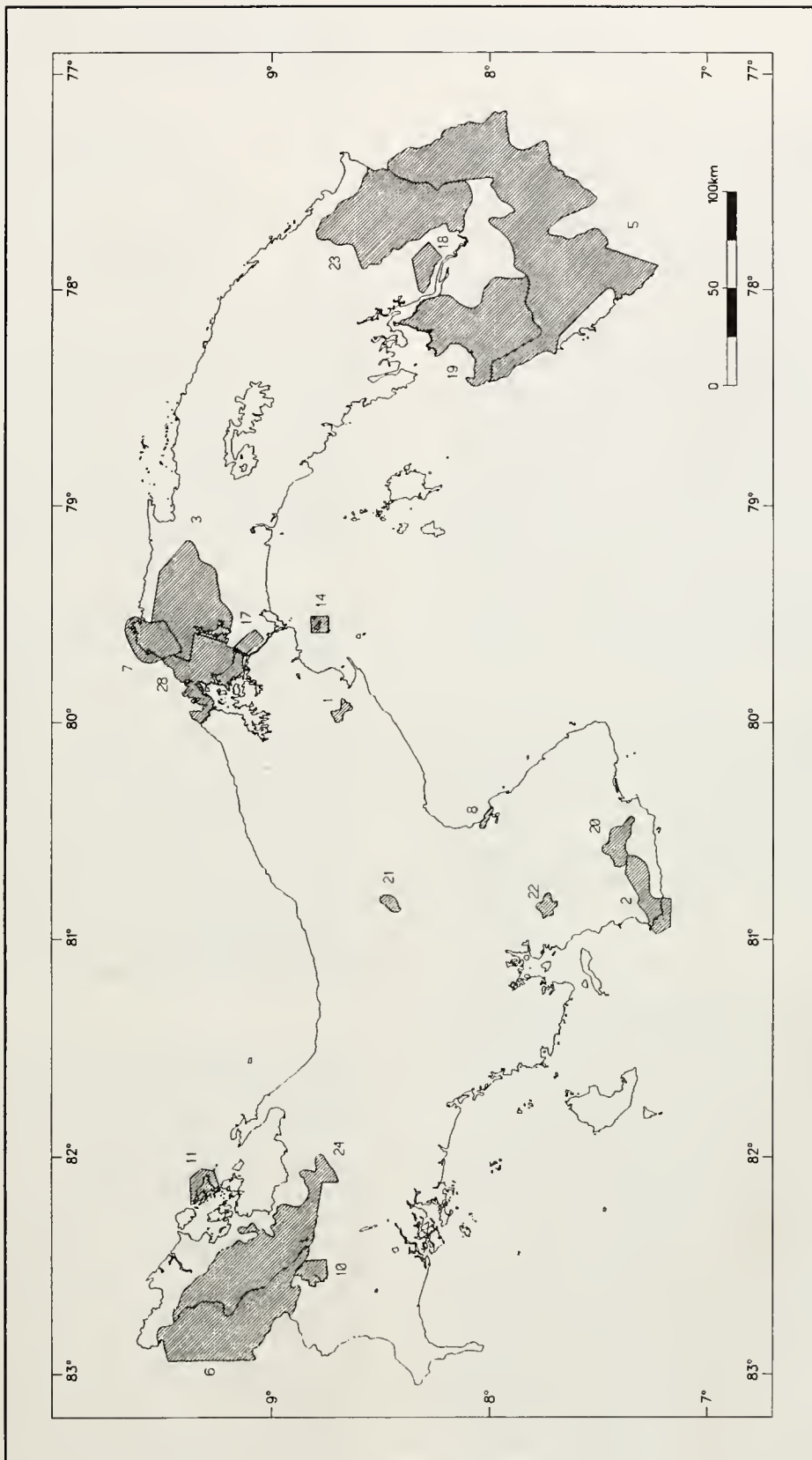
All exploitation is prohibited within special forest areas, except for specific cases in the public interest for which they were created.

**Source:** FAO (1966)

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Altos de Campana	II	4,816	1977
2	Cerro Hoya	II	32,557	1984
3	Chagres	II	129,000	1984
4	Coiba	II	270,000	1991
5	Darién	II	579,000	1980
6	La Amistad	II	207,000	1988

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
7	Portobelo	II	34,846	1976
8	Sarigua	II	8,000	1984
9	Soberanía	II	22,104	1980
10	Volcán Barú	II	14,000	1976
	<i>National Marine Park</i>			
11	Isla Bastimentos	II	13,226	1988
	<i>Scientific Reserve</i>			
12	Isla Maje	I	1,433	1977
	<i>Wildlife Refuges</i>			
13	Ciénega del Mangle	IV	776	1980
14	Islas Taboga y Uraba	IV	258	1984
15	Peñón de la Onda	IV	2,000	1984
	<i>Natural Monument</i>			
16	Barro Colorado	II	15,400	1977
	<i>Natural Park</i>			
17	Metropolitano	V	265	1985
	<i>Forest Reserves</i>			
18	Canglón	VIII	31,650	1984
19	Chepigana	VIII	146,000	1960
20	La Tronosa	VIII	22,000	1977
21	La Yeguada	VIII	3,000	1960
22	Montuoso	VIII	10,000	1978
	<i>Protection Forests</i>			
23	Alto de Darién	VIII	211,000	1972
24	Palo Seco	VIII	244,000	1983
	<i>Indigenous Reserves</i>			
25	Comarca Kuna Yala (San Blas)	VII	320,000	1938
26	Embere-Wounan (Ember-Orua)	VII	432,600	1983
	<i>Water Production Reserve</i>			
27	La Fortuna	VIII	15,000	1976
	<i>Recreation Area</i>			
28	Lago Gatún	V	348	1985
	Golfo de Montijo		80,765	1990
	<i>Biosphere</i>			
	Parque Nacional Fronterizo Darién	IX	597,000	1983
	<i>Ramsar Wetland</i>			
	Golfo de Montijo	R	80,765	1990
	<i>World Heritage Sites</i>			
	Parque Nacional Darién	IX	579,000	1981
	Parque Internacional La Amistad	X	207,000	1990



Protected Areas of Panama





# THE REPUBLIC OF ARGENTINA

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Area 2,766,890 sq. km  
Population 32,322,000 (1990)  
Natural increase: 1.17% per annum

## Economic indicators

GDP: US\$ 2,647 per capita (1987)  
GNP: US\$ 2,160 per capita (1989)

**Policy and Legislation** Politically, Argentina is a federation. There are 23 provinces, one federal district (Buenos Aires), and the national territories of Antarctica and the South Atlantic Islands. Under provisions of the 1922 Constitution, the creation and management of protected areas pertain to both national and provincial governments. No national conservation objectives have been stated in their entirety, although the large number of legal acts relating to conservation collectively comprise what may be considered a national objective (Anon., 1990; Merino, 1987).

The first national protected areas legislation was the 1934 Law of National Parks (Ley de Parques Nacionales) No. 12.103, which provided for the creation of the National Parks Service (Dirección de Parques Nacionales). A revision of the 1934 Law in 1970, National Parks Law No. 18.594, modified and standardised protected area designations. Power of administration and enforcement were vested in the National Park Service, an autonomous body under the Secretariat of State for Agriculture, Livestock and Fisheries (Secretaría de Estado de Agricultura, Ganadería y Pesca). Provision was made for the creation of a national administrator to direct and supervise the National Park Service. The law also enables the establishment of a local advisory committee for each national park and a warden service with police force status.

The National Parks Law currently in effect is No. 22.351, 1980 which is a modification of the previous two laws. It provides for the creation of an autonomous organisation, the National Parks Administration (Administración de Parques Nacionales) (APN), to be responsible for managing protected areas on federal territory. The APN is empowered to expropriate private land where required to establish a protected area. Three categories of protected area are defined in the 1980 law; national park (parque nacional), natural monument (monumento natural) and national reserve (reserva nacional). Economic activities other than tourism are prohibited in the first two categories; commercial, industrial and other exploitative activities are permitted in national reserves (C. Daniele and C.E. Natenzon, pers. comm., 1992; Fourcade and Uribelarra, 1992) (see Annex). Protected areas on federal territory collectively form the system of national parks, national reserves and natural monuments (sistema de parques nacionales, reservas nacionales y monumentos naturales) and are

owned by federal government (Giudice, 1988). In 1991, Decree No 2419/91 transferred the APN from the Secretariat of State for Agriculture, Livestock and Fisheries to the Secretariat for Natural Resources and Human Environment (Secretaría de Recursos Naturales y Ambiente Humano) (F. Erize, pers. comm., 1992; C. Daniele and C.E. Natenzon, pers. comm., 1992).

Provincial legislation makes provision for the establishment of protected areas at local level, and varies from simply declaring the creation of a specific site, to listing objectives, prohibitions, and administrative details (APN, 1991; Merino, 1987). Human settlement and cattle exploitation are generally prohibited. Provincial legislation may also make provision for protected areas under private or university tenure, which are formed by agreement with the appropriate administrative organisation. A protected area must be transferred from provincial to national ownership by provincial law in order to be included in the national system. The area is then designated a management category – either national park, national reserve or natural monument – following the 1980 National Parks Law (F. Erize, pers. comm., 1992).

Forest resource use and protection is founded on the 1948 Defence of Forest Heritage (Defensa de la Riqueza Forestal) Law No. 13.273. Protection and permanent forests are defined (see Annex). Forested land within national parks or other protected areas is subject to the regulations given in the 1948 Law. Several modifications to this law, mainly with respect to articles regulating forest exploitation, have been made (see Annex).

The fragmentary nature of conservation policy and legislation precludes a uniform strategy to be applied by all the appropriate administrative organisations (Anon., 1990; Merino, 1987). Because of the very limited participation that the present National Parks Law affords the provinces, and because of the overabundance of national security provisions it contains, there have been several attempts to revise it since 1984, but none of these has proceeded beyond draft form (F. Erize, pers. comm., 1992). The current proposal for revision, written by APN, is part of a major effort to unify protected areas into a national system (APN, 1991). The draft states national conservation objectives and provides a legal framework for a coherent system, consolidating both national and provincial protected areas. Additional management categories and standardised designations are proposed (APN, 1991). The draft also proposes the establishment of a Federal Council of Natural Protected Areas (Consejo Federal de Areas Naturales Protegidas), comprising representatives from each province, as the highest authority for implementation of the law (APN, 1991). It must be stressed that, while much agreement has been reached informally

between all parties involved, this project is in draft form only, and as such may be subject to major changes before being finally approved (F. Erize, pers. comm., 1992). By April 1992, it had still not passed through congress (C. Daniele and C.E. Natenzon, pers. comm., 1992)

**International Activities** Argentina signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940, which has since been ratified. In 1976, Argentina and Bolivia signed the Agreement on the Protection of Flora and Fauna and the Formation of Frontier Parks (Acuerdo sobre la Protección de la Flora y Fauna y la Formación de Parques Fronterizos). The Convention for the Conservation and Management of Vicuña (Convenio para la Conservación y Manejo de la Vicuña) was signed by Argentina, Bolivia, Chile, Ecuador, and Peru in 1979, and later ratified under Argentinian legislation.

Argentina is party to the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) to which it acceded on 23 August 1978, with two sites inscribed. Argentina also participates in the Unesco Man and the Biosphere Programme, having five sites approved as biosphere reserves. Argentina ratified the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 5 May 1992 and has three sites inscribed.

In 1991, The Nature Conservancy (USA) bought more than US\$ 500,000 of Argentine foreign debt to be used to fund conservation efforts in the Patagonian Andes.

**Administration and Management** A large number of institutions are responsible for protected area management, and the situation is complex (APN, 1991; Merino, 1987). Generally, protected areas may be under either national legislature and administered by federal government, or under provincial legislature and administered according to tenure. A significant step in unifying administration and management of federal protected areas was the creation of the National Parks Service in 1934. The organisation was vested with the responsibility to regulate resource use in protected areas on federal territory.

The National Parks Service became the National Parks Administration (APN) under the 1980 National Parks Law, and it continues to manage federally owned areas. At the same time, the provinces developed their own policies, created protected areas and assigned administrative responsibilities to various organisations (Anon., 1990; Giudice, 1988). The APN is an autonomous government agency under the Secretariat for Natural Resources and Human Environment (Secretaría de Recursos Naturales y Ambiente Humano). The APN has a directorate comprising a president, a

vice-president and four members (APN, 1991; Boyle and Boyle, 1986), and managerial power such as formulating and implementing management plans, research and conservation activities (FAO, 1983). In 1991, the APN was in the process of changing the structure of its directorate to include representatives from provincial governments (APN, 1991). The APN employs 260 park guards (guardaparques), of which 180 are involved in vigilance and control of protected areas (C. Daniele and C.E. Natenzon, pers. comm., 1992).

The APN is responsible for national parks, national reserves, national natural monuments. All national parks have areas within them that are managed as strict natural reserves, and many national parks include a national natural reserve as part of their total area. Although these natural reserves are delimited, they are managed together with the park as one entity (APN, 1991).

Forest reserves, designated as multiple use reserves, are declared by national decree or law but are managed by the National Forestry Institute (Instituto Forestal Nacional) (IFONA). Forests that occur within a national park or other protected area are managed by the respective administration, according to the tenure of the protected area.

Most administrative responsibilities are determined by provincial laws. In some provinces, institutions have been established specifically to manage protected areas, while in others, more general institutions are given responsibility. These organisations are responsible for research activities, development and regulation enforcement (APN, 1991; Merino, 1987).

Protected areas situated on land that is owned by a municipality are declared by municipal order and are managed either by provincial administrations or by the municipality itself. Protected areas on land owned by universities are declared and managed in agreement with the respective provincial administrative body. Privately-owned protected areas may be managed independently or by provincial administration. Independent administration is often undertaken by non-governmental organisations, which either buy the land themselves, or work in conjunction with private landowners (APN, 1991).

In recent years, the human pressure on Argentina's natural resources has increased dramatically because of the country's severe economic crisis, and it is often difficult to maintain strict protected areas. Thus, biosphere reserves constitute an important alternative. Of Argentina's five biosphere reserves, two are managed by state Subsecretariats, one by a municipality, and two by independent institutes; this gives rise to a heterogeneous system of logistics and management. Unfortunately, poor regional development throughout Argentina has retarded the integration of biosphere reserves into territorial planning (Daniele *et al.*, n.d.)



There are many non-governmental organisations (NGOs) dedicated to conservation and sustainable development. One of the largest, the Argentinian Wildlife Foundation (Fundación Vida Silvestre Argentina) (FVSA), is the most active in assisting private land owners to establish and manage protected areas (APN, 1991). The FVSA obtains provincial legal declarations, formulates management plans, and visits the area periodically (FVSA, n.d.). By 1991, the FVSA managed the majority of privately-owned protected areas (APN, 1991). Other NGOs include the River Plate Ornithological Association (Asociación Ornitológica del Plata), Friends of the Earth Foundation (Fundación Amigos de la Tierra), and the Argentinian Museum of Natural Sciences (Museo Argentino de Ciencias Naturales "Bernardino Rivadavia").

There has been little or no coordination between the APN and the provinces with respect to protected areas management (Boyle and Boyle, 1986). Great differences in management between the provinces have arisen, with inconsistent designations and differences in the number of personnel employed (APN, 1991; Giudice, 1988; Merino, 1987). In many cases, insufficient resources are available for effective natural resource regulation, and information on the efficiency of provincial management is not readily available (APN, 1991).

Projects to formulate a new National Parks Law and create a National System of Natural Protected Areas (Sistema Nacional de Areas Naturales Protegidas) are being put forward. These strive to coordinate policies and management and stimulate cooperation between the provincially managed protected area systems and the federally managed, or national, system. A Federal Council (Consejo Federal), comprising representatives from all the provinces and the federal government would assess the activities of the different management authorities and propose policies to them (see Systems Reviews) (APN, 1991; Giudice, 1988; F. Erize, pers. comm., 1992).

To increase administrative efficiency, a wider range of management categories would be introduced, varying from multiple use to strict protection, and protected areas sub-divided into different managerial zones. Management plans would be mandatory for each area (APN, 1991; Giudice, 1988). By 1992, four management plans had been written (Fourcade and Uribelarrea, 1992).

**Systems Reviews** Four main geographical regions are distinguished: mountain, sub-mountain, grassland and steppe. The Andean mountains extend almost the entire length of the country along the western border, and encompass a variety of associated ecosystems from Andean desert in the north and west, to forest and Patagonian steppe in the south (Luna, 1977). Altitudes range to 6,960m. In the south, the Andes are much lower in elevation with many glacial lakes (Luna, 1977). The sub-Andean region is extensively irrigated for agricultural production.

Grassland extends east of the Andes over a large part of the country, and may be distinguished into two different types: Chaco and pampas grassland (Paxton, 1989). The Chaco is a humid and swampy region with annual precipitation between 400mm and 1000mm, extending from Bolivia and Paraguay into northern Argentina. The vegetation is sub-tropical, and cotton farming is the major agricultural activity. Pampas grassland, characterised by deep, fertile soil and a mild climate, extends in a wide belt from the Chaco in the north to southern Buenos Aires Province and covers most of San Luis and La Pampa provinces. Together with a large tract of savanna grassland, known as the Pampeana Steppe in Buenos Aires province, this comprises the flattest and most densely populated region in the country. Agriculture is extensive; the main industries are located in this region and 60% of the population lives here (APN, 1991; Paxton, 1989). This region has suffered the greatest degree of human alteration in the country, and only those parts not suitable for agriculture remain in their natural state (APN, 1991).

The Patagonian Steppe, a low, cold and arid plateau characterised by strong wind, extends from Neuquen Province to Tierra del Fuego, covering the majority of the southern part of the country. It is bordered to the east by the Atlantic Ocean and to the west by the Andean mountains. The ecosystems found here are very fragile and soil erosion occurs in areas of extensive pastoral agriculture (APN, 1991).

Sub-tropical forests are found in two regions. The Tucumano-Boliviana forest, an extension of Bolivian forest, covers part of Salta, Jujuy and Tucuman provinces in the north, and the Mision forest (Selva Misionera), an extension of the southern Brazilian forest, covers most of Misiones Province in the north-east (Correa Luna, 1977). Agricultural activities have affected 41% of the Mision forest, 23% remains in its natural state and 36% is secondary growth. Subantarctic, or Andiropatagonian forest stretches in a narrow belt (50km at its widest) from Neuquen Province to Tierra del Fuego, and may be considered as two distinct regions divided by the 47 southern latitude. North of this is the Valdivian District, and south, the Magellan forest, characterised by strong winds and extreme cold (APN, 1991). A detailed, modern work, classifying Argentine vegetation into 20 categories, has been produced (Natenzon, 1988).

The creation of protected areas dates back to 1903 when privately-owned land was donated to the government, to be maintained in its natural state in the area that is now Nahuel Huapi National Park. Likewise, land in Misiones Province has been regulated as a natural reserve since 1909, in the area that now forms Iguazú National Park (APN, 1991). Neither of these areas was legally protected, and the first national park provided for by legislation was created in 1922. Prohibited activities included felling trees, killing wildlife and altering watercourses. The first provincial protected area was established in 1936.



By 1991, a total of 12,135,900ha was protected, corresponding to around 4.35% of total land area and comprising 190 individual sites. There are 24 conservation units under national administration, covering 25,817 sq. km, and one under the administration of Buenos Aires city, all declared by federal legislation. The nationally administered system represents 0.9% of the country (Fourcade and Uribe Larrea, 1992). The remaining 165, covering 95,542 sq. km, are under provincial legislation, the majority of which are administered by provincial organisations alone, but eight are managed by municipalities, 23 by individuals, and four by universities, often in conjunction with provincial institutions (APN, 1991; Erize, n.d.).

The present system of protected areas does not reflect the diversity present in Argentina, with many ecosystems poorly represented or not included at all (APN, 1991). Of the 25-30 different ecosystems found in Argentina, only 12 are represented in the national system (Fourcade and Uribe Larrea, 1992). Sub-tropical forest and the Chaco region are significantly under represented, and pampas grassland, where human impact has been greatest, is virtually unprotected. The regions with the highest coverage of protected areas are high Andean steppe and Subantarctic Forest, including lakes and glaciers (APN, 1991; F. Erize, pers. comm., 1992).

Protected areas are very heterogeneous in terms of legislation, ownership, administration and management. In some cases, there is little more than a decree creating the protected area, without defining boundaries or objectives. This results in confusion and inconsistencies over the designation of management categories (APN, 1991). Federal protected areas collectively comprise the system of national parks, national reserves and natural monuments administered by the APN. Provincial protected areas must first be ceded to federal ownership before they can be included in the system (Giudice, 1988).

The main problems facing protected areas differ between north and south. In the north, hunting and timber extraction are the main threats, whereas excessive tourism and "exploitation of forest resources" are problems in the south. Grazing is a problem throughout. Of twenty units of the national system seven are managed inadequately (Fourcade and Uribe Larrea, 1992).

Following the creation of the FAO Latin American Network (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, otras Areas Protegidas, Flora y Fauna Silvestres) in 1983, all participating countries were encouraged to form national networks to consolidate protected area management. The aim of a national system is to organise conservation units within national territory so that national conservation objectives may be attained (APN, 1991). The National Network of Technical Cooperation in Protected Areas in Argentina (Red Nacional de Cooperación Técnica en Areas

Naturales Protegidas) was created in 1986 to instigate the process of creating a national system (APN, 1991; Di Pace, 1989). It comprises representatives from all organisations that administer protected areas, both national and provincial. The Provisional Board of Directors (Comisión Directiva Provisoria) is made up of representatives from the APN, the National Commission of Environmental Politics (Comisión Nacional de Política Ambiental) (CONAPA), and from 18 of the 23 provinces. Workshops are held at least once a year (APN, 1991).

The proposal for a national system of protected areas was put forward by the National Network in 1990. All conservation units, under their respective administrative organisations and legislation, are to be united in this system by the National Network. Increased cooperation between the APN and provincial organizations is encouraged. Proposed national conservation objectives are stated and include maintaining natural biological process and protecting representatives of national ecosystems. The national system of protected areas would comprise two sub-systems; the national sub-system managed by the APN, IFONA, and Buenos Aires city, and the provincial sub-system managed by all other provincial and private institutions. The network encourages provincial governments to unify their protected areas into coherent sub-systems (APN, 1991).

The first stage in unifying protected areas into a national system is to standardise designations. In 1989, the network adopted a classification system for protected areas in Argentina along the lines of the IUCN system of management categories (see Annex). Existing protected areas throughout the country were reviewed and reclassified as necessary, although this procedure is not yet complete (APN, 1991).

Argentina is undergoing a process of increasing federalisation and the provinces are asserting their power to administer natural resources in their territory. This accentuates the need for a national strategy for resource protection (Anon., 1990). The implementation of the proposed national system of natural protected areas would be a significant step towards effective protection of natural resources in Argentina (APN, 1991).

#### Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Ley de Parques y Reservas Nacionales y Monumentos Naturales (Law of National Parks and Reserves and Natural Monuments), National Law No. 22.351

**Date:** 12 December 1980

**Brief description:** To provide for the creation of protected areas on land owned by the Republic, giving three designations. Protection of natural resources is in accordance with national security requirements.

**Administrative authority:** Administración de Parques Nacionales (National Parks Administration), within the Ministerio de Economía (Ministry of Economy)

**Designations:**

**Parque Nacional (National Park)** Natural area that has not been altered in any way except to fulfil essential tourist and National Security requirements. Protection is inviolable, exploitation of floral and faunal resources, except in relation to tourism, is prohibited.

**Reserva Nacional (National Reserve)** Conservation area established either as a protection zone adjacent to a national park, or as an independent protected area when the designation of national park is not appropriate.

Human settlement and development must be compatible with specified conservation objectives and priorities.

**Monumento Natural (Natural Monument)** Inviolable area allocated for protection of any plant or animal species or communities, or natural formations of scientific, scenic or historic interest. The only activities permitted are authorised scientific research and those relating to tourism.

**Source:** Original legislation

#### Management categories adopted within the National System of Protected Areas in 1989 (APN, 1991)

**Reserva Científica/Reserva Natural Estricta (Scientific Reserve/Strict Natural Reserve)** Natural area with exceptional ecosystems or communities of floral or faunal species, the protection of which is of scientific and national

interest. The ecosystems or organisms may be particularly fragile and do not demonstrate any human interference.

Protection is inviolable. The only activities permitted are research for scientific and educational purposes.

**Parque Nacional (National Park)** Natural area showing little or no human interference, which is representative of a particular national biogeographic region or of particular scenic or scientific interest. Two different administrative zones are distinguished within a national park:

**Zona Intangible (Intangible Zone)** Inviolable protection given to an area containing floral or faunal species of scientific interest. All activities that would cause disturbance to the ecosystem are prohibited.

**Zona Restringida (Restricted Zone)** Tourism and minimum alteration for effective management are allowed in the area but human settlement, hunting, fishing, and industrial exploitation are all prohibited.

**Monumento Natural (Natural Monument)** Area that contains natural formations, habitats or plant or animal species of national or provincial importance. Protection is inviolable and public access restricted.

**Reserva Natural Manejada/Santuario de Fauna y Flora (Natural Managed Reserve/Floral and Faunal Sanctuary)** Area where the protection of a specific habitat is essential for maintaining the existence of wild species of national or provincial importance.

Size is unimportant as long as the criteria for protection are met.

Activities that are compatible with protection objectives are allowed, subject to regulation, as long as they do not endanger the protected species or habitats.

**Paisaje Protegido (Protected Landscape)** Diverse category of areas protected to maintain natural or cultural characteristics. Areas that come under this designation may be distinguished as two types:

Natural or modified areas (but not urban centres) that have been intensively exploited by man for



recreation and tourism and have attractive scenic characteristics.

Landscapes that exhibit cultural modifications owing to human inhabitation over a long period of time.

**Reserva Natural-Cultural (Natural-Cultural Reserve)** Natural area inhabited by indigenous communities interested in preserving their cultural integrity. In these areas, people are directly dependent on the land to provide their livelihood. May be of anthropological interest.

The administrative organisations responsible for these areas must reach an agreement with the community in question, to protect and develop indigenous culture.

Management plans are to be drawn up, that promote the participation of the communities themselves.

**Reserva de Uso Múltiple (Multiple-Use Reserve)** Area with certain degree of transformation from its natural state, where production activities are practised in a sustainable manner. The administrative organisations impose prohibitions and regulations to ensure exploitation is sustainable.

Different functional zones may be distinguished within the area. Zones set aside for the exploitation of wildlife or plant species are maintained more or less in their natural condition, whereas zones set aside for human settlement allow the introduction of exotic floral or faunal species for economic purpose.

Area may be extensive. Management plans are obligatory, to be drawn up by the administrative organisation for each area.

This category may include severely degraded areas where protection and regulation is required to restore them to a stable state.

**Source:** APN, 1991 NB Only categories "parque nacional", "reserva natural", and "monumento natural" are used within the federal system; the rest apply to the provincial system (F. Erize, pers. comm., 1992). It is unclear whether these categories have yet been legally approved.

### **Title: Defensa de la Riqueza Forestal (Defence of Forest Heritage) Law No. 13.273**

**Date:** 30 September 1948, Amendments in 1963, 1972, 1973, 1974, 1975 and 1979

**Brief description:** Declares it in the public interest to protect and improve natural forested areas, whether on federal, provincial or private land. The provinces receive federal support to comply with this law.

**Administrative authority:** Administración Nacional de Bosques (National Forestry Administration), within the Ministerio de Agricultura (Ministry of Agriculture). The provinces are obliged to create their own corresponding administrative organisations. Privately-owned land is under the respective provincial administration.

#### **Designations:**

**Bosque Protector (Protection Forest)** A forested area that is important as a watershed, refuge for protected species, or for soil stabilisation.

**Bosque Permanente (Permanent Forest)** Areas that are to remain forested because they form part of national or provincial park or reserve, or because they include protected species.

For both protection and permanent forest, commercial exploitation is prohibited. Only improvement activities are allowed.

**Source:** Original legislation

### **Title: Modification of Law No. 13.273**

**Date:** 30 August 1973

**Brief description:** A modification of the 1948 Defence of Forest Heritage Law, providing for the creation of an autonomous, federal organisation responsible for forestry administration. The new institute replaces the former National Administration of Forests.

**Administrative authority:** Instituto Forestal Nacional (National Forestry Institute), within the Ministerio de Economía (Ministry of Economy)

**Source:** Original legislation



## SUMMARY OF PROTECTED AREAS

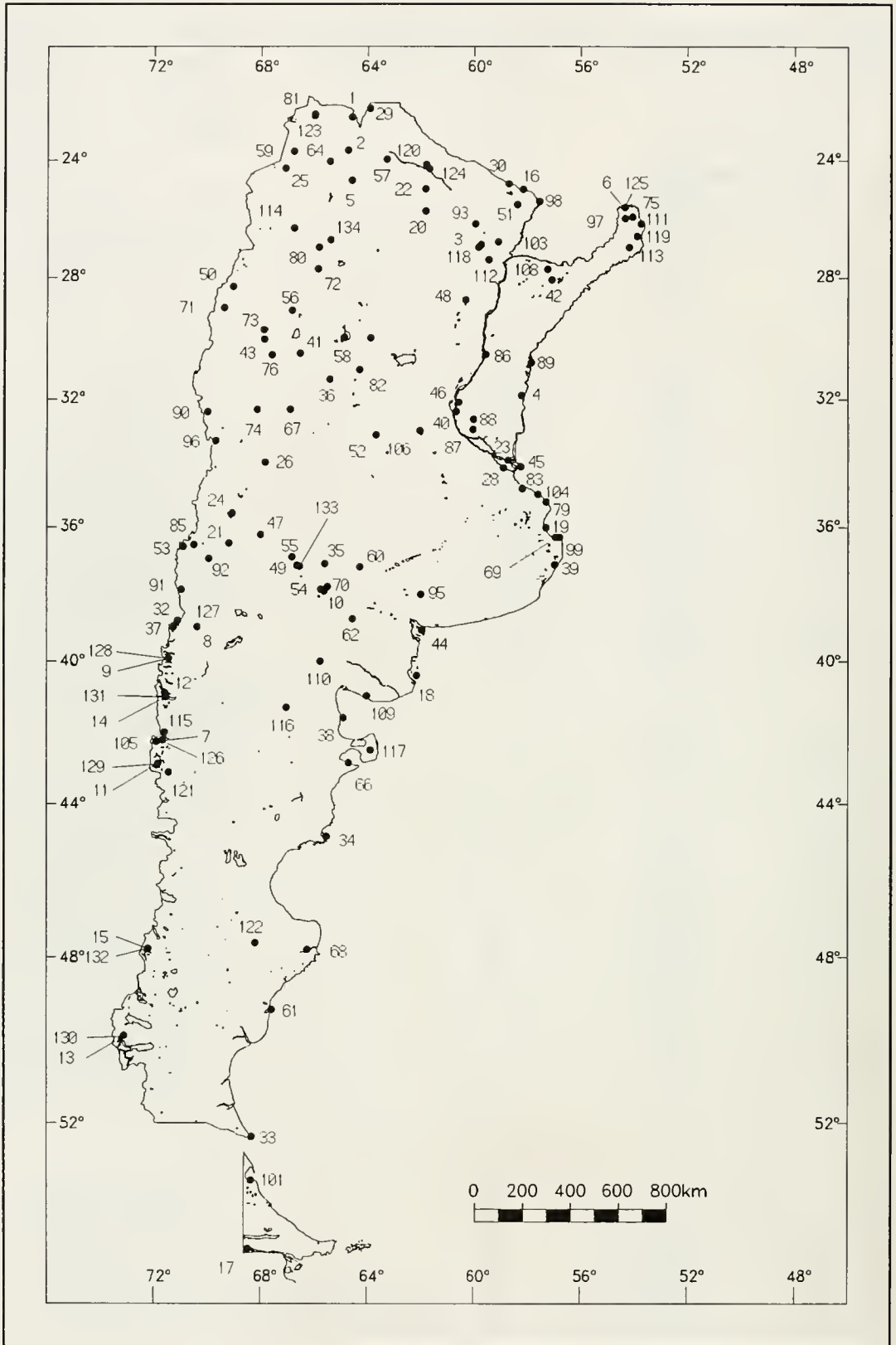
Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Baritú	II	72,439	1974
2	Calilegua	II	76,000	1980
3	Chaco	II	15,000	1954
4	El Palmar	II	8,500	1966
5	El Rey	II	44,162	1948
6	Iguazú	II	49,395	1934
7	Lago Puelo	II	14,220	1971
8	Laguna Blanca	II	8,213	1940
9	Lanín	II	200,870	1937
10	Lihué Calel	II	9,900	1977
11	Los Alerces	II	186,730	1937
12	Los Arrayanes	II	1,000	1974
13	Los Glaciares	II	450,000	1937
14	Nahuel Huapi	II	475,781	1934
15	Perito Moreno	II	85,100	1937
16	Río Pilcomayo	II	47,000	1951
17	Tierra del Fuego	II	63,000	1960
<i>Scientific Reserves</i>				
18	Bahía San Blas	I	7,386	1987
19	Bahía de Samborombón	I	9,380	1982
20	Copo	I	114,250	1968
21	El Payén	I	192,996	1982
22	Fuerte Esperanza	I	11,619	
23	Isla Botija	I	730	1958
24	Laguna de Llancanelo	I	40,000	1980
25	Los Andes	I	1,440,000	1980
26	Ñacuñán	I	12,880	1961
27	Punta León	I	1,000	1985
<i>National Scientific Reserve</i>				
28	Otamendi	I	2,632	1990
<i>Natural Reserves</i>				
29	Acambuco	IV	8,266	1979
30	Agua Dulce	IV	10,000	1970
31	Auca Mahuida	IV	1,000	1990
32	Batea Mahuida	IV	1,286	1968
33	Cabo Virgenes	IV	1,230	1986
34	Cabo dos Bahías	IV	1,183	1973
35	Chacharrameni	IV	2,500	1974
36	Chancani	IV	4,920	1986
37	Chañy	IV	2,039	1986
38	Complejo Islote Lobos	IV	800	1977
39	Dunas del Atlántico Sur	IV	3,000	1989
40	El Rico	IV	2,600	1968
41	Guasamayo	IV	9,000	1963
42	Iberá	IV	1,200,000	1982
43	Ichigualasto	IV	62,916	1971
44	Isla Embudo, Bermeja y Trinidad	IV	14,000	1991
45	Isla Martín García	IV	180	1969
46	La Azotea	IV	2,458	1990
47	La Humada	IV	5,000	1974
48	La Loca	IV	2,169	1968
49	La Reforma	IV	5,000	1974

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
50	Laguna Brava	IV	405,000	1980
51	Laguna Hu	VI	1,800	1970
52	Laguna la Felipa	IV	1,307	1986
53	Lagunas del Epulafquen	IV	7,450	1973
54	Lihue Calel	IV	2,600	1974
55	Limay Mahuida	IV	5,000	1974
56	Los Cabrera	IV	17,500	1979
57	Los Palmares	IV	6,000	1979
58	Monte de las Barrancas	IV	7,656	1988
59	Olaroz-Cauchari	IV	180,000	1981
60	Parque Luro	IV	7,608	1975
61	Península San Julian	IV	10,400	1986
62	Pichí Mahuida	IV	4,119	1974
63	Pilaga	IV	1,250	1971
64	Potrero de Yala	IV	3,000	
65	Punta Delgada	IV	2,829	1969
66	Punta Loma	IV	1,707	1967
67	Quebracho de la Legua	IV	2,242	1979
68	Ría de Puerto Deseado	IV	10,000	1977
69	Rincón de Ajo	IV	2,311	1988
70	Salitral Levalle	IV	9,501	1974
71	San Guillermo	IV	860,000	1972
72	Santa Ana	IV	18,500	1951
73	Talampaya	IV	215,000	1975
74	Telteca	IV	20,400	1986
75	Urugua-1	IV	84,000	1988
76	Valle Fértil	V	800,000	1971
<i>Natural Parks</i>				
77	Bañados del Río Dulce y Laguna de Mar	V	50,000	1966
78	Cerro Colorado	V	3,000	1974
79	Parque Costero del Sur	V	74,000	
<i>Protected Landscapes</i>				
80	La Florida	V	98,592	1936
81	Laguna de los Pozuelos	V	364,000	1980
82	Parque La Quebrada	V	4,200	1987
83	Parque Pereyra Iraola	V	10,248	1949
84	Pozuelos O Carahuasi	V	20,000	1980
<i>Resource Reserves</i>				
85	Domuyo	VI	3,620	1989
86	Isla Curuzú Chalfí	VI	16,000	1968
87	Isla del Pillo	VI	100,000	1968
88	Laguna del Pescado	VI	20,200	1968
89	Salto Grande	VI	860,000	1968
<i>Provincial Parks</i>				
90	Aconcagua	II	70,000	1983
91	Copahue	II	28,300	1962
92	El Tromen	II	24,000	1971
93	Pampa del Indio	II	8,633	1957
94	Parque Ernesto Torquinst	V	6,097	1958
95	Sierra de La Ventana	II	6,718	1958
96	Volcán Tupungato	II	110,000	1985
<i>Private Reserves</i>				
97	Aguaray-Mi	IV	4,050	1988
98	Bouvier	I	5,000	1990

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
99	Campos del Tuyú	I	3,500	1978
100	Canadon del Duraznillo	IV	1,740	1990
101	Dicky	IV	1,900	1991
102	El Bagual	I	6,000	1986
103	El Cachape	IV	1,750	1990
104	El Destino	IV	1,500	
105	Lago Esperanza	IV	15,000	1991
106	Las Dos Hermanas	IV	1,055	1989
107	Saltino	IV	2,000	1990
108	San Juan de Periahu	IV	14,199	1989
<i>Multiple Use Reserves</i>				
109	Caleta de los Loros	VIII	3,000	1984
110	Cinco Chanares	VIII	40,000	1981
111	General Manuel Belgrano	VIII	1,505	1948
112	General Obligado	VIII	3,447	1948
113	Guaraní	VIII	17,000	1977
114	Laguna Blanca	VIII	770,000	1979
115	Loma del Medio y Río Azul	VIII	2,435	1948
116	Meseta de Somuncura	VIII	1,600,000	1986
117	Península de Valdés	VIII	360,000	1983
118	Presidente de la Plaza	VIII	2,250	1935
119	San Pedro Reserva Forestal	VIII	9,500	1977
120	Teuquito	VIII	14,960	1987
121	Trevelin	VIII	3,030	1944
<i>National Natural Monuments</i>				
122	Bosques Petrificadas	III	10,000	1954
123	Laguna de los Pozuelos	III	16,000	1979
<i>National Natural Reserves</i>				
124	Formosa	IV	10,000	1968
125	Iguazú	IV	6,105	1934
126	Lago Puelo	IV	9,480	1971
127	Laguna Blanca	IV	3,038	1940
128	Lanín	IV	178,130	1937
129	Los Alerces	IV	76,270	1937
130	Los Glaciares	IV	150,000	1937
131	Nahuel Huapi	IV	282,219	1934
132	Perito Francisco P. Moreno	IV	29,900	1937
<i>University Reserves</i>				
133	La Reforma	I	9,500	1973
134	Sierra de San Javier	II	14,174	1973
<i>Biosphere Reserves</i>				
	Parque Costero del Sur	IX	30,000	1984
	Pozuelos	IX	405,000	1990
	Reserva Ecológica de Ñacuñán	IX	11,900	1986
	Reserva Natural de Vida Silvestre Laguna Blanca	IX	981,620	1982
	San Guillermo	IX	981,460	1980
<i>Ramsar Wetlands</i>				
	Laguna de Pozuelos	R	16,224	1992

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	Laguna Blanca	R	11,250	1992
	Río Pilcomayo	R	55,000	1992
	<b>World Heritage Sites</b>			
	Parque Nacional Iguazú	X	55,000	1984
	Parque Los Glaciares	X	600,000	1981





Protected Areas of Argentina

# BOLIVIA

**Area** 1,098,580 sq. km

**Population** 7,314,000 (1990)

Natural increase: 2.28% per annum

## **Economic Indicators**

GDP: US\$ 588 per capita (1987)

GNP: US\$ 620 per capita (1989)

**Policy and Legislation** Following independence in 1832, the newly-formed government implemented the first legal measures for natural resource protection. However, no coherent national conservation strategy had been elaborated by 1991 (Marconi and Morales, 1991). Bolivian legislation describes 100 legal measures concerning environmental protection. Although these may contain adequate policies on the importance of conservation, sustainable resource use and preservation of natural resources, their dispersed and inconsistent nature reduces their objectives to an incoherent form. Many were passed without considering previous acts, and, as a result, confusion and contradictions in the legislation are common (Marconi and Morales, 1991; Sandoval *et al.*, 1989).

Bolivia participates in the FAO Tropical Forestry Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. A national action plan, in accordance with TFAP objectives, was drawn up in 1989 (Sandoval *et al.*, 1989). Information on the extent of implementation of this plan is currently not available.

The first legislative act specifically concerning the protection of natural resources was the 1953 Decree Law No. 3612, Law of the Republic (*Ley de la República*). Under this Law, provision is made for the creation of an institute responsible for establishing national forest reserves and classifying them as protection (protector), permanent (*permanente*), experimental (*experimental*), exploitation (*de explotación*), or special (*especial*) forests, according to their respective ecosystems and national economic need (Marconi, 1989). Through various changes, this institute became the present Forest Development Centre (*Centro de Desarrollo Forestal*) (CDF). Supreme Decree No. 9013 (1969) provided for the creation of the Forest Guard (*Guardia Forestal*), a body vested with regulation enforcement responsibilities within forest reserves, national parks and other protected areas.

Two laws form the current legal basis for the protected areas system, one governing forests and the other national parks and similar areas. Forests are currently protected under the 1974 National General Forest Law (*Ley General Forestal de la Nación*), Decree No. 11686, which covers production, exploitation and conservation, and defines four categories of reserve. Regulations and

definitions are given for forest reserves (see Annex). The creation of protected areas is referred to in a general sense, declaring water sources, soils, wildlife and human settlements as priority areas. The CDF is cited as the institute responsible for forest protection, and the Forest Guard is now a department within it (Marconi, 1989). The Law also states that the CDF will create reserves for the survival of forest-dwelling indigenous peoples (Marconi and Donoso, 1992). Regulation of the 1974 Forest Law in 1977 (*Reglamento de la Ley General Forestal de la Nación*) strengthens forestry administration, tightens exploitation controls, and states that the Forest Guard has the function of a forest police force. Management plans are made obligatory (CDF, 1987; Marconi, 1989).

Protected areas are covered by the 1975 Wildlife, National Parks, Hunting and Fishing Law (*Ley de Vida Silvestre, Parques Nacionales, Caza y Pesca*), Decree Law No. 12301. Five categories are defined (see Annex), and administrative responsibilities assigned. Reference is made to a future regulation to this Law, which would give further details of protected area management and resource control, but no such regulation has yet been made (Hanagarth and Arce, 1986; Marconi, 1989). The 1975 Law is very confused, vague and contradictory. Designations given are not clearly defined, and neither prohibitions nor prerequisites for classification are detailed (Hanagarth and Arce, 1986; Marconi, 1989). No distinction is made in the legislation, between a national park and a wildlife reserve and there is no designation of higher importance that may be used for particularly fragile ecosystems or species, such as strict natural reserve or scientific reserve (Sandoval *et al.*, 1989).

Supreme decrees providing for the creation of individual protected areas may give further details of their objectives and management, but these often do not coincide with the 1975 Law. For example, reserves are referred to as "natural wildlife reserves" (*reservas naturales de vida silvestre*) or "national wildlife reserves" (*reservas nacionales de vida silvestre*), neither of which is defined in the 1975 Law (Hanagarth and Arce, 1986). In practice, 11 protected area designations are used (Marconi, 1989); those not defined in the legislation are fiscal reserve (*reserva fiscal*) and biological station (*estación biológica*).

Without detailed description of protected area management, the 1975 Law is ineffective in controlling natural resource use. Many areas require reclassification under a new system that would supersede the current legislation (CDF, 1987; Marconi *et al.*, 1988). An evaluation of the legal system was undertaken by the Bolivian Conservation Data Centre (CDC-Bolivia), which includes an analysis of the legal protection afforded to each current category of protected area (Marconi, 1989). This states that no clear definitions of

management categories exist in Bolivian legislation, inhibiting the establishment of a coherent system of protected areas. In many cases, there is a difference between the legal designation assigned to an area, and the category by which it is effectively managed (Marconi, 1989).

In 1986, a proposal was made to coordinate all previous environment and natural resource legislation into a coherent Environment Law (*Ley del Medio Ambiente*). A new Project for the General Environment Law (*Proyecto de Ley General del Medio Ambiente*) was formulated in 1991, and by the end of the same year, the law was passing through National Congress (*Congreso Nacional*). It proposes to unify all existing protected areas in the country into the National System of Protected Areas (*Sistema Nacional de Areas Protegidas*) (SNAP), under the administration of the proposed Environment Secretariat. However, standard definitions of management categories to be included in the system are not given, but are to be stated in the legislation providing for the creation of each protected area (M.R. Marconi, pers. comm., 1991; Pinaya, pers. comm., 1991).

**International Activities** Bolivia signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940. In 1976, Bolivia and Argentina signed the Agreement on the Protection of Flora and Fauna and the Formation of Frontier Parks (*Acuerdo sobre la Protección de Flora y Fauna y la Formación de Parques Fronterizos*). Bolivia is one of the eight countries with territory in the Amazon region that signed the Amazon Cooperation Treaty (*Tratado de Cooperación Amazónica*) on 3 July 1978, an agreement to regulate natural resource conservation and management over the region. The Convention for the Conservation and Management of Vicuña (*Convenio para la Conservación y Manejo de la Vicuña*) was signed by Chile, Peru, Argentina, Ecuador and Bolivia in 1979, and ratified under Bolivian legislation in 1980.

An agreement between the government and Conservation International, the US-based non-governmental organisation (NGO), was signed in 1987, to provide financial and technical support for conservation and sustainable resource management with emphasis on protected areas. Following this agreement, Conservation International bought part of the country's external debt in exchange for the creation of a protection and management fund for Beni Biological Station and Biosphere Reserve.

Bolivia ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (*World Heritage Convention*) on 4 October 1976, but no natural sites have been nominated. Bolivia ratified the Convention on Wetlands of International Importance especially as Waterfowl Habitat (*Ramsar Convention*)

on 27 June 1990, and one wetland site has been listed. Bolivia also participates in the Unesco Man and the Biosphere Programme, and has three biosphere reserves.

**Administration and Management** All natural resources are the responsibility of the Forest Development Centre (CDF), an autonomous organisation within the Ministry of Rural and Agrarian Affairs (*Ministerio de Asuntos Campesinos y Agropecuarios*) (MACA). Responsibilities of the CDF include formulating and implementing national forestry and conservation policies. Within the CDF, the Forest Department (*Departamento de Bosques*) is responsible for managing forest reserves, and the Wildlife, National Parks, Hunting and Fishing Department (*Departamento de Vida Silvestre, Parques Nacionales, Caza y Pesca*) (DVSPN) manages other protected areas and wildlife (Marconi, 1989).

In the first few years of its functioning, the CDF comprised a general directorate at the highest level, below which was a subdirectorate with four departments, including the DVSPN. The CDF has its own legal department to formulate resource legislation. However, since the mid 1980s, the lack of economic resources and competent personnel has greatly reduced its capabilities (Sandoval *et al.*, 1989). At the local level, regional directorates (*direcciones regionales*) of the CDF operate in nine departments in the country. In total, the CDF employs 313 personnel, including 94 professional and technical staff, and 76 park or forest guards (Sandoval *et al.*, 1989).

In some cases, legislation providing for the creation of a protected area makes no reference to any organisation responsible for its administration, or cites another institute apart from the CDF (Marconi, 1989). Protected areas may be located on land that belongs to the state; jointly to the state and a community; or to private individuals or companies. Depending on land tenure, administration of protected areas may be the sole responsibility of the CDF, or of another institution in conjunction with the CDF, or a delegated NGO, or independent institute (Marconi, 1989; Marconi and Donoso, 1992).

A number of NGOs are involved in conservation activities, such as The Nature Pro-Defence Association (*Asociación Pro-Defensa de la Naturaleza*) (PRODENA), founded in 1979. PRODENA works in coordination with the MACA and the CDF to provide technical assistance for Amboró National Park, and has a number of other on-going projects (Hardy, 1986). A support group, the Bolivian Wildlife Society, has been set up, with offices in both the USA and the UK, to promote the activities of PRODENA. In 1985, the Environment Defence League (*Liga de Defensa del Medio Ambiente*) (LIDEMA) was created to coordinate NGO activities. It links 11 different ecological groups (Marconi, 1988).



The CDC-Bolivia was established in 1986 to collect and analyse information on protected areas and the environment and provide this information to the government and relevant national and international organisations (Sandoval *et al.*, 1989).

The CDF is very inefficient due to lack of human and economic resources, and lack of coordination with other government agencies. For example, the National Colonisation Institute (Instituto Nacional de Colonización) has settled people in protected areas (Marconi and Morales, 1991). Reorganisation of the CDF has resulted in financial and operational disorder and overall lack of coordination between the regional offices and central government (Marconi *et al.*, 1988; Sandoval *et al.*, 1989). The majority of protected areas do not have any administration (Marconi *et al.*, 1988).

A revision of natural resource management is being undertaken as part of the Project for the General Environment Law which proposes the creation of a Environment Secretariat (SENMA). Responsibilities of the SENMA are to include managing protected areas in the form of a coordinated national system and therefore unifying administration into one organisation (M.R. Marconi, pers. comm., 1991). At the local level, Departmental Environment Secretariats (Secretarías Departamentales del Medio Ambiente) will be responsible for natural resources and protected areas in each department. Departmental Environment Councils (Consejos Departamentales del Medio Ambiente) (CODEMA) are to be established, to formulate local conservation policies and assess the activities of the Departmental Secretariats (M.R. Marconi, pers. comm., 1991).

**Systems Reviews** Bolivia encompasses tropical, subtropical and temperate regions, resulting in a number of different ecosystems and a high degree of biodiversity (Arce, 1988; Sandoval *et al.*, 1989). The country may be crudely divided into two distinct biogeographical regions: the Andean region, with altitudes between 500m and 7,000m; and the Amazon-Chaco (Amazónica-Chaqueña) lowland region, with altitudes below 500m (Arce, 1988).

The Andes mountains extend in two ranges along the south-western part of the country, the Western and Eastern Cordillera. Between them lies the Altiplano Intercordillerano, a large, high altitude plain, with puna (alpine) vegetation. The Altiplano is characterised by extreme cold and lack of rain. Human habitation in the mountain regions is very difficult (Sandoval *et al.*, 1989).

The Amazon-Chaco region comprises humid, lowland forest of the Beni region in the north, and the swampy savanna and dry plains of the Chaco extending to the south. Semi-humid, Tucumano-Boliviana forest is found on the border with Argentina (Arce, 1988). The Brazilian Shield, flat, swampy plains including part of the Pantanal, extend east into Brazil. Between the mountains

and the lowlands is the Humid Mountain Forest region, an important watershed, comprising the sub-Andean belt, the yungas and the humid, fertile valleys (Arce, 1988).

A total of 55.8 million ha of land is forested, accounting for 51.4 % of total land area. Of this, 44.1 million ha are lowland forest and the remaining 11.7 million ha are Andean slope forest (Sandoval *et al.*, 1989; Pinaya, pers. comm., 1991). Around half of the forested areas, 22.5 million ha, is under concession to commercial foresters (Marconi and Morales, 1991; Sanz, 1988). Forest exploitation is particularly threatening to lowland forest (Arce, 1988; Marconi and Morales, 1991). Under forestry legislation, concessions are restricted to designated production forests, but as these only account for 6.4 million ha, most of the concessions are located in unclassified forests (Marconi and Morales, 1991).

Some 78% of the population is concentrated in only 40% of the territory in the High Andes (Sandoval *et al.*, 1989). Serious degradation of ecosystems has resulted from over-exploitation in this region. Mining activities threaten watersheds and river basins (Arce, 1988). Agricultural activities involve 70% of the population, and result in deforestation and overworking of the soil in populated regions (Sandoval *et al.*, 1989).

The first national park was created in 1939, but legal protection of natural resources began in 1953. This marked the creation of an organisation within the Ministry of Agriculture specifically for natural resource administration (Marconi, 1989; Sandoval *et al.*, 1989). In 1991, the CDC listed 42 protected areas; 30 parks, reserves, refuges or sanctuaries, 1 biological station, and 11 forest reserves (M.R. Marconi, pers. comm., 1991). However, estimates of the number of protected areas vary from 12, covering almost 4 million ha, to 45, covering 15 million ha (Marconi and Morales, 1991). There is no official list of protected areas owing to the lack of clear definitions (Marconi, 1989; M.R. Marconi pers. comm., 1990).

The present system of protected areas may be considered to comprise two parts; forest reserves, and protected areas as defined under the 1975 Wildlife and National Parks Law. There is little information regarding private reserves, and no clear relationship exists between independent administrative organisations and the CDF (Marconi, 1989). The majority of protected areas are located in the Beni plains and the High Andes. Therefore, many representative examples of Bolivian ecosystems are not protected (Marconi, 1988). Important ecosystems lacking in protected area coverage are: valleys and semi-arid mountains; semi-arid puna lower south of the Chaco; semi-arid, lowland and mountainous forest (Sandoval *et al.*, 1989).

The 1974 General Forest Law makes provision for the CDF to set aside indigenous territories (territorios indígenas) to protect forest-dwelling indigenous peoples; by the end of 1990, four indigenous areas



covering more than 2 million ha had been declared, two overlapping with existing protected areas (Marconi and Donoso, 1992; H. Eilers, pers. comm., 1992).

There is little or no communication between the administrative organisations responsible for protected areas. New areas have been created with little consideration of existing conservation units, and hardly anything is known about their biogeographical characteristics. All protected areas show signs of human interference (Marconi, 1988; Marconi and Donoso, 1992; Pinaya, pers. comm., 1991). Very few conservation units are managed in accordance with the decrees declaring their creation (CDF, 1987). Marconi and Donoso (1992) have assessed the management of 36 of Bolivia's protected areas: 12 totally lack administration, 10 are still in the planning stage, and just three are adequately or well managed. The government is also planning exploitative activities in 12 protected areas (Marconi and Morales, 1991).

Bolivia is working towards the implementation of a national system of protected areas, and participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres) through the CDF (Marconi, 1988; Ormazábal, 1988). A review of protected areas by Marconi (1988) cites the need for coherent legislation giving details of national conservation objectives, in order to implement a national system.

#### Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Ley General Forestal de la Nación (National General Forest Law), Decree No. 11686

**Date:** 13 August 1974

**Brief description:** Regulates the exploitation of forest resources and makes provision for the creation of forest reserves for the protection and conservation of forest resources. Forests and forested land is owned by the state.

**Administrative authority:** Centro de Desarrollo Forestal (CDF), (Forest Development Centre), within the Ministerio de Asuntos Campesinos y Agropecuarios, (MACA), (Ministry of Rural and Agricultural Affairs)

#### Designations:

**Bosque Permanente de Producción (Permanent Production Forest)** Forest which is exploited in a sustainable manner, for economic purpose. May be nationally or privately owned.

**Bosque Permanente de Protección (Permanent Protection Forest)** Forest which is important for the protection of other resources in the environment, such as a watershed or wildlife habitat.

**Reserva Forestal de Inmovilización (Closed Forest Reserve)** Those forests that are placed under government protection, prohibiting exploitation of their resources until a suitable designation is assigned to them by an act of legislation, such as national park, forest reserve or private property.

**Bosque Especial (Special Forest)** Forests which, owing to their special characteristics, require special classification and management. They may be for mixed use, such as arable forest or grazing forest, or for harvesting forest products without felling.

Harvesting of forest products is covered by the regulations under this law.

**Bosque de Uso Múltiple (Multiple-Use Forest)** Forests which are suitable to function as production, protection, recreation and wildlife conservation as a combination.

**Bosque no Clasificado (Unclassified Forest)** Two types of forest are not covered by the above classifications, and no specific functions are assigned to them:

**Bosque Fiscal de la Nación en Terrenos Baldíos (National Fiscal Forest on Unfarmed Land)**

**Bosque no Clasificado (Unclassified Forest)** under private ownership

**Source:** FAO (n.d.)

**Title:** Ley de Vida Silvestre, Parques Nacionales, Caza y Pesca (Wildlife, National Parks, Hunting and Fishing Law), Decree Law No. 12301

**Date:** 24 March 1975

**Brief description:** Provides for the establishment of protected areas and the rules governing the protection and exploitation of faunal resources, and declares it the responsibility of the supreme government to protect natural resources and the environment. It was first proposed in article 123 of the 1974 National General Forest Law to complement forest protection.

**Administrative authority:** Departamento de Vida Silvestre, Parques Nacionales, Caza y Pesca (DVSPN), (Department of Wildlife, National Parks, Hunting and Fishing), part of the Centro de Desarrollo Forestal (CDF), (Forest Development Centre), which is itself within the Ministerio de

Asuntos Campesinos y Agropecuarios (MACA),  
(Ministry of Rural and Agricultural Affairs)

**Designations:**

*Parque Nacional y Reserva de Vida Silvestre (National Park and Wildlife Reserve)* An area set aside for scientific research, protection and management of a wild faunal population, to assure the conservation and continuing production of the species.

Planning for a national park or reserve will be subjected to a special regulation.

A national park or wildlife reserve is declared by Executive Power.

*Refugio de Fauna Silvestre (Wildlife Refuge)* Considered important for the protection, conservation and propagation of wild animals, particularly those species in danger of extinction.

*Santuario de Vida Silvestre (Wildlife Sanctuary)* That is the natural habitat for an endemic or endangered species, or where the concentration of particular species is, or could be, an important tourist attraction.

A wildlife refuge or sanctuary is declared by the Ministry of Rural and Agricultural Affairs.

In the four categories defined above it is prohibited to alter the boundaries or undertake any activities within the area that are contrary to the protection objectives of its designation, specifically hunting.

*Coto de Caza (Hunting Reserve)* Specifically suited for developing wildlife management programmes and hunting.

Source: Original legislation

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Amboró	II	180,000	1973
2	Carrasco Ichilo	II	1,300,000	1988
3	Isiboro Sécure	II	1,100,000	1965
4	Llica	II	97,500	1991
5	Noel Kempff Mercado	II	914,000	1979
6	Sajama	II	29,940	1939
7	Santa Cruz la Vieja	II	17,080	1989
8	Torotoro	V	16,576	1989
9	Tunari	VIII	6,000	1962
10	Tuni Condoriri	VIII	14,800	1942
	<i>Biological Station</i>			
11	Beni	I	135,000	1982
	<i>National Reserves</i>			
12	Cordillera de Sama	IV	108,500	1991
13	Eduardo Avaroa	IV	714,000	1973
14	Incacasani Altamachi	IV	23,000	1991
15	Lagunas del Beni y Pando	IV	275,000	1961
16	Manuripi Heath	IV	1,884,000	1973
17	Noel Kempff Mercado	IV	21,900	1988
18	Ríos Blanco y Negro	IV	1,400,000	1990
19	Tariquíá	IV	246,870	1989
20	Ulla Ulla	IV	250,000	1972
	<i>Wildlife Refuges</i>			
21	El Dorado	IV	180,000	1988
22	Estancias Elsner Espíritu	IV	70,000	1978
23	Estancias Elsner San Rafael	IV	20,000	1978
24	Huancaroma	IV	11,000	1975
	<i>Reserves</i>			
25	Altamachi Vicuña	IV	100,000	1977
26	Huancaroma Vicuña	IV	140,429	1975
	<i>Sanctuary</i>			
27	Cavernas El Repechón	IV	1,500	1986
	<i>Forest Reserves</i>			
28	Baja Paragua	VIII	3,388,200	1988
29	Chimanes	VIII	804,000	1986
30	El Chore	VIII	800,000	1966
31	Guaravos	VIII	1,400,000	1969
32	Quinera del Aten	VIII	20,000	1977
	<i>Protection Forest Reserves</i>			
33	Bella Vista	VIII	90,000	1964
34	Eva Eva - Mosetenes	VIII	225,000	1990
35	Sajta Ichilo	VIII	350,000	1988
	<i>Regional Park</i>			
36	El Pirai	VIII	250,000	1984
37	Lomas Arena	V	13,300	1989
38	Yacuma	VIII	130,000	1987



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>Closed Forest Reserves</i>				
39	Chiquitanía	VI	5,774,000	1977
40	Convendo	VI	249,195	1984
41	Iténez	VI	1,500,000	1988
42	Río Boppi	VI	128,000	1979
43	Río Grande Masicuri	VI	242,000	1979
<hr/>				
<i>Biosphere Reserves</i>				
	Estación Biológica Beni	IX	135,000	1986
	Parque Nacional Pilón-Lajas	IX	100,000	1977
	Reserva Nacional de Fauna Ulla Ulla	IX	200,000	1977
<i>Ramsar Wetland</i>				
	Laguna Colorada	R	5,240	1990



Protected Areas of Bolivia



# FEDERAL REPUBLIC OF BRAZIL

Area 8,511,996 sq. km

Population 155,562,917 (1990)

Natural increase: 1.87% per annum

## Economic Indicators

GDP: US\$ 2,306 per capita (1987)

GNP: US\$ 2,540 per capita (1989)

**Policy and Legislation** The present government structure consists of 26 states and one federal district. Each state has its own administrative, legislative and judicial authorities, its own constitution and laws, which must, however, agree with the constitutional principles of the Union (Hunter, 1991). Protected area legislation is summarised in the Environment Chapter (Capítulo do Meio Ambiente) of the 1988 Brazilian Constitution (Constituição Brasileira) (Dias *et al.*, 1991; IBAMA, 1991), the eighth since independence from the Portuguese in 1822 (Hunter, 1991). An important aspect of this chapter is the recognition of a new right of the people to enjoy an ecologically balanced environment, which is considered the common property of the population (IBAMA, in Dias *et al.*, 1991). It is the duty of the government and the community to safeguard and preserve the environment in the interests of present and future generations. A national conservation strategy has not been prepared, and Brazil does not participate in the FAO Tropical Forest Action Plan.

Principles for nature conservation were first established by virtue of the Royal Charter of 1797, which provided measures for forest protection as well as severe penalties for burning or destroying forests (Anon., n.d.). Later, José Bonifácio, the Father of Independence, published an article, "Vision of the Great Motherland" (Visão da Grande Patria), in which he suggested the creation of a government portfolio to protect the forests that were being progressively destroyed by serious environmental and climatic modifications (Anon., n.d.). The first national parks (Itaiaia and Serra dos Orgãos) were not established until the following century (1937 and 1939, respectively). The first modern legal measures relating to protected areas were taken in the 1930s: amongst important developments were the promulgation of the First Forestry Code (Primeiro Código Florestal) Decree No. 23.793 (1934), the Hunting and Fisheries Code (Código de Caça e Pesca) and the Water Code (Código de Aguas) (Dias *et al.*, 1991). They were later replaced by the New Forestry Code (Novo Código Florestal) Law No. 4.771 (1965) and the 1967 Faunal Protection Law (Lei de Proteção a Fauna) Law No. 5.197 which are still in force (see Annex).

The New Forestry Code made provision for the creation of parks (parques), biological reserves (reservas biológicas) and forests (florestas), each at national, state and municipal levels (see Annex). Decree No. 97.635 (1989) regulates Article 27 of the 1965 Forestry Code, and makes provision for the prevention and fighting of forest fires. The 1967 Faunal Protection Law makes provision for the protection

of fauna, and the creation of biological reserves and hunting parks (parques de caça) (Anon., n.d.; IBAMA, 1991). Although biological reserves were briefly defined by this Law, the regulations which define and characterise them have still to be established (IBAMA, 1991; Rylands, 1990). Law No. 6.902 (1981) provides for the creation of ecological stations (estação ecológica) and environmental protected areas (área de proteção ambiental) (APA), both categories to be administered by SEMA (created in 1974 to design and implement Brazil's environment policy) (see Annex) (Dias *et al.*, 1991; IBAMA, 1991; Schenkel and Kaniak, 1992).

The basis for modern environmental protection is established by the National Environment Policy (Política Nacional do Meio Ambiente) which was established by virtue of Law No. 6.938 (1981). This Policy makes provision for the creation of the National Environment System (Sistema Nacional do Meio Ambiente) (SISNAMA), constitutes the National Environment Council (Conselho Nacional do Meio Ambiente) (CONAMA), and institutes the National Directory of Environmental Institutions (Cadastro Nacional das Instituições que Atuam na Área do Meio Ambiente), an official register (IBAMA, 1990a, 1990b). CONAMA's role is to advise the President on environmental policy, and to produce guidelines for environmental management and sustainable development. Laws Nos 6.902 and 6.938 are further regulated by Decree No. 99.274 (1990) (IBAMA, 1991). Decree No. 89.336 (1984) recognises as ecological reserves (reservas ecológicas) those areas established by the public sector as well as those established by Law No. 6.938, 1981 (see Annex) (Anon., n.d.). Decree No. 84.017 (1979) approves the Regulation for Brazilian National Parks (Regulamento dos Parques Nacionais Brasileiros) and defines them more clearly. Resolução CONAMA No. 11 (1988), provides resolutions for the use of forests affected by fires; the use of burnt wood, which can only be used in and around the conservation area, and educational programmes on the control and prevention of fires in natural areas (IBAMA, 1991). Areas of relevant ecological interest (área de relevante interesse ecológico) are established by virtue of Decree No. 88.351/83 (1983) and are further recognised by Decree No. 89.336 (1984). Private flora and fauna reserves (reservas particulares de flora e fauna) can be registered on the basis of Portaria No. 217/88 (1988) (Anon., n.d.). Resolução CONAMA No. 13 (1990) details the protection of ecosystems in existing conservation units. Scientific research in conservation units is strictly regulated through Portaria No. 174/81P (1981) (IBAMA, 1991).

Law No. 7735 (1989) led to the creation of the Brazilian Institute for the Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis) (IBAMA). IBAMA's objectives are to carry out national environment policy, and to conserve and control the use of the renewable natural resources (Dias *et al.*, 1991).



pressure from rubbertappers led to the passing of Law No. 7.804 to provide for the creation of extractive reserves (reservas extrativistas).

The protection of the historical and cultural heritage, and of outstanding landscapes, is by virtue of Law Decree No. 25 of 30 (1937). The protection of archaeological and prehistoric monuments was further advanced by Law No. 3.924 (1961) (see Annex). Provisions for the establishment of special areas and sites of touristic interest (áreas especiais/locais de interesse turístico) were made by virtue of Law No. 6.513 (1977). This Law is further regulated through Decree No. 86.176 (1981) (Anon., n.d.). Decree No. 99.556 (1990) makes provisions for the protection of natural caves (cavernas) (Anon., n.d.). Private natural heritage reserves (reserva particular do patrimônio natural) are established by virtue of Decree No. 98.914 (1990). The Constitution of 1988 makes provision for the establishment of anthropological reserves (reserva antropológica) through several of its Articles (see Annex) (Anon., n.d.).

Although Brazil does not have specific legislation for a protected area system, it has begun work to establish one. A Conservation Units Plan was prepared by the IBDF, Phase I in 1979 and Phase II in 1982. This plan proposed new protected areas, several of which have now been declared. New management categories, linking local, regional and national protected area designations more closely with those used by IUCN, have been put forward.

A proposal for a National System of Conservation Units has been developed by FUNATURA and IBAMA and approved by CONAMA; it still awaits the approval of the National Congress and publication in law. The System consists of three groups of units as follows:

**Group I. Integral Protection Units** Their resources can only be "indirectly" used, and ecosystems must remain in their natural state with only a minimum of disturbance. Management categories are: biological reserve, ecological station, national park, natural monument and wildlife refuge.

**Group II. Provisional Management Units** Total protection of natural resources. "Indirect use" of resources is compatible, and native communities are allowed to use resources directly on a sustainable basis. The only category is natural resource reserve.

**Group III. Sustainable Use Units** This comprises faunal reserve, environmental protection area (APA), national forest, and extraction reserve (Schenkel and Kaniak, 1992).

**International Activities** Brazil signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention) in 1940, and ratified it subsequently. Brazil is developing joint programmes with other Latin American countries through the Amazonian Treaty which it signed in 1978. Member countries of this Treaty integrate the subnetwork

of planning and management of protected areas in the Amazon Region. Within this Treaty, Brazil supports the importance of preserving continuous areas in the Amazon region which will transcend geopolitical boundaries (Dias *et al.*, 1991).

Brazil participates in the Unesco Man and the Biosphere Programme and two biosphere reserves were recognised in 1991. In 1977, Brazil ratified the International Convention on Civil Responsibility for damages caused by oil pollution. In 1977, it ratified the Convention concerning the World Cultural and Natural Heritage (World Heritage Convention) and one site was inscribed in 1986. However, it has not yet ratified the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (Diegues, 1990).

Brazil participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, otras Areas Protegidas, Flora y Fauna Silvestres) (FAO, n.d.; Ormazábal, 1988). An extensive technical cooperation programme for the environment is being carried out with Germany, Canada, USA and UK (B. Griesinger, pers. comm., 1992).

**Administration and Management** Shortcomings in protected area administration were largely resolved with the creation of IBAMA in 1989. Prior to this, particularly between 1981-1989, problems arose because conservation units were administered at national level by two different bodies under separate ministries. The Institute of Forestry Development (Departamento de Instituto Brasileiro de Desenvolvimento Florestal) (IBDF) was created under the Ministry of Agriculture in 1967. It was responsible for national parks, biological reserves and national forests. In 1973, the Special Environmental Secretariat (Secretaria Especial do Meio Ambiente) (SEMA) was created within the Ministry of the Interior (MINTER), to manage ecological stations, ecological reserves and environmental protection areas (APAs) (Schenkel and Kaniak, 1992). Additionally, SEMA prepared an incoherent programme of establishing a network of ecological stations to represent all major ecosystems (Nogueira-Neto and Carvalho, 1979; Rylands, 1990).

The Directorate of National Historic and Artistic Heritage (Diretoria do Patrimônio Histórico e Artístico Nacional) within the Ministry for National Historic and Artistic Heritage (SPHAN) maintains a register of archaeological monuments (Anon., n.d.).

Currently, the main organisation responsible for the formulation and coordination of national environmental policies is the Ministry of the Environment (Secretaria do Meio Ambiente) (SEMAM), created by virtue of Law No. 99.244 (1991). In 1989, the IBDF and SEMA were merged together with other superintendencies to form the Brazilian Institute for the Environment and Natural Renewable Resources (IBAMA) under the Ministry of the Environment (Rylands, 1990). Within IBAMA, two

directorates deal with protected areas: the Directorate of Renewable Natural Resources (Directoria dos Recursos Naturais Renováveis) and the Directorate of Ecosystems (Directoria de Ecossistemas) (Schenkel and Kaniak, 1992).

IBAMA has initiated a programme of consolidation of its conservation units through the national Programme for the Environment (PNMA) with financial resources in the order of US\$ 117 million for its first phase (B. Griesinger, pers. comm., 1992).

Numerous government and nongovernment organisations (NGOs) are concerned with the environment, working at local, regional or national level. These are listed in the national register (cadastre) produced by IBAMA. Some NGOs working national level are Fundação ProNatureza (FUNATURA), the Brazilian Foundation for Nature Conservation (Fundação Brasileira para a Conservação da Natureza) (FBCN), and Fundação SOS Mata Atlântica. FUNATURA has established a network of private wildlife refuges which are of considerable importance and are better protected than government areas (Mittermeier, 1988b).

Problems with protected areas have been apparent from colonial times, when the Portuguese showed little regard for the native wildlife while exploiting natural resources, and ignored existing regulations (Anon., n.d.). Currently, the main problems related to conservation units are insufficient and irregular funding, and lack of personnel and infrastructure. A large proportion of the conservation units have not been implemented or do not have the minimum infrastructure to function adequately. Parks which are affected include Pico da Neblina and São Joaquim which, despite being established in 1979 and 1961, respectively, do not have any infrastructure (Dias *et al.*, 1991). Only 10% of national protected areas have a management plan (Dourojeanni, 1988). None of the ecological stations has a management plan (Rylands, 1990).

IBAMA employs 548 people to administer and manage 158,000 sq. km of protected areas (one person to 29,000ha) (Dias *et al.*, 1991). Unfortunately, at present only three people in the current system are trained to a degree level adequate to conduct basic activities in the conservation units, leaving them vulnerable to invasion, poaching, deforestation, illegal agricultural and livestock exploitation, pollution of watercourses and soils, disorganised tourism, mining and fires. Only 20% of the territory included in the protected areas has some form of management (Schenkel and Kaniak, 1992). This is an extremely serious problem especially for protected areas in the Amazon or other distant and inhospitable parts of the country (Dias *et al.*, 1991).

**Systems Reviews** Brazil is the fifth largest country in the world, with a 7,500km long coastline (4°25'N – 33°45'S). It is bounded by the Atlantic on the east, and, on its northern, western and southern borders, by all

South American countries except Chile and Ecuador (Hunter, 1991). It is mainly located in the tropics and has three main geographical zones: the Amazon basin (c. 3,500 000 sq. km); the plains ("chapadas"), and two mountains chains: the Guyanas and the Atlantic massif. Because of the large variety of its habitats, it harbours potentially one of the greatest biological diversities in the world (Dias *et al.*, 1991).

The large area of inland water (55,457 sq. km) (Hunter, 1991) results in a wide diversity of wetlands of ecological and socioeconomic importance, amongst them the Pantanal, the Amazon floodplain (várzeas) and innumerable important coastal ecosystems (Diegues, 1990). Mangroves are particularly important, as Brazil has the largest areas of mangrove in the world. In addition, there are thousands of square kilometres of artificial wetlands such as dams and reservoirs (Diegues, 1990). However, they are still under serious threat (Diegues, 1990).

The Amazon has extensive alluvial plains created by meandering rivers, raised plateaux worked by erosion, low cliffs and rivers with black, clear and white waters. Approximately 30% of the world's tropical forests occur in Brazil. Representative ecosystems include the Amazon forest, the Atlantic forest, Caatinga ecosystems (dwarf vegetation and cacti), closed ecosystems, Araucaria forests, swamps, southern washes, mangroves, coastal shrubs ("restingas") and palm tree zones (Dias *et al.*, 1991). The Amazon forest occupies 40% of total land area, representing around 2.7 million sq. km. (Dias *et al.*, 1991).

The "chapadas" are residuals of an ancient crystalline massif which gradually ascend from west to east to reach altitudes over 1,000m in some areas of Goiás and Mato Grosso. The highest mountain is Roraima (2,875m), part of the Guyanas range. The Atlantic mountain ranges form an abrupt maritime relief, and comprise various systems: Serra Geral, Serra do Mar (Pico Bandeira, 2,790m), Serra de Mantiqueira (Pico da Itatiaia, 2,787m), Serra do Espinhaco and Chapada Diamantina.

According to the definition given by the FAO Latin American Network Programme, Brazil is in the process of developing a coherent national system. The first management plan for federal conservation units was produced in 1979, based on IUCN methodology. Currently, only 16 of the 34 existing national parks and five of the 22 biological reserves have management plans, and the majority of these require updating. There are no such plans for any of the ecological stations (Dias *et al.*, 1991).

The current protected area system is made up of several superimposed subsystems (at local, state and national levels). All systems lack human and financial resources, and face severe threats; particularly from agriculture. Not all Brazilian ecosystems are adequately represented. Omissions include: caatinga (arboreal, sertao, seridó and cariri), cerrados, veredas, pantanal, Araucaria forest,



northeast Atlantic forest, savannas, Amazon forest and caves (Dias *et al.*, 1991; Dourojeanni, 1988; Schenkel and Kaniak, 1992).

The public sector has expressed an interest in financing the system of conservation units. In addition, the governments of Japan and Germany have expressed interest in funding activities related to protected area establishment and management (Dias *et al.*, 1991).

#### Addresses

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- Fundação ProNatureza (FUNATURA) (President), C.P. 020186, 70.001 BRASILIA DF
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ANNEX

Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Decree Law No. 25

**Date:** 30 November 1937

**Brief description:** Organises the protection of the historical and artistic national heritage.

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Natural Renewable Resources) within the Ministry of the Environment (Secretaria do Meio Ambiente)

**Designations:**

*Monumento Natural (Natural Monument)* Sites or landscapes which should be conserved and protect because of their notable natural or manmade features.

**Source:** Anon. (n.d.)

**Title:** Law No. 3.924

**Date:** 26 June 1961

**Brief description:** Makes provision for archaeological and prehistoric monuments

**Administrative authority:** Secretaria do Patrimonio Histórico e Artístico Nacional

**Designations:**

*Monumento Arqueológico ou PreHistórico (Archaeological or PreHistoric Monument)*  
No authorisation will be given for research or production of calcareous shells with the characteristics of an archaeological or prehistoric monument without prior knowledge of the Directorate of Historic and Artistic National Heritage office.

**Source:** Anon. (n.d.)

**Title:** Forestry Code, Law No. 4.771

**Date:** 15 September 1965

**Brief description:** Provides protection to all existing forests and other forms of vegetation. Makes provisions for the creation of national parks, ecological reserves and forests.

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Natural Renewable Resources) within the Ministry of the Environment (Secretaria do Meio Ambiente)

**Designations:**

*Parque Nacional, Estadual e Municipal and Reserva Biológica (National, State and Municipal Park and Biological Reserve)* Set aside to protect areas with exceptional natural attributes, conciliating the overall protection of the flora and fauna with use for educational, recreational and scientific purposes

*Foresta Nacional, Estadual e Municipal (National, State and Municipal Forest)* Set aside for economical, technical or social purposes, even in areas that are not covered by forest but are intended for use as forest

Article 16 limits the use of privately-owned forests and sets a minimum limit of 20% to 50% of the area in each property with localised tree cover to be respected. This extensive Article distinctly limits the use of the properties for each region of the country.

Prohibited activities in these conservation units include destroying or damaging the forest or other forms of vegetation; cutting trees without adequate permits; entering the area with arms or any other prohibited substance or instrument; lighting fires without proper care; making, selling, transporting or releasing balloons which may cause fires; preventing or hindering natural regeneration; receiving or transporting timber or timber products without licence; failing to return expired licences to the authorities; releasing animals or failing to take necessary precautions to prevent domestic animals from entering the forests; extracting stones, sand, lime or any type of mineral.

**Source:** Original legislation

**Title:** Law No. 5197 (Dispositions on the protection of fauna and other provisions)

**Date:** 3 January 1967

**Brief description:** Provisions for the protection of fauna and the establishment of biological reserves and hunting parks. It revokes Decree Law No. 5894 of 20 October 1943.

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Natural Renewable Resources) within the Ministry of the Environment (Secretaria do Meio Ambiente)

**Designations:**

*Reserva Biológica Nacional, Estadual e Municipal (National, State and Municipal Reserve)* Areas where activities relating to the use, persecution, hunting, harvest (gathering), or introduction of specimens of wild and domestic fauna and flora, as well as any modifications of the environment are prohibited, with the exception of scientific activities duly authorised by the authorities.

*Parque de Caça Federal, Estadual e Municipal (Federal, State and Municipal Hunting Park)* Areas partially or totally open to the public where hunting is allowed either on a temporary or permanent basis with recreational, educational and touristic purposes.

Source: Original legislation

**Title: Law No. 6.513**

Date: 20 December 1977

**Brief description:** Makes provisions for the establishment of special areas and sites of touristic interest.

**Administrative authority:** EMBRATUR

**Designations:**

*Area Especial de Interesse Turístico e Local de Interesse Turístico (Special Area of Touristic Interest and Site of Touristic Interest)* Set aside due to their cultural and natural value, they are protected by specific legislation especially regarding historic, artistic, archaeological or prehistoric wealth

Continuous spaces which include territorial waters and which should be preserved and valued in the cultural and natural sense, destined for tourist development plans and projects. Their development will depend on the areas not being subjected to special protection regulations and their respective **entorno** of environmental protection.

Source: Anon. (n.d.)

**Title: Decree No. 84.017 (Regulation for Brazilian National Parks)**

Date: 21 September 1979

**Brief description:** Provides definitions of national parks at the three levels (federal, state and municipal)

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis IBAMA (Brazilian Institute for the Environment and Natural Renewable Resources)

**Designations:**

*Parque Nacional (National Park)* Extensive and defined geographical areas with exceptional natural attributes, permanently protected.

Destined for scientific, cultural, educational and recreational purposes and are created and administered by the federal government. Constitute the wealth of the Union destined for the use of the people and should be preserved and maintained untouched by the authorities.

Main objective is the preservation of the ecosystems from any modification.

Source: Anon. (n.d.)

**Title: Law No. 6.902**

Date: 27 April 1981

**Brief description:** Allows for the creation of ecological stations, environmental protected areas and other provisions.

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Natural Renewable Resources) within the Ministry of the Environment (Secretaria do Meio Ambiente)

**Designations:**

*Estação Ecológica (Ecological Station)*

Areas representative of ecosystems destined for basic and applied ecological research, the protection of the natural environment and the development of conservation education. Afford protection to 90% of the area, the rest may be modified for research purposes. They can be established by federal, state and municipal dependencies.

*Area de Proteção Ambiental (Environmental Protection Area)* Areas set aside by the Executive Power for the protection of the environment to ensure the welfare of the human population and to conserve or improve the local ecological situation.

The following activities are prohibited: the establishment or functioning of potentially polluting industries capable of affecting water streams; the alteration of the soil through canalisation; activities capable of causing soil erosion or water basin siltation; and activities which threaten rare species within the protected area with extinction.

Source: Original legislation

**Title: Decree No. 89.336**

**Date:** 31 January 1984

**Brief description:** Makes further provision for ecological reserves

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis IBAMA (Brazilian Institute for the Environment and Natural Renewable Resources)

**Designations:**

**Reserva Ecológica (Ecological Reserve)** Those areas for permanent preservation mentioned in Article 18 of Law No. 6.938 of 1981, as well as those established by the Public (Executive) Power. Exceptions to this include those areas established as ecological stations by virtue of Laws No. 6.938 and 6.902 of 1981. These areas may be public or private according to the status of their land tenure.

**Source:** Anon. (n.d.)

**Title: Decree No. 98.914**

**Date:** 31 January 1990

**Brief description:** Makes provision for the establishment of natural heritage private reserves.

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis IBAMA (Brazilian Institute for the Environment and Natural Renewable Resources)

**Designations:**

**Reserva Particular do Patrimônio Natural (Natural Heritage Private Reserve)** Area set aside permanently by its owner in which natural primitive or semi primitive, recovered conditions will be identified or whose characteristics justify recovery action due to their landscape aspects or for the preservation of the biological cycle of the native species of fauna or flora.

Article 4 of this Decree states that these areas will be recognised as such in the public interest through the President of IBAMA. They will be exempt of rural tax.

**Source:** Anon. (n.d.)

**Title: Decree No. 99.274**

**Date:** 6 June 1990

**Brief description:** Regulates Law No. 6.902 of 27 April 1981 and Law No. 6.938 of 31 August 1981 by governing the processes of establishment and management of ecological stations. It further determines that any activity which may affect the biota within a distance of 10km from any ecological station will depend on provisions supplied by CONAMA.

**Administrative authority:** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis IBAMA (Brazilian Institute for the Environment and Natural Renewable Resources)

**Designations:**

**Estação Ecológica (Ecological Station)** Created by virtue of Public Executive decrees, through proposals of the Secretary of the Environment. The act should define its geographical limits, its denominations and entities responsible for their administration and management and zoning.

Any activity carried out within 10km of the surrounding area that could affect the biota of the conservation unit will be subject to regulations by CONAMA.

**Área de Proteção Ambiental (Environmental Protection Area)** At the federal level it is the responsibility of the Secretary of the Environment in accordance with IBAMA to propose the establishment of such areas to the President of the Republic. The decree should mention its denomination, geographical limits, main objectives and any prohibitions or restrictions in the use of its environmental resources.

The supervisory entity should direct and assist owners so that the legislation objectives are followed.

Any action or omission that result in noncompliance of regulations will be regarded as an offence. Amongst others, this includes actions that cause decline in water or environmental quality, any type of pollution which affect cultivated or wild plants, carry out activities which may potentially degrade the environment without appropriate licence, injury, killing or capture of rare species in the conservation unit.

**Source:** Original legislation



## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Amazonia (Para-Amazonas States)	II	994,000	1974
2	Aparados da Serra (R Grande Sul-Sta Catarina)	II	10,250	1959
3	Araguaia	II	562,312	1959
4	Brasilia	II	28,000	1961
5	Cabo Orange	II	619,000	1980
6	Caprao (Espirito Santo - Minas Gerais)	II	26,000	1961
7	Chapada Diamantina	II	152,000	1985
8	Chapada dos Guimaraes	II	33,000	1989
9	Chapada dos Veadeiros	II	60,000	1961
10	Emas (Goiás - Mato Grosso)	II	131,868	1961
11	Grande Sertao Veredas (Bahia and Minas Gerais)	II	84,000	1989
12	Iguacu	II	170,000	1939
13	Itatiaia (Rio de Janeiro-Minas Gerais)	II	30,000	1937
14	Jau	II	2,272,000	1980
15	Lagoa do Peixe	II	34,357	1986
16	Lencois Maranhenses	II	155,000	1981
17	Marinho Fernando de Noronha	II	11,270	1988
18	Marinho dos Abrolhos	II	91,300	1983
19	Monte Pascoal	II	22,500	1961
20	Monte Roraima	II	116,000	1989
21	Pacaas Novos	II	764,801	1979
22	Pantanal Matogrossense	II	135,000	1981
23	Pico da Neblina	II	2,200,000	1979
24	Sao Joaquim	II	49,300	1961
25	Serra da Bocaina (Sao Paulo - Rio de Janeiro)	II	100,000	1971
26	Serra da Canastra	II	71,525	1972
27	Serra da Capivara	II	97,933	1979
28	Serra do Cipo	II	33,800	1984
29	Serra do Divisor	II	605,000	1989
30	Serra dos Orgaos	II	11,000	1939
31	Sete Cidades	II	6,221	1961
32	Superagui	II	21,000	1989
33	Tijuca	II	3,200	1961
34	Xingu	II	2,200,000	1961
	<i>Ecological Reserves</i>			
35	Jutai-Solimoes	I	284,285	1983
36	Raso da Catarina	I	200,000	1983
	<i>Ecological Stations</i>			
37	Agua Emendades	IV	9,768	1968
38	Anavilhanas	IV	335,000	1981
39	Ilha Maraca-Jipioca	IV	72,000	1981
40	Ilha do Mel	IV	2,240	1982
41	Jari (Amapa and Para States)	IV	227,126	1982
42	Juami-Japura	IV	745,850	1985
43	Jureia-Itatins	IV	80,000	1987
44	Mamiraua	IV	1,124,000	1990
45	Piria-Gurupi (Maranhao and Para)	I	341,650	1988
46	Rio Acre	IV	77,500	1981
47	Serido	IV	1,116	1982
48	Serra das Araras	IV	115,000	1982
49	Taiama	IV	12,000	1981



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
<i>Biological Reserves</i>				
50	Abufari	I	288,000	1982
51	Atol das Rocas (R. Grande do N and Maranhao)	I	36,249	1979
52	Guaribas	I	4,321	1990
53	Lago Piratuba	I	357,000	1980
54	Pedra Talhada (Alagoas - Pernambuco)	I	4,469	1989
55	Rio Trombetas	I	385,000	1979
56	Tapirape	I	103,000	1989
57	Uatuma	I	560,000	1990
<i>Federal Biological Reserves</i>				
58	Augusto Ruschi (Nova Lombardia)	I	4,000	1982
59	Caracara	I	61,126	1971
60	Corrego Grande	I	1,504	1989
61	Corrego do Veado	I	2,392	1982
62	Marinha do Arvoredo	I	17,600	1990
63	Poco das Antas	I	5,000	1974
64	Santa Isabel	I	2,766	1988
65	Serra Negra	I	1,100	1982
66	Sooretama	I	24,000	1982
67	Tingua	I	26,000	1989
68	Una	I	11,400	1980
<i>Federal Ecological Stations</i>				
69	Aiuaba	IV	11,525	1981
70	Babitonga	IV	7,833	1987
71	Caracarai	IV	394,560	1982
72	Carijos	IV	11,295	1987
73	Coco-Javaes	IV	37,000	1981
74	Cunia	IV	104,000	1982
75	Foz do Sao Francisco/Praia do Peba	IV	5,322	1981
76	Guaraquecaba	IV	13,638	1982
77	Ique	IV	200,000	1981
78	Itabaiana	IV	1,100	1987
79	Jureia	IV	24,065	1986
80	Maraca	IV	101,312	1981
81	Niquia	IV	286,600	1985
82	Pirai	IV	4,000	1982
83	Pirapitinga	IV	1,090	1987
84	Taim	IV	33,995	1986
85	Tamoios	IV	4,070	1990
86	Tupinambas	IV	4,628	1987
87	Urucui-Una	IV	135,000	1981
<i>Federal Environment Protection Areas</i>				
88	Cairucu	V	33,800	1983
89	Cananea - Iguape e Peruibe	V	202,832	1984
90	Carstre do Lagoa Santa	V	35,600	1990
91	Fernando de Noronha-	V	1,692	1986
92	Guapi-Mirim	V	14,340	1984
93	Guaraquecaba	V	291,500	1985
94	Morro da Pedreira	V	66,200	1990
95	Petropolis	V	44,000	1982
96	Serra da Mantiqueira (M Gerais-S Paulo-R Jan)	V	402,517	1985
97	Serra da Tabatinga (Maranhao - Tocantins)	V	61,000	1990
<i>Faunal Reserve</i>				
98	Secundario Perimetro de Sao Roque	VI	23,900	1978

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
	<i>Area of Outstanding Ecological Interest</i>			
99	Manguezais da Foz do Rio Mamanguape <i>State Forest Parks</i>	IV	5,721	1985
100	Espigao Alto	II	1,319	1949
101	Nonoai	II	17,498	1949
102	Rondinha	II	1,000	1982
	<i>Environmental Protection Areas</i>			
103	Abaete	V	1,800	1987
104	Algodoal	V	2,367	1990
105	Bacia do Descoberto (D Federal - Goias)	V	32,100	1983
106	Bacia do Rio Sao Bartolomeu	V	84,100	1983
107	Bacias do Gama e Cabeça do Veado	V	25,000	1986
108	Cachoeira Andorinhas	V	18,700	1989
109	Cafuringa	V	30,000	1988
110	Caverna do Moroaga	V	256,200	1990
111	Cavernas do Peruacu	V	150,000	1989
112	Floresta do Jacaranda	V	2,700	1983
113	Gruta dos Brejoes/Vereda do Romao Gramacho	V	11,900	1985
114	Igarape Gelado	V	21,600	1989
115	Jericoacoara	V	6,800	1983
116	Lago Ayapua	V	610,000	1990
117	Mangaratiba	V	22,936	1987
118	Marituba do Peixe	V	8,600	1988
119	Parintins Nhamunda	V	195,900	1990
120	Piacabucu	V	5,500	1983
121	Santa Rita	V	8,800	1984
122	Serra de Baturite	V	3,269	1990
	<i>National Forests</i>			
123	Amapa	VIII	412,000	1989
124	Amazonas	VIII	1,573,100	1989
125	Araripe	VIII	38,262	1946
126	Bom Futuro	VIII	250,000	1988
127	Capao Bonito	VIII	4,347	1968
128	Caxiuana	VIII	200,000	1961
129	Chapeco	VIII	1,686	1968
130	Cubate	VIII	416,532	1990
131	Cuiari	VIII	107,516	1990
132	Ibirama	VIII	57,058	1988
133	Icana	VIII	200,561	1990
134	Icana-Aiari	VIII	491,400	1990
135	Irati	VIII	3,495	1968
136	Jamari	VIII	215,000	1984
137	Macaua	VIII	173,475	1988
138	Mapia	VIII	311,000	1989
139	Mapia-Inauini	VIII	311,000	1989
140	Pari Cachoeira I	VIII	18,000	1989
141	Pari Cachoeira II	VIII	654,000	1989
142	Passo Fundo	VIII	1,260	1947
143	Pira/Auara	VIII	631,436	1990
144	Purus	VIII	256,000	1988
145	Rio Preto	VIII	2,830	1990
146	Roraima	VIII	2,664,685	1989
147	Sao Francisco de Paula	VIII	1,138	1947
148	Saraca Taquera	VIII	429,600	1989
149	Tapajos	VIII	600,000	1974
150	Tapirape-Aquiri	VIII	190,000	1989

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
151	Taracua I	VIII	647,744	1990
152	Taracua II	VIII	559,504	1990
153	Tefe	VIII	1,020,000	1989
154	Tres Barras	VIII	4,458	1968
155	Urucu	VIII	66,496	1990
156	Xie	VIII	407,935	1990
<i>Forest Reserves</i>				
157	Gorotire	VI	1,843,000	1961
158	Jaru	VI	1,085,000	1961
159	Juruena	VI	1,800,000	1961
160	Mundurucania	VI	1,377,000	1961
161	Parima	VI	1,756,000	1961
162	Pedras negras	VI	1,171,000	1961
163	Rio Negro	VI	3,790,000	1961
164	Tumucumaque	VI	1,793,000	1961
<i>Indigenous Reserves</i>				
165	Amanayes	VII	261,000	
166	Apiaca-Kayabi	VII	111,410	
167	Areoes	VII	218,515	
168	Iranxe	VII	46,790	
169	Jarina	VII	268,813	
170	Marechal Rondon	VII	98,500	
171	Merure	VII	82,301	
172	Nambiquara	VII	1,011,961	
173	Parabubure	VII	224,447	
174	Pareci	VII	563,586	
175	Pimental Barbosa	VII	328,966	
176	Sao Marcos	VII	188,478	
177	Xerente	VII	167,542	
<i>Indigenous Areas</i>				
178	Alto Purus	VII	265,000	1987
179	Alto Rio Guama	VII	278,000	1990
180	Alto Tarauaca	VII	23,840	1987
181	Alto Turiacu	VII	530,524	
182	Anambe	VII	7,912	1988
183	Ananas	VII	1,769	
184	Andira Marau	VII	465,868	
185	Aningal, Mpio Alto Alegre	VII	7,627	
186	Anta	VII	2,250	
187	Apinayes	VII	141,904	
188	Apiterewa	VII	981,722	1988
189	Araca	VII	50,018	
190	Arara I	VII	247,010	1990
191	Arara II	VII	46,232	
192	Arara	VII	1,060,400	
193	Arara do Igarape Humaita	VII	27,700	1987
194	Arariboia	VII	413,288	
195	Arawete	VII	985,000	1987
196	Aripuana (Mato Grosso and Rondonia)	VII	753,400	
197	Awa	VII	232,000	
198	Bacaja	VII	192,126	1979
199	Bacurizinho	VII	82,432	
200	Bakairi	VII	61,405	
201	Barata Livramento	VII	18,830	
202	Bau Menkranotire	VII	1,850,000	1986

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
203	Bom Jesus	VII	1,313	
204	Boqueirao	VII	13,950	
205	Cabeceira do Rio Acre	VII	18,870	1988
206	Cachoeira Seca/Iriri	VII	760,479	1989
207	Cajueiro	VII	4,304	
208	Campinas	VII	28,862	1985
209	Cana-Brava	VII	131,868	
210	Canauamim	VII	6,324	
211	Capoto	VII	186,000	
212	Caru	VII	172,667	
213	Catete	VII	439,151	1987
214	Cubate	VII	1,023,000	
215	Cuminapanema	VII	2,059,700	1987
216	Curua	VII	13,000	1988
217	Deni	VII	998,400	
218	Escondido	VII	275,100	
219	Est. Rondon	VII	2,400	
220	Estivadinho	VII	1,970	
221	Estrela da Paz	VII	16,300	
222	Evare 1	VII	596,000	
223	Evare 2	VII	165,000	
224	Figueira	VII	25,973	1987
225	Figueiras	VII	10,000	
226	Funil	VII	16,000	
227	Galibi	VII	6,689	
228	Gaviao	VII	7,980	
229	Geraldo e Toco-Preto	VII	16,588	
230	Governador	VII	41,644	
231	Guapenu	VII	2,450	
232	Iauarete	VII	990,000	
233	Ibirama	VII	14,156	
234	Icana-Ajari	VII	896,000	
235	Icana-Xie	VII	480,000	
236	Igarape Lages	VII	107,321	
237	Igarape Preto	VII	79,500	
238	Igarape Ribeirao	VII	47,863	
239	Ilha Jacare Xipaca	VII	2,044	
240	Ipixuna	VII	179,640	
241	Jaboti	VII	8,000	
242	Jacamim	VII	107,000	
243	Jaminawa Arara	VII	28,280	1977
244	Jaminawa do Igarape Preto	VII	23,117	1986
245	Japuirá	VII	148,450	
246	Jaquiri	VII	1,830	
247	Jarina/Margem Direita	VII	139,000	
248	Jarudore	VII	4,706	
249	Jatuarana	VII	5,251	
250	Jumina	VII	24,000	
251	Kampa do Rio Amonea	VII	91,200	1987
252	Kampa do Rio Envira	VII	238,400	1987
253	Kanamari	VII	607,563	
254	Kanela	VII	125,212	
255	Karaja Santana do Araguaia	VII	1,126,000	
256	Kararao	VII	224,000	1988
257	Karipuna	VII	195,000	
258	Karitiana	VII	89,682	
259	Katukina/Kaxinawa	VII	17,750	1984



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
260	Kaxarari (also Rondonia)	VII	127,540	
261	Kaxinawa do Igarape do Caucho	VII	9,540	1986
262	Kaxinawa do Nova Olinda	VII	32,150	1986
263	Kaxinawa do Rio Breu	VII	23,840	1987
264	Kaxinawa do Rio Humaita	VII	127,383	1984
265	Kaxinawa do Rio Jordao	VII	92,000	1984
266	Kayabi	VII	117,246	1982
267	Kayapo	VII	3,204,000	1985
268	Koatinema	VII	288,600	1988
269	Kraolandia	VII	302,533	
270	Krikati	VII	85,500	
271	Kulina do Igarape do Pau	VII	14,400	1987
272	Kulina do Medio Jurua	VII	770,300	
273	Kulina do Rio Envira	VII	48,400	1986
274	Lago Aiapoa	VII	25,500	
275	Lago Beruri	VII	4,600	
276	Lagoa Comprida	VII	13,198	
277	Lamerao	VII	49,500	
278	Lauro Sodre	VII	9,600	
279	Macarrao	VII	25,312	
280	Mae Maria	VII	62,488	1981
281	Malacacheta	VII	16,150	
282	Mamoadate	VII	313,646	1985
283	Mangueira	VII	4,064	
284	Manoa/Pium	VII	43,337	
285	Mariene	VII	10,793	
286	Mekrangnoti	VII	4,913,000	1990
287	Menku	VII	47,094	
288	Mequens	VII	105,250	
289	Miratu	VII	28,800	
290	Mundurucu	VII	1,965,000	1978
291	Murutinga	VII	1,210	
292	Nhamunda Mapuera (part)	VII	845,400	
293	Nhamunda Mapuera	VII	1,022,400	
294	Nove de Janeiro	VII	234,400	
295	Nukini	VII	30,900	1986
296	Ouro	VII	13,573	
297	Paquicamba	VII	4,351	1990
298	Paracana	VII	351,697	1985
299	Paracuhuba	VII	1,040	
300	Pari-Cachoeira	VII	1,152,000	
301	Paru d'Este	VII	1,182,800	
302	Perigara	VII	10,740	
303	Piraha	VII	389,000	
304	Pirineus de Souza	VII	28,212	
305	Pium	VII	3,180	
306	Ponta de Serra	VII	15,597	
307	Porquinhos	VII	79,520	
308	Poyanawa	VII	19,987	1986
309	Raimundao	VII	4,300	
310	Raposa/Serra do Sol	VII	1,401,320	
311	Recanto da Saudade	VII	13,750	
312	Rikbaktsa	VII	79,935	
313	Rio Bia	VII	1,180,200	
314	Rio Branco	VII	236,137	
315	Rio Formoso	VII	19,700	
316	Rio Gregorio	VII	92,859	1983

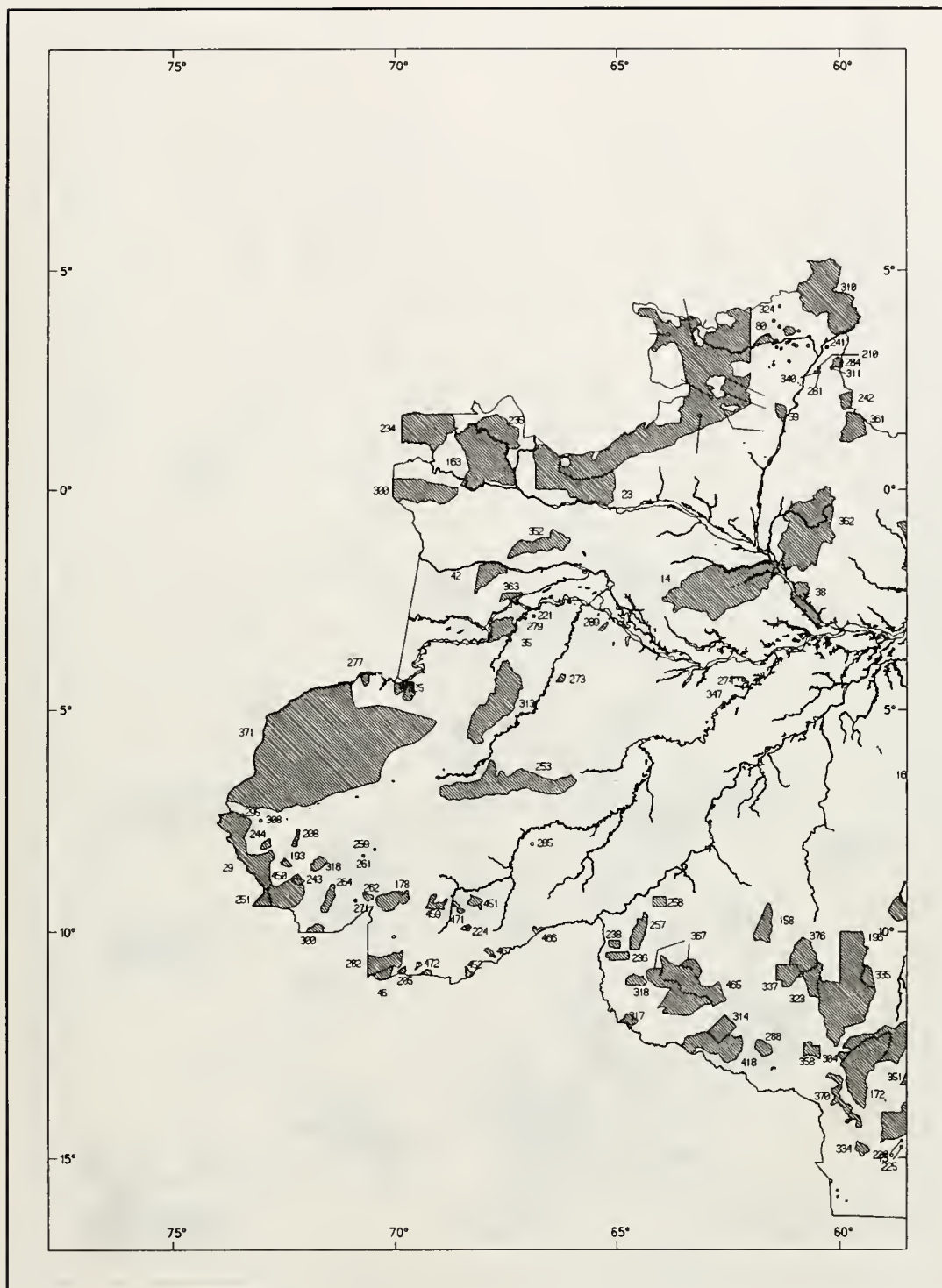
Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
317	Rio Guapore	VII	128,196	
318	Rio Negro Ocaia	VII	104,063	
319	Rio Paru do Leste	VII	1,182,800	
320	Rio Pindare	VII	15,002	
321	Rodeador	VII	2,319	
322	Roosevelt (part with MT) Mpio Pimenta Bueno	VII	233,055	
323	Roosevelt	VII	233,055	
324	S. Ines	VII	29,698	
325	S. Leopoldo	VII	55,000	
326	Sagarana	VII	8,400	
327	Sai-Cinza	VII	125,552	1988
328	Saluma	VII	533,940	
329	Sangradouro/Volta Grande	VII	11,660	
330	Sangradouro	VII	88,620	
331	Santana	VII	35,471	
332	Sao Domingos	VII	5,474	
333	Sao Marcos	VII	653,949	
334	Sarare	VII	67,420	
335	Serra Morena	VII	148,300	
336	Serra da Moca	VII	11,626	
337	Sete de Setembro (Rondonia and Mato Grosso)	VII	247,870	
338	Sororo	VII	26,258	1977
339	Sucuba	VII	5,983	
340	Tabalascada	VII	7,000	
341	Tadarimana	VII	9,785	
342	Tapirape/Karaja	VII	66,166	
343	Taracua-Uaupes	VII	1,666,000	
344	Tembe	VII	1,075	1989
345	Tenharim/Transamazonia	VII	488,550	
346	Terese Cristina	VII	25,694	
347	Terra Vermelha	VII	8,750	
348	Ticuna Feijoal	VII	1,320	
349	Ticuna Porto Espiritual	VII	3,550	
350	Ticuna de Santo Antonio	VII	1,450	
351	Tirecatinga	VII	130,575	
352	Tora	VII	24,600	
353	Tracaja	VII	1,550	
354	Trincheira	VII	1,550	
355	Trincheira/Bacaja	VII	1,438,856	1989
356	Trocara	VII	21,722	1982
357	Truaru	VII	6,640	
358	Tubarao Latunde	VII	116,000	
359	Tuere	VII	640,000	
360	Uaca, 1 and 2	VII	434,660	
361	Uai-Uai	VII	330,000	
362	Uaimiri Atroari	VII	2,585,911	
363	Uati-Parana	VII	102,187	
364	Umariacu	VII	1,600	
365	Umutina	VII	28,120	
366	Uneixi	VII	405,000	
367	Uru-Eu-Uau-Uau	VII	1,832,300	
368	Urucu-Jurua	VII	12,697	
369	Utariiti	VII	412,304	
370	Vale do Guapore	VII	242,593	
371	Vale do Javari	VII	8,338,000	
372	Vui-Uata-In	VII	125,000	
373	Waiapi	VII	543,000	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
374	Waimiri-Atroari	VII	2,440,000	
375	Xambioa	VII	3,265	
376	Zoro	VII	431,700	
377	Zuruaha	VII	233,900	
<i>Indigenous Parks</i>				
378	Araguaia	VII	1,395,000	
379	Aripuana	VII	1,258,323	
380	Tumucumaque	VII	2,700,000	1968
381	Xingu	VII	2,642,008	
382	Yanomami (Amazonas and Roraima)	VII	7,751,945	
<i>State Parks</i>				
383	Alto Ribeira	II	37,712	1958
384	Bacanga	II	3,075	1980
385	Brigadeiro	II	32,500	1988
386	Campos do Jordao	II	8,286	1941
387	Carlos Botelho	II	37,797	1982
388	Caxambu	II	1,040	1979
389	Delta do Jacui	II	4,322	1976
390	Desengano	V	22,500	1983
391	Ibitipoca	II	1,488	1973
392	Ilha Anchieta	II	828	1977
393	Ilha Bela	II	27,025	1958
394	Ilha Grande	II	15,000	1978
395	Ilha do Cardoso	II	22,500	1962
396	Itacolomi	II	7,542	1967
397	Jacupiranga	II	150,000	1969
398	Jaiba	II	6,358	1973
399	Mananciais da Serra	II	2,249	
400	Mirador	II	385,000	1980
401	Morro do Chapeu	II	6,000	1973
402	Morro do Diabo	II	34,441	1986
403	Pedra Branca	II	12,500	1974
404	Rio Doce	II	35,973	1944
405	Serra Caldas Novas	II	12,315	1970
406	Serra Furada	II	1,329	1980
407	Serra do Mar	II	314,800	1969
408	Serra do Tabuleiro	II	87,405	1975
409	Sumidouro	II	1,300	1980
410	Tainhas	II	4,924	1975
411	Terra Ronca	II	14,493	
412	Turvo	II	17,491	1965
413	Vascununca	II	1,484	1970
414	Vila Velha	II	3,245	1953
<i>State Biological Reserves</i>				
415	Aguai	I	7,672	1983
416	Araras	I	2,068	1972
417	Canela Preta	I	1,844	1980
418	Guapore	I	600,000	1982
419	Jaru	I	268,150	1979
420	Mata Acaua	I	5,000	1974
421	Parauna	I	3,490	1979
422	Praia do Sul	I	3,600	1981
423	Rio Ouro Preto	I	46,438	1990
424	Sassafraz	I	5,416	1977
425	Serra Geral	I	1,700	1982

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year
426	Tracadal	I	22,540	1990
<i>State Ecological Stations</i>				
427	Angatuba	IV	1,394	1985
428	Bracinho	IV	4,606	1984
429	Caetetus	IV	2,188	1987
430	Chauas	IV	2,700	1987
431	Itirapina	IV	2,300	1984
432	Jatai	IV	4,532	1982
433	Paraiso	IV	4,920	1987
434	Santa Barbara	IV	2,712	1984
435	Xitue	IV	3,095	1987
<i>State Environment Protection Areas</i>				
436	Bacia dos Rios Piracicaba e Juqueri - Mirim	V	390,000	1987
437	Cabreuva	V	26,100	1984
438	Cajamar	V	13,400	1987
439	Campos do Jordao	V	26,900	1984
440	Corumbatai-Botucatu-Tejupa	V	641,000	1984
441	Ibitinga	V	64,900	1987
442	Ilha Comprida	V	19,375	1987
443	Jundiá	V	43,200	1984
444	Serra das Mangabeiras	V	96,743	1983
445	Serra do Mar	V	548,100	1984
446	Silveiras	V	42,700	1984
447	Tiete	V	45,100	1983
448	Varzea do Alto Tiete	V	8,500	1987
<i>State Forest</i>				
449	Antimari	VIII	66,168	
<i>Extractive Reserves</i>				
450	Alto Jurua	VIII	506,186	1990
451	Antimari	VIII	260,277	1988
452	Cachoeira	VIII	24,099	1987
453	Cajari-2	VIII	82,000	
454	Cajari-3	VIII	104,000	
455	Cautario, Mpio Costa Marques	VIII	230,000	
456	Chico Mendes	VIII	970,570	1990
457	Iratapuru	VIII	70,000	
458	Jaciparana and Mutumparana	VIII	240,000	
459	Macaua	VIII	103,106	1978
460	Maraca-1	VIII	75,000	1988
461	Maraca-2	VIII	22,500	1988
462	Maraca-3	VIII	226,500	1988
463	Matauau	VIII	68,000	
464	Ouro Preto	VIII	170,000	
465	Pacaas Novos	VIII	180,000	
466	Porto Dias	VIII	22,145	1987
467	Remanso	VIII	43,502	1987
468	Rio Cajari	VIII	481,650	1990
469	Rio Ouro Preto	VIII	204,583	1990
470	Rio Pedras Negras	VIII	180,000	
471	Riozinho	VIII	35,896	1988
472	Santa Quitéria	VIII	43,248	1980
473	Terrua	VIII	139,295	1989

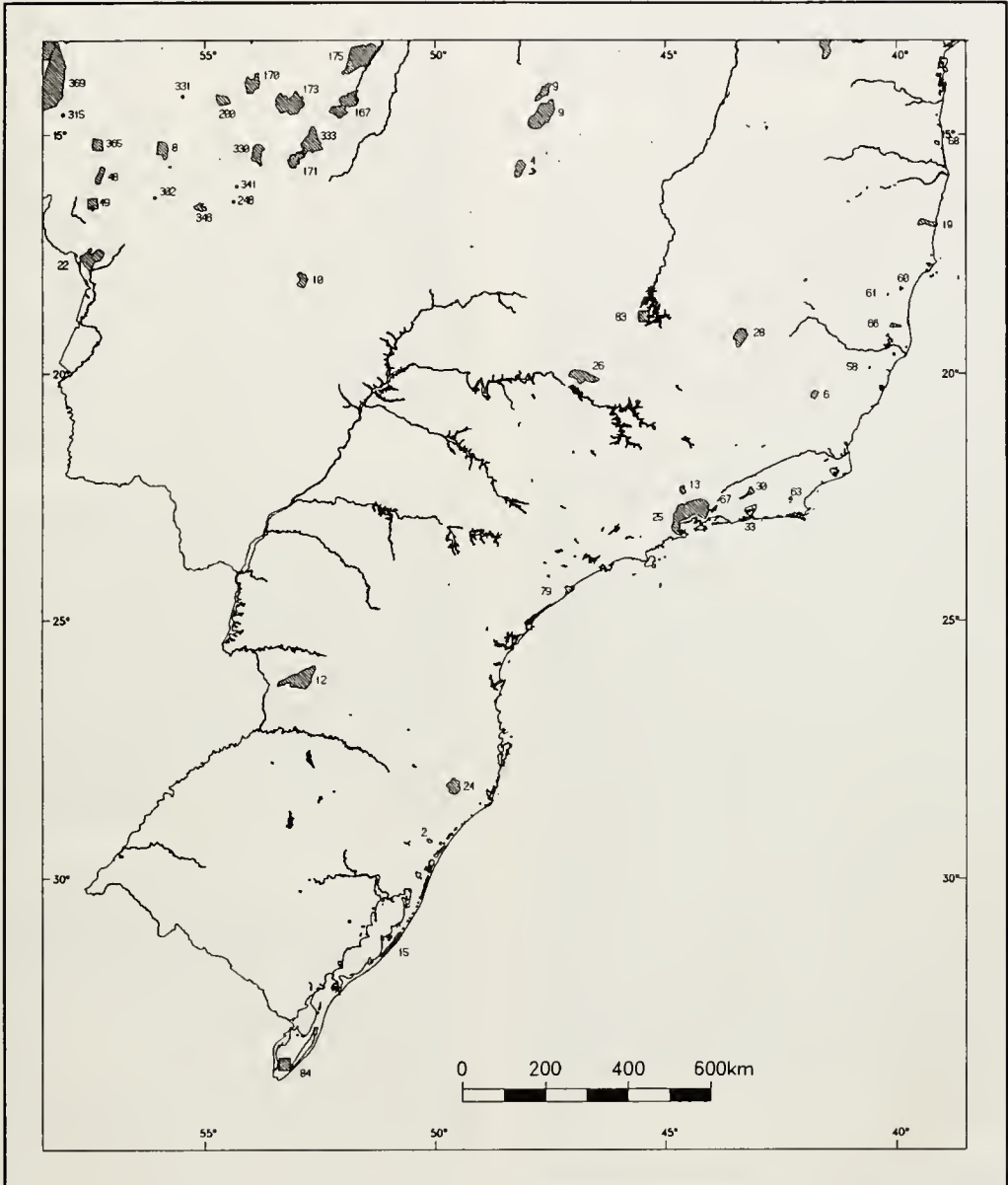


<b>Map ref.</b>	<b>National/international designations Name of area</b>	<b>IUCN management category</b>	<b>Area (ha)</b>	<b>Year</b>
	<b><i>Biosphere Reserves</i></b>			
	TijucaTinguaOrgãos	IX	67,600	1991
	Vale do RibeiraSerra do Graciosa	IX	1,794,500	1991
	<b><i>World Heritage Site</i></b>			
	Iguaçu National Park	X	170,000	1986



**Protected Areas of Brazil  
North-West Brazil**





Protected Areas of Brazil  
Southern Brazil





# CHILE

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**Area** 756,943 sq. km

**Population** 13,173,000 (1990)  
Natural increase: 1.55 % per annum

## **Economic Indicators**

GDP: US\$ 1,511 per capita (1987)  
GNP: US\$ 1,770 per capita (1989)

**Policy and Legislation** Article 19 of the 1980 Political Constitution of Chile (Constitución Política de la República de Chile) states that all inhabitants are assured the right to live in an environment free of contamination, and that the state is responsible for nature protection. However, little importance is afforded to protected areas as part of a national development strategy, and a comprehensive strategy for protected areas is lacking (Stutzin *et al.*, 1991; Gutiérrez, 1992). Although there is abundant legislation (over 20 legal texts) referring to national parks, it is disperse, ambiguous and contradictory (Gutiérrez, 1992), and there is no consolidated law to cover national protected areas (Araya and Cunazza, 1992).

The first legislation to make provision for protected areas was the 1925 Forests Law (*Ley de Bosques*), Decree Law No. 656, which authorises the creation of national parks and forest reserves. This was amended by the 1931 Forests Law, Supreme Decree No. 4363, which provides for the expropriation of private land for protected areas, and the establishment of national tourist parks and forest reserves to conserve national natural beauty and certain tree species. Land set aside for protection cannot be used for any other purpose. The Agriculture and Livestock Service (*Servicio Agrícola y Ganadero*) (SAG) is assigned responsibility for management of protected areas.

Decree Law No. 1939 (1977) on the Acquisition, Administration and Disposition of State or Fiscal Property (*Adquisición, Administración y Disposición sobre los Bienes del Estado o Fiscales*) replaces Decree Law No. 701 (1974) of the same name, and makes provisions for managing state property including parks and reserves. Trees may only be felled with prior authorisation from the National Forestry Corporation (*Corporación Nacional Forestal*) (CONAF). CONAF is an autonomous state corporation, under the Ministry of Agriculture, responsible for forests and protected areas.

CONAF manages the National System of Wild Protected Areas (*Sistema Nacional de Areas Silvestres Protegidas del Estado*) (SNASPE). Definitions are given for the protected area categories of national park, natural monument, national reserve and wilderness reserve, and provisions made for reclassifying protected areas accordingly. Forest reserves are now known as national reserves (CONAF, 1989). No wilderness reserves have been declared. CONAF is obliged to develop a

management plan for each protected area in the SNASPE.

In 1988, Law No. 18768 formally transfers administrative responsibilities for national parks and forest reserves from the SAG to CONAF. In practice, transfer had already taken place several years earlier following an agreement between the two institutions (CONAF, 1989).

Improvements in legislation for protected areas and natural resource management took place in 1984 with the promulgation of two new laws: Law Nos. 18348 and 18362 (CONAF, 1989). However, for administrative and financial reasons they have not come into effect yet (Stutzin *et al.*, 1991; Gutiérrez, 1992). Law No. 18348 provides for the creation of the National Corporation for Forests and the Protection of Natural Renewable Resources (*Corporación Nacional Forestal y de Protección de Recursos Naturales Renovables*) (also known as CONAF), as an autonomous state institution. This new institution would be part of the Ministry of Agriculture, controlled financially by the General Auditor of the Republic (*Controlaría General de la República*). Some of the conservation, protection and natural resource regulation activities that were previously assigned to the SAG would be transferred to the new CONAF, including forest exploitation and regulation enforcement. Professionals from appropriate fields can be deployed to assist in research projects. The new Corporation that would be formed under this legislation takes over all responsibilities and property from the former National Forestry Corporation. From 1980 onwards, CONAF advocated a single law, No. 18362, to consolidate all aspects of protected area legislation. This law, promulgated in 1984, but not yet in effect, provides for the creation of a new, coherent National System of Wild Protected Areas (SNASPE). The five conservation objectives of the SNASPE are given as: maintaining areas unique in character or representative of national ecological diversity for continuity of natural processes and public education; maintaining natural resources and ensuring their sustainable use; maintaining the productive capacity of soils and hydrological systems; and preserving natural scenic beauty and cultural heritage. Protected area designations are given (see Annex).

**International Activities** Chile signed Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940, and ratified it in 1967. However, national legislation transgresses the Western Hemisphere Convention, particularly in the case of mineral resource exploitation within protected areas (Gutiérrez, 1992; Astorga, n.d.). Chile ratified the

Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 16 January 1980 (through Decree No. 3056 of 1979), but no natural sites have been inscribed. Chile ratified the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 27 July 1981 (through Decree Law No. 3485 of 1980 and Supreme Decree No. 771 of 1981) and one wetland has been listed. Chile also participates in the Unesco Man and the Biosphere Programme, and has seven biosphere reserves. In 1979, the Convention for the Conservation and Management of Vicuña (Convenio para la Conservación y Manejo de la Vicuña) was signed by Argentina, Bolivia, Chile, Ecuador, and Peru, and was ratified in Chilean legislation in 1981.

The United Nations Development Programme and the FAO carried out a study on protected areas in arid and semi-arid zones, with a view to improving their management and identifying further areas for protection, between 1986 and 1988. Among the recommendations made was the inclusion into SNASPE of several areas in the northern regions.

Support for conservation projects and training park guards is received from several international organisations including WWF, WCI-NYZZ, the World Monument Fund, the FAO, United Nations Environment Programme and Unesco (CONAF 1989).

**Administration and Management** Legal responsibility for protected areas is assigned to the Ministry of Agriculture (Ministerio de Agricultura), which delegates all aspects of administration and management to the National Forestry Corporation (CONAF).

Financial and policy-making responsibilities are divided within the central administration of CONAF. The Executive Director (Director Ejecutivo) is responsible for the internal administration of CONAF, and all financial matters. The Executive Council (Consejo Directivo), comprising the Minister of Agriculture, the Executive Director of CONAF, the Executive Director of SAG, the Vice-president of the Institute for Agricultural Development (Instituto de Desarrollo Agropecuario) and the Director of the Office of Agricultural Planning (Oficina de Planificación Agrícola), develops conservation policies and implements projects which are annually reviewed and modified where necessary.

CONAF comprises four departments: Wild Heritage (Patrimonio Silvestre) responsible for protected areas management, Forest Control, Fire Control and Fire Management (Ramírez, pers. comm., 1991). CONAF has offices in each of the country's 13 regions. Seven professionals are employed in central administration and 27 regionally, including forestry engineers, biologists and agricultural technicians. Regional offices are responsible for protected areas management. By 1989 there were 350 park guards distributed among 59 of the

75 protected areas in the SNASPE, and seven national training courses had taken place. A further 160 technicians and administrative personnel are employed (CONAF 1989). CONAF is also responsible for wildlife management within the SNASPE. By 1989, 17 projects had been undertaken to study wildlife and implement management plans for certain species such as the vicuña and chinchilla (CONAF 1989).

CONAF's administrative faculties are not sufficient for it to adequately carry out its duties. Infringement of protected areas by private timber and mineral companies is a major problem (Stutzin *et al.*, 1991; Gutiérrez, 1992). This is due to lack of resources, and also because of CONAF's status as an autonomous state corporation. Its powers are further limited by the fact that infringements are not defined in the legislation (Gutiérrez, 1992). By 1989, 14 of the country's protected areas were occupied (Cunazza, 1989). On a general level, national and regional policies do not put sufficient importance on either conservation or sustainable development: areas designated for protection are often also designated for other incompatible uses by other government institutions (Stutzin *et al.*, 1991; Araya and Cunazza, 1992; E. Astorga, M. Stutzin and H. Verscheure, pers. comm., 1992).

Recently, CONAF has turned to industry as a source of additional financial support for its work. Non-governmental conservation organisations (NGOs) also fund specific aspects of CONAF's work, such as environmental education and research (Stutzin *et al.*, 1991).

In the northern region of Chile an NGO, the Flora and Fauna Defense Committee (Comité Nacional Pro Defensa de la Flora y la Fauna) (CODEFF), supports protected areas, and works towards increasing environmental protection and preventing pollution (Guerra, pers. comm., 1991). It has sections in seven cities, and manages a private reserve in the south of Chile. The Austral Ecological Defence Initiative (Iniciativa de Defensa Ecológica Austral) (IDEA) works on issues related to protected areas in the south of Chile. The National Network for Ecological Action (Red Nacional de Acción Ecológica) (RENACE) links NGOs throughout the country via a monthly news bulletin, *Ecoprensa*.

**Systems Reviews** Chile extends 4,200km from 17S to 56S, with an altitude range from sea level to 7,000m, and includes oceanic islands. A number of distinct ecosystems are found, with a high degree of biodiversity (Mark, 1984; Ormazábal, 1986a). To obtain a better understanding of the country's vegetation formations and ecosystems, and to assess the degree of protection afforded by the SNASPE, CONAF initiated the Basic System of Classifying Chilean Native Vegetation (Sistema Básico de Clasificación de la Vegetación Nativa Chilena) in 1985 (Ormazábal, 1986b). The System identifies 8 ecological regions, 17



sub-regions and 83 different vegetation formations (Ormazábal, 1986a, 1986b).

The two main mountain ranges are the Cordillera de los Andes, extending the length of the country, and the Cordillera de la Costa along the northern coast. Chilean territory includes Easter Island, Sala y Gomez Island, and the Juan Fernández Islands. Tropical coastal desert and high desert grassland (puna), located in the far north, include the Atacama desert where average rainfall is less than 1mm per year.

Predominantly scrubland vegetation lies to the south, where annual precipitation varies from 100mm in northern areas to 1000mm further south. This is the most productive agricultural land in the country and includes the capital metropolitan area. Two-thirds (66%) of the population lives in this region, which occupies only 10% of the total national territory, a situation that has resulted in extreme environmental degradation (Weber, 1983).

A 300km-long stretch of *Araucaria* forest intervenes between the scrubland and the Valdivian mixed temperate rain forest, which is characterised by the presence of bamboo in the understorey. True Chilean *Nothofagus* beech forests extend 2,000km to the south, and Patagonian steppe with tussock grassland and shrub vegetation extends down to the Magellan Straits (Mark, 1984). Cattle ranching is concentrated in this region.

The first national park was declared in 1926, with the objective of protecting natural beauty and resources and allowing for tourism, without endangering the livelihoods of the local inhabitants (Contreras *et al.*, 1979; Ormazábal, 1986b). A further 12 parks were established between 1935 and 1945 with the objective of protecting particular tree species. Between 1958 and 1979, 36 more protected areas were established. During the 1970s, management plans were compiled, describing the infrastructure, research and educational projects required (Contreras *et al.*, 1979). By 1990, there were 30 national parks, 36 national reserves, and 10 natural monuments, totalling 13,600,000ha or around 18% of total land area (Poblete, pers. comm., 1990).

The principal fault with the protected areas system is the considerable difference in coverage between different regions of the country, with some ecosystems absent from SNASPE altogether (Ormazábal, 1986a, 1986b). The majority of the area under protection, 82%, is located in Aysen and Magallanes regions at the southern tip of the country. Both these regions have nearly 50% of their territory within the SNASPE. Less than 1% of Antofagasta is protected, despite being of similar size to both of the southern regions. The desert, Patagonian steppe, Matorrales and sclerophyll wood regions are also considered to be inadequately protected (Ormazábal, 1986b). Of Chile's 17 ecological sub-regions, eight are well or adequately represented within the SNASPE, five are poorly represented, and four are not represented at

all (Valencia *et al.*, 1987). Studies carried out as part of the native vegetation classification project found that approximately 30 of the 83 different vegetation formations described are not represented in any protected area (Valencia *et al.*, 1987; Ramírez, pers. comm., 1991). Lack of protection is most pronounced in the Central Zone, and the northern regions, Antofagasta and Atacama (Ormazábal, 1986b).

National parks have not always been created in accordance with stated national objectives. Some were declared in order to stop agricultural colonisation or for political reasons, such as improving the country's international image (Contreras *et al.*, 1979). Therefore, several national parks do not fulfil the appropriate legal designation (Anon., 1983; Ormazábal, 1986b). In 1972, five national parks were established under provisions of Law No. 17699, but with no specified boundaries, management plans, or consideration of the fact that most of the land was privately owned (Anon., 1983).

Chile participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres) through CONAF. According to the definition provided by the network, Chile has developed a comprehensive national system (Ormazábal, 1988; FAO, n.d.).

Owing to the country's geographical diversity and the great differences between each protected area, there is no single solution to the problems of SNASPE (Ormazábal, 1986b). Special priority is given to incorporating under-represented ecosystems into SNASPE. This includes the Central Zone where degradation is most accelerated (CONAF, 1989; Ormazábal, 1986b). Incorporating more aquatic ecosystems into SNASPE, increasing staff salaries and providing more training opportunities are amongst the current aims of CONAF (CONAF, 1989).

#### Addresses

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**ANNEX**  
**Definitions of protected area designations, as legislated,**  
**together with authorities responsible for their administration**

**Title:** Act No. 18362 crea un Sistema Nacional de Areas Silvestres Protegidas del Estado (to create a National System of State Protected Wildland Areas)

**Date:** 8 November 1984 (but not in force)

**Brief description:** Unifies all previous protected area legislation by redefining designations and stating conservation objectives.

**Administrative authority:** Ministerio de Agricultura (Ministry of Agriculture), acting through the Corporación Nacional Forestal y de Protección de Recursos Naturales Renovables (National Corporation of Forests and the Protection of Renewable Natural Resources) (CONAF)

**Designations:**

**Parque Nacional (National Park)** An area, usually of considerable size, where ecosystems are found that are unique or representative of the natural ecological diversity of the country, and have not been spoilt by human interference. Research, educational and leisure activities are the only permitted uses.

**Monumento Natural (Natural Monument)**

An area, usually of no great extent, where native species of flora or fauna are found, or geological sites of educational, cultural, scientific or scenic importance.

**Reserva de Región Virgen (Wilderness Reserve)**

Any area where primitive natural conditions of wildlife, fauna, or human habitation exist, with no roads for motorised traffic and where all commercial exploitation is prohibited. These areas will remain untouched as far as possible, except for authorised scientific research and inspection by the Corporation. For all the above designations, hunting, killing or chasing wildlife specimens, destroying vegetation and nest sites and removing floral or fauna specimens are prohibited.

**National Reserve** Any area where resource conservation is required and special care exercised in their use. Flora and fauna may be used according to sound principles of sustainability.

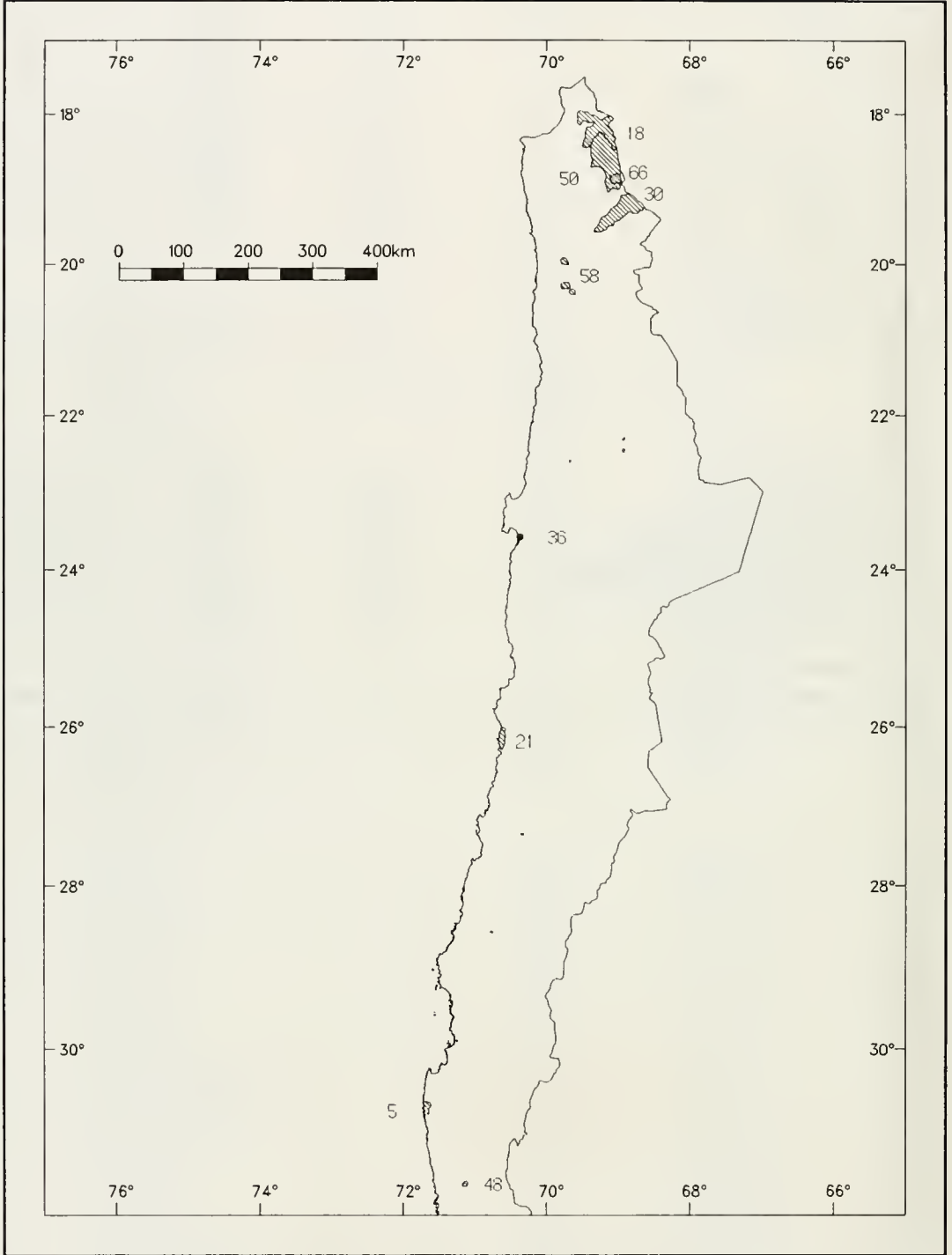
**Source:** Original legislation

## SUMMARY OF PROTECTED AREAS

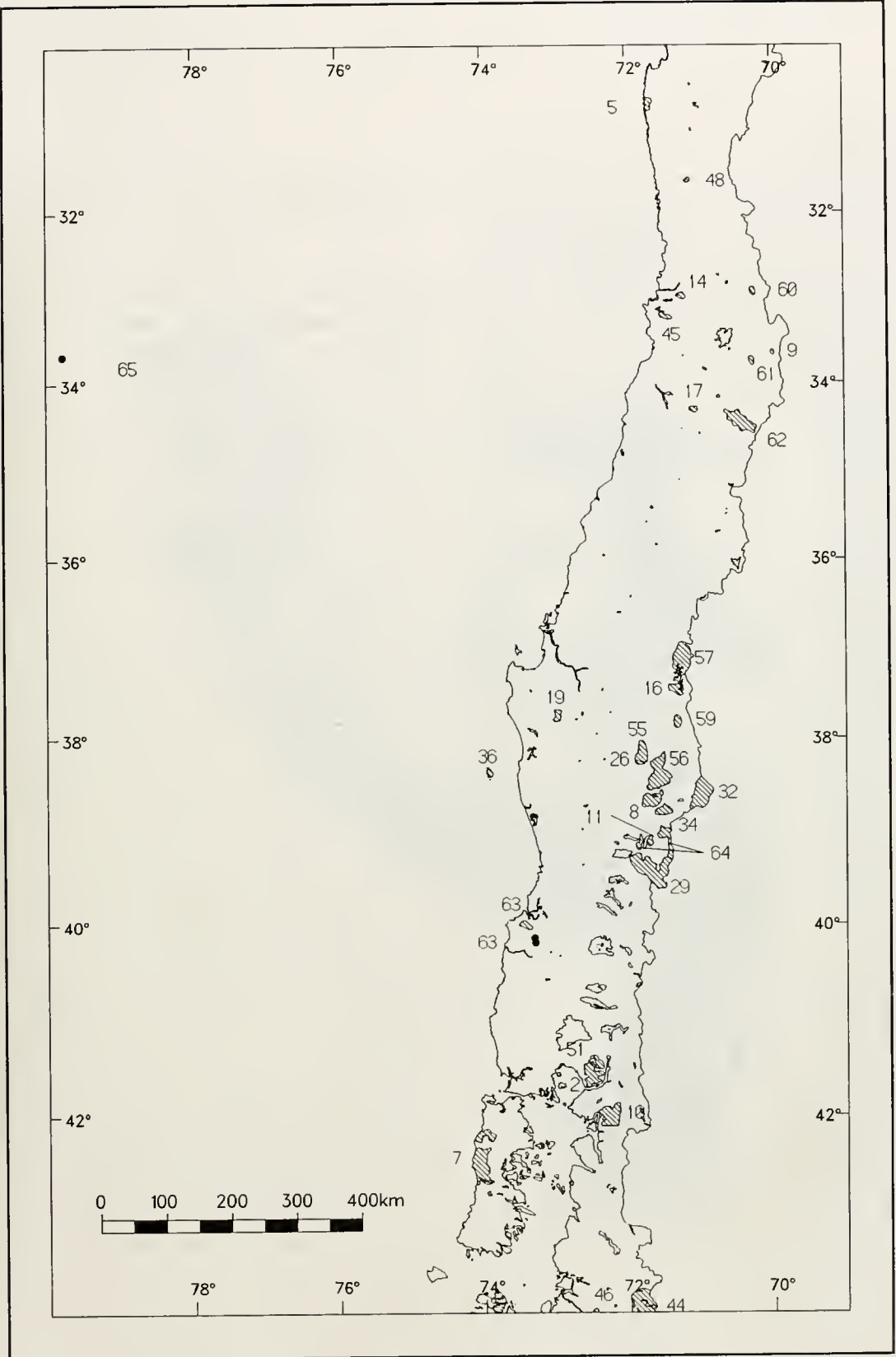
Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Alberto de Agostini	II	1,460,000	1965
2	Alerce Andino	II	39,255	1982
3	Archipiélago de Juan Fernández	II	9,109	1935
4	Bernardo O'Higgins	II	3,525,901	1969
5	Bosque Fray Jorge	II	9,959	1941
6	Cabo de Hornos	II	63,093	1945
7	Chiloé	II	43,057	1982
8	Conguillío	II	60,832	1950
9	El Morado	II	3,000	1974
10	Hornopirén	II	48,232	1988
11	Huerquehue	II	12,500	1967
12	Isla Guambin	II	10,625	1967
13	Isla Magdalena	II	157,640	1983
14	La Campana	II	8,000	1967
15	Laguna San Rafael	II	1,742,000	1959
16	Laguna del Laja	II	11,600	1958
17	Las Palmas de Cocalán	II	3,709	1972
18	Lauca	II	137,883	1970
19	Nahuelbuta	II	6,832	1939
20	Pali-Aike	II	3,000	1970
21	Pan de Azúcar	II	43,754	1986
22	Puyehue	II	107,000	1941
23	Queulat	II	154,093	1983
24	Rapa Nui (Easter Island)	II	6,666	1935
25	Río Simpson	II	40,790	1967
26	Tolhuaca	II	6,374	1935
27	Torres del Paine	II	181,414	1959
28	Vicente Pérez Rosales	II	226,305	1926
29	Villarrica	II	61,000	1940
30	Volcán Isluga	II	174,744	1967
<i>National Reserves</i>				
31	Alcalufes	IV	2,313,875	1969
32	Alto Bío-Bío	IV	35,000	1912
33	Cerro Castillo	IV	179,550	1970
34	China Muerta	IV	9,887	1968
35	Coihaique	IV	2,150	1948
36	Isla Mocha	IV	2,368	1988
37	Katalalixar	IV	674,500	1983
38	La Chimba	IV	2,583	1988
39	Lago Carlota	IV	27,110	1965
40	Lago Cochrane	IV	8,361	1967
41	Lago General Carrera	IV	178,400	1974
42	Lago Jeinimeni	IV	38,700	1967
43	Lago Las Torres	IV	16,516	1969
44	Lago Palena	IV	41,356	1965
45	Lago Peñuelas	IV	9,094	1952
46	Lago Rosselot	IV	12,725	1968
47	Laguna Parrillar	IV	18,814	1977
48	Las Chinchillas	IV	4,229	1983
49	Las Guaitecas	IV	1,097,975	1938
50	Las Vicuñas	IV	209,131	1983
51	Llanquihue	IV	33,972	1912
52	Los Flamencos	IV	73,987	1990

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
53	Magallanes	IV	13,500	1932
54	Malalcahuello	IV	17,530	1931
55	Malleco	IV	17,371	1907
56	Nalcas	IV	13,775	1967
57	Ñuble	IV	55,948	1978
58	Pampa del Tamarugal	IV	100,650	1988
59	Ralco	IV	12,421	1972
60	Río Blanco	IV	10,175	1932
61	Río Clarillo	IV	10,185	1982
62	Río de Los Cipreses	IV	38,582	1986
63	Valdivia	IV	9,727	1929
64	Villarrica	IV	60,005	1912
<i>Natural Monuments</i>				
65	Alerce Costero	III	2,308	1964
66	Salar de Surire	III	11,298	1983
<i>Biosphere Reserves</i>				
	Araucarias	IX	81,000	1983
	La CampanaPeñuelas	IX	17,095	1984
	Parque Nacional Fray Jorge	IX	14,074	1977
	Parque Nacional Juan Fernández	IX	9,290	1977
	Parque Nacional Laguna San Rafael	IX	1,742,448	1979
	Parque Nacional Lauca	IX	358,312	1981
	Parque Nacional Torres del Paine	IX	184,414	1978
<i>Ramsar Wetland</i>				
	Santuario Carlos Anwandter	R	4,877	1981

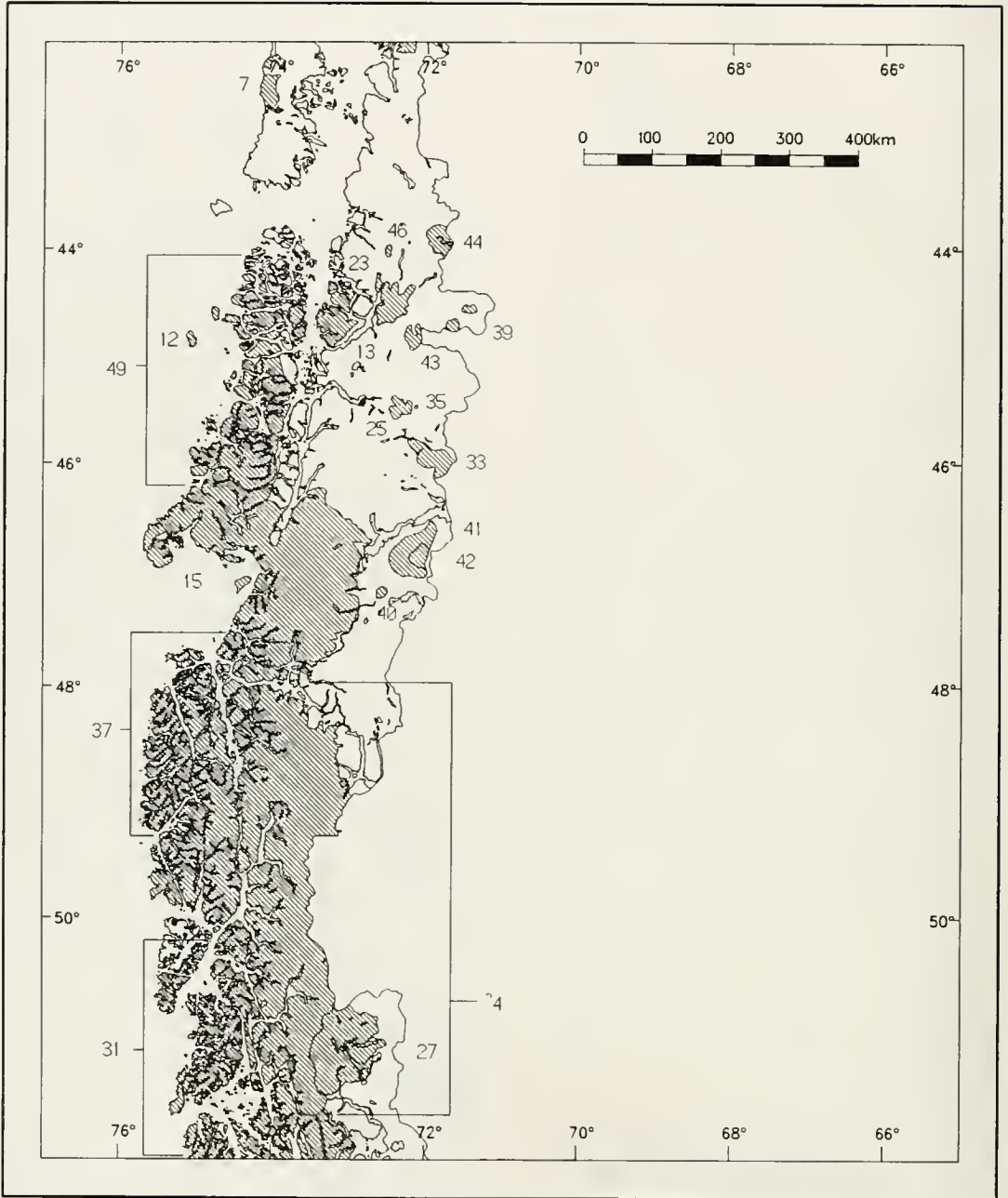




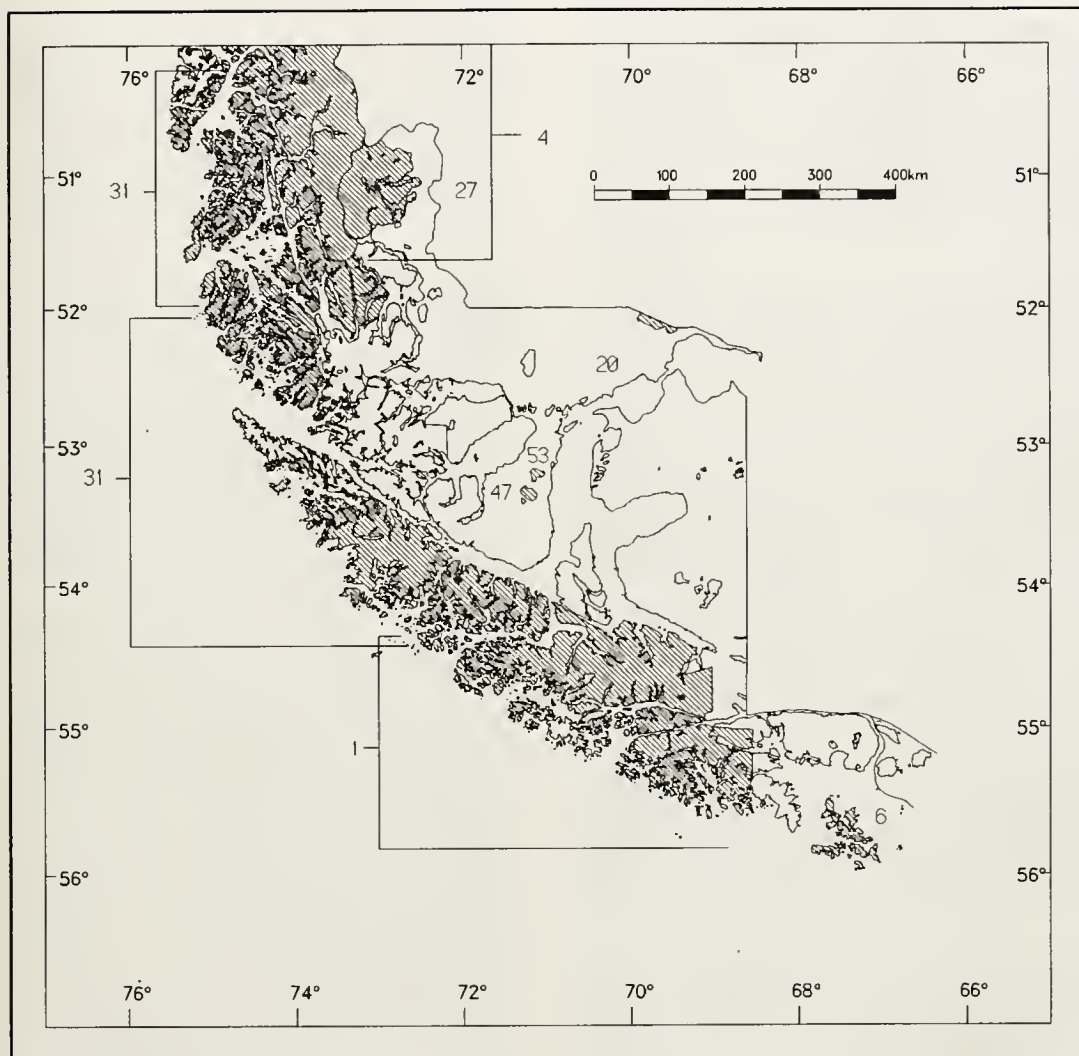
Protected Areas of Chile



Protected Areas of Chile



Protected Areas of Chile



Protected Areas of Chile





# COLOMBIA

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Area 1,141,748 sq. km

Population 32,978,000 (1990)

Natural increase: 1.85% per annum

## Economic Indicators

GDP: US\$ 1,316 per capita (*The Economist*, 1991)

GNP: US\$ 1,240 per capita (1988)

**Policy and Legislation** National conservation objectives are stated in legislation, with detailed definitions of management categories, allowing for the creation of a coherent national system of protected areas (Ormazábal, 1988). However, a comprehensive national conservation strategy (estrategia nacional para la conservación) that would reinforce the legislation and national system has not yet been formulated (INDERENA-DPN, 1991).

In 1987, the government initiated a policy of Opening of Parks (Apertura de Parques) to increase funding and public awareness of the national system of protected areas. Various projects have been implemented to encourage scientific research and recreation, to train students and professionals in conservation and protected area management, and to strengthen national support. A state-run Voluntary Park Guard Service (Servicio de Guardaparques Voluntarios) programme augments the regular body of park guards with seasonal workers and students (Castaño, 1989; INDERENA-DPN, 1991).

Colombia participates in the FAO Tropical Forest Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. In 1989, the National Planning Department (Departamento Nacional de Planeación) presented a Forest Action Plan (Plan de Acción Forestal) (PAFC). It interprets the global designs of the TFAP into a national plan according to Colombia's particular biological characteristics and objectives. A Special Secretariat (Secretaría Especial) was created within the National Planning Department to implement the PAFC, which contains 70 projects to develop, protect and improve forested areas. Four projects specifically involve protected areas in the natural national parks system, and include a proposal to enlarge the national system to incorporate more forest ecosystems (INDERENA-DPN, 1991; C. Castaño and H. Sánchez, pers. comm., 1991; C. Romero, pers. comm., 1991). The plan is in the process of implementation.

The first environmental legislation was the 1959 Law of National Forest Economy and the Conservation of Renewable Natural Resources (*Ley Sobre Economía Forestal de la Nación y Conservación de los Recursos Naturales Renovables*) which provided the general principles of conservation still in practice today (H. Sánchez, pers. comm., 1992). The

Ministry of Agriculture (Ministerio de Agricultura) is empowered to define areas which might later be developed as national parks, including all permanently snow-covered mountains and their surrounding areas. Over 55 million ha of forest reserves (reservas forestales) are declared under provision of this Law (INDERENA-DPN, 1991; Sánchez, 1990, cited in C. Castaño and H. Sánchez, pers. comm., 1991).

Decree No. 2420 (1968) provided for the creation of an organisation specifically responsible for natural resource management, the National Institute of Renewable Natural Resources and the Environment (Instituto Nacional de los Recursos Naturales Renovables y del Medio Ambiente) (INDERENA), and all protected area responsibilities were transferred to it. Decree No. 133 (1976) restructured INDERENA, expanding its range of responsibilities.

The principal current legislation is the National Code of Renewable Natural Resources and Protection of the Environment (Código Nacional de los Recursos Naturales Renovables y de Protección al Medio Ambiente), Decree No. 2811 of 18 December 1974. All natural resources are declared as state property, private rights to which are subject to specific conditions. Private land may be expropriated for the creation of protected areas, where necessary. The Code provides the basis for natural resource protection, scientific investigation, and environmental education, by stating national conservation objectives. Regulations for natural resource use are detailed, and provision made for forest reserves. The system of national parks (sistema de parques nacionales) is defined as a conjunction of areas of exceptional national value established to conserve flora, fauna, ecosystems, cultural or historical specimens, and collectively attain national conservation objectives. Definitions are given of the six management categories employed in the system (see Annex). Further details of protected area management and prohibitions will be given in regulations pertaining to the Code.

Decree No. 622 (1977) regulates all articles of the Code relating to the national parks system, referring to it as the natural national parks system (sistema de parques nacionales naturales), and provides specific guidance for administration and management. Provision is made for protected areas to be subdivided into management zones providing different degrees of protection: these range from intangible to high density use (see Annex). A master plan, giving details of development, management and conservation objectives, must be drawn up for each area, following the zonation system. The regulations state that national parks and other protected areas are compatible with indigenous reserves and *resguardos*, and where indigenous groups occupy areas in the national system, an agreement will be reached between the respective agencies to allow coexistence and

compliance with established conservation aims (see Systems Review). An extensive list of prohibitions is given, including all forms of natural resource exploitation except under authorisation from INDERENA.

Prohibited activities and penalties imposed for illegal exploitation of natural resources and colonisation in protected areas are also given in the General National Penal Code (Código General Nacional Penal), 1981. Penalties include imprisonment and fines.

Colombia acknowledges indigenous rights of land ownership, and has adopted a series of legal measures following these principles. Legislation defines two types of indigenous areas: *resguardos* are traditionally inhabited lands communally owned by indigenous peoples through a legal title (C. Romero, pers. comm., 1992), and indigenous reserves (*reservas indígenas*) which are territories provisionally assigned to a particular indigenous community for their own use but the actual ownership of the land and its subsoil remains in the hands of the state (C. Romero, pers. comm., 1992). Current environmental legislation and policy providing for the establishment of protected areas is compatible with the system of *resguardos* and indigenous reserves; in most cases, the indigenous communities use natural resources on a sustainable basis (Castaño, 1989; 1992).

Although the legislation details national conservation objectives, the lack of a national conservation strategy providing for their implementation gives rise to conflict between governmental institutions over land use and ownership rights (INDERENA-DPN, 1991). These conflicts of interest are one of the most serious threats to the protected area system. A national conservation strategy would allow for land ownership and be given priority and political support by the government (INDERENA-DPN, 1991).

**International Activities** Colombia signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940. It is one of the eight countries with territory in the Amazon region that signed the Amazon Cooperation Treaty (Tratado de Cooperación Amazónica) on 3 July 1978, an agreement to regulate and promote cooperation in natural resources management. The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and the related Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region were both signed by Colombia on 24 March 1983 and ratified on 3 March 1988. The second protocol, Protocol Concerning Specially Protected Areas and Wildlife (SPAW), was signed by Colombia in June 1991, but has not yet been ratified.

Colombia ratified the Convention concerning the Protection of the World Cultural and Natural Heritage

(World Heritage Convention) on 24 May 1983, but no natural sites have been inscribed to date, and participates in the Unesco Man and the Biosphere Programme with three biosphere reserves inscribed in 1979.

Colombia has signed an agreement with the Venezuelan government to protect El Tamá Transfrontier National Park. Further details are not yet available.

Since 1992, the National Planning Department has been collaborating with INDERENA, autonomous regional corporations and local non-governmental organisations (NGOs) to obtain international support for the protected area system by means of a programme comprising 200 environmental projects (M. Kelsey, pers. comm., 1992).

**Administration and Management** Since its creation in 1968, INDERENA has been responsible for formulating conservation policies and managing natural resources and protected areas. INDERENA is part of the Ministry of Agriculture, and comprises a Directive Committee (Junta Directiva) at its head, with the General Management (Gerencia General) below. Within the General Management are four sub-managements: finance and administration; environment; development; and forests and waters, under which is the National Parks Division (División de Parques Nacionales) (DPN), the department responsible for the actual management of protected areas in the national natural parks system.

The DPN implements the policies of INDERENA and is responsible for planning, coordinating and regulating the programmes of the national system of protected areas. The total number of personnel employed in the national system is 287, comprising professionals, administrative and technical staff and labourers, including park guards. The responsibilities of INDERENA with respect to the national system were established by decree in 1989, and include the declaration and delimitation of protected areas, and their regulation and administration *via* the DPN (INDERENA-DPN, 1991; C. Castaño and H. Sánchez, pers. comm., 1991).

Forest reserves are managed by INDERENA under the 1959 legislation (FAO, 1991). The Colombian Institute of Agrarian Reform (Instituto Colombiano de la Reforma Agraria) (INCORA) is responsible for establishing the system of indigenous reserves known as *resguardos*, and for regulating forest resource use in these areas (FAO, 1991). Forest reserves do not form part of the national system of protected areas.

INDERENA is responsible for natural resource management at the national level, but there are autonomous regional corporations (*corporaciones regionales*) throughout the country, responsible for resource regulation in their particular regions. Where this occurs, an agreement is reached between INDERENA and the regional corporation to coordinate the management of protected areas in the region. Some administrative functions may be delegated to the regional corporation, although INDERENA remains the



ultimate administrative authority (C. Castaño and H. Sánchez, pers. comm., 1991; C. Romero, pers. comm., 1991). For example, the Cauca Valley Autonomous Regional Corporation (Corporación Autónoma Regional del Valle del Cauca) (CVC) manages around 25% of Farallones de Cali Natural National Park in conjunction with INDERENA (Anon., 1989; C. Castaño and H. Sánchez, pers. comm., 1991). Regional corporations carry out other conservation activities in their region involving parts of the national system. Similiar agreements may also be reached between INDERENA and NGOs.

There are a number of NGOs working in environmental issues. Among the largest is the Nature Foundation (Fundación Natura), established in 1985, which has signed an agreement with INDERENA to cooperate in the management of some protected areas (INDERENA-DPN, 1991). Through an agreement with a private national company, the Nature Foundation shares ownership and management of a scientific reserve, and three national parks as well as managing several private reserves (Fundación Natura, 1990; C. Romero, pers. comm., 1991, M. Kelsey, pers. comm., 1992). The Sierra Nevada de Santa Marta Support Foundation (Fundación Pro-Sierra Nevada de Santa Marta) is also directly involved in protected area management, concerned with promoting scientific research, training programmes and inter-institutional support for Sierra Nevada de Santa Marta Natural National Park (IUCN/ITTO, 1991; Maldonado, pers. comm., 1991). The Green Heritage Foundation (Fundación Herencia Verde) works closely with autonomous regional corporations in buffer zone management, and also in the Chocó (M. Kelsey, pers. comm., 1992). The Foundation for Higher Education (Fundación para la Educación Superior) (FES), in conjunction with WWF, established a community nature reserve in 1982 for educational and conservation purposes, which it now manages (Orejuela, 1985; Samper and Orejuela, n.d.).

A regional Conservation Data Centre (Centro de Datos para la Conservación) has been established within the Cauca Valley Autonomous Regional Corporation to compile and process information on the biology and distribution of endangered plant and animal species, and the current situation of protected areas in the south-west. This information enables conservation programmes to be formulated at the species or at the regional level (Z. Piñeros, pers. comm., 1991).

Problems with protected area management arise from the internal organisation of INDERENA. The subordinate position of the DPN within INDERENA has reduced its operative ability, and given rise to conflict between central administration and regional offices (INDERENA-DPN, 1991). In response to these problems and the weak management of natural resources, the government is working in coordination with the National Planning Department and INDERENA to create a Ministry of the Environment (Ministerio de Medio Ambiente)

specifically responsible for formulating environmental policies and managing natural resources. The Ministry of the Environment will include a National Parks Directorate (Dirección de Parques Nacionales) to improve the efficiency of protected area administration and management (Castaño, 1992; C. Castaño and H. Sánchez, pers. comm., 1991). At present, lack of funds reduces administrative capacity by a shortage of human resources and equipment (IUCN/ITTO, 1991).

The DPN has proposed a project to improve conservation measures in the Pacific region, principally by strengthening protected area administration (INDERENA-DPN, 1991). Decentralisation of INDERENA is recommended, together with implementing the proposed internal restructuring and increasing training programmes for personnel.

**Systems Reviews** Colombia is a country of great geographical contrast, resulting in a diversity of ecosystems, species richness and endemism (Castaño, 1989; González *et al.*, 1989). A number of major waterways are found in the country, including the Orinoco and the Amazon river systems. As a result of its varied topography, with altitudes ranging from sea level to 5,755m, and coasts on both the Caribbean Sea and the Pacific Ocean, Colombia has one of the highest levels of species diversity in the world (Carrizosa, 1990, cited in IUCN/ITTO, 1991; INDERENA-DPN, 1991).

The country may be divided into five main biogeographical regions or provinces: Orinoquia, Amazonia, Andes, Caribbean and Chocó (C. Castaño and H. Sánchez, pers. comm., 1991). The Orinoquia province covers the lowlands of the Orinoco River drainage system, with elevations from 100m to 500m. Most of this region is covered by natural savanna grassland, and the occurrence of fires, both natural and man-made, is the most significant factor causing changes in vegetation composition and soil degradation. The Amazonian province is an alluvial plain with a relatively uniform relief, an annual rainfall of 2,500mm and annual temperature of more than 24°C, which accounts for around one-third of total land area (C. Castaño and H. Sánchez, pers. comm., 1991). The Amazonian region is crossed by a complex of waterways, and is very rich in species diversity.

The Andean Complex is characterised by typical floral and faunal species found throughout the central and southern Andes. Three main mountain ranges run parallel from north to south, producing distinct regions separated by valleys and the rivers Cauca and Magdalena: the Western Cordillera, the lowest; the Cordillera Central, the oldest and highest in altitude; and the Eastern Cordillera or Real del Ecuador. Some of the species present in the three cordilleras are similar but a high degree of endemism is found in each (C. Castaño and H. Sánchez, pers. comm., 1991).

The Caribbean complex and Massif of the Sierra Nevada de Santa Marta comprise a province that contains several



different vegetation types, from montane forest to mangroves (C. Castaño and H. Sánchez, pers. comm., 1991). The massif of Santa Marta is the highest coastal range in the world and is completely isolated from the other mountain ranges (Adams, n.d.). With altitudes ranging from sea level to 5,775m, the Santa Marta mountains contain all of the altitudinal zones found in the country, and has a biota related to that of the Andes, but with a highly endemic component.

The Chocó province in the Pacific coastal region, where 17% of the total population is located, is characterised by humid rain forest, except in the south where there are periods of drought. Representatives of most of the ecosystems found in the country are present here, including mangrove forests and coral reefs. Some species are similar to those of the Amazonian region, and it is thought that many of these plant and animal species originated in the Chocó region and migrated outwards. A high degree of endemism is found (C. Castaño and H. Sánchez, pers. comm., 1991).

Natural resource protection was initiated by Colombia's participation in the 1940 Western Hemisphere Convention, as a result of which hunting and fishing in the Muña River was prohibited in 1943. The first protected area, a natural reserve, was declared in 1948, but it was not until 1959, when the first piece of environmental legislation was passed, that conservation principles and regulations for natural resource use were described and a legal framework for the establishment of national parks provided (INDERENA-DPN, 1991; C. Castaño and H. Sánchez, pers. comm., 1991). Several parks were declared during the 1960s by the Colombian Institute of Agrarian Reform (INCORA) and are managed by autonomous regional corporations. Following the creation of INDERENA in 1968, protected area management was unified into one organisation (González *et al.*, 1989; C. Castaño and H. Sánchez, pers. comm., 1991, 1992).

Colombia has a coherent and coordinated national system of protected areas, following the definition given by the FAO Latin American Network (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres). This stipulates that protected areas should be unified by comprehensive legislation, stating national conservation objectives and giving detailed definitions of the management categories used, and that there is coordination between the administration of each area so that they may collectively attain national objectives (Ormazábal, 1988). Colombia is the Regional Coordinator of the Latin American Network programme (C. Castaño and H. Sánchez, pers. comm., 1991).

By 1991, the national natural parks system comprised 42 conservation units, covering 9,016,893ha or 8.6% of the total land area (INDERENA-DPN, 1991; C. Castaño and H. Sánchez, pers. comm., 1991). The protected area system contains 44% of the country's ecosystems (IUCN/ITTO, 1991). There is a high representation of

mountain areas, particularly the Andean region and the Sierra Nevada de Santa Marta (Castaño, 1989; C. Castaño and H. Sánchez, pers. comm., 1991). The Chocó biogeographical province in the Pacific region is the most under-represented of all the provinces. As part of the Forestry Action Plan, the DPN proposed a project to strengthen and expand the system of national parks and protected areas in the Pacific region (INDERENA-DPN, 1991).

As well as the national system of protected areas, Colombia has a system of indigenous reserves known as *resguardos* which are community-owned areas and cannot be sold. Since 1968 the government, through the Colombian Institute of Agrarian Reform (INCORA), has established over 300 *resguardos* and reserves totalling around 26 million ha (C. Castaño, pers. comm., 1991). The 1977 Regulations state that protected areas and *resguardos* are compatible, and can coordinate management to attain conservation objectives. In fact, 20 of the 42 units which comprise the protected area system contain indigenous communities (Castaño, 1992). An important step in protecting the Amazonian region was taken in 1988 by INCORA, by declaring 6 million ha of rain forest as an indigenous reserve. Together with the national parks in the area, 5.3 million ha of Amazonian rain forest is now under protection either as indigenous land which cannot be exploited by government concessions, or as part of the national system of protected areas (Bunyard, 1989).

However, the integrity of protected areas is threatened by a lack of state control in rural areas, and civil unrest, guerrilla activities and drug trafficking. The lack of trained personnel in the national park system and shortage of funds available exacerbate the problem (IUCN/ITTO, 1991).

## Addresses

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ANNEX

Definition of protected area designations as legislated,  
together with authorities responsible for their administration

**Title:** Código Nacional de Recursos Naturales Renovables y de Protección al Medio Ambiente (National Code of Renewable Natural Resources and the Protection of the Environment), Decree Law No. 2811

**Date:** 18 December 1974

**Brief description:** Natural resources and the environment are the property of the state, and their protection is in the public interest. The system of national parks (sistema de parques nacionales) is described as a union of protected areas with the objectives of conserving examples of outstanding ecological, historical, cultural or scenic value, and promoting the continuity of natural processes and maintaining biological diversity. Management categories employed in the system are defined.

**Administrative authority:** Instituto Nacional de los Recursos Naturales Renovables y del Ambiente (National Institute of Renewable Natural Resources and the Environment) (INDERENA), within the Ministerio de Agricultura (Ministry of Agriculture)

**Designations:**

**Parque Nacional (National Park)** An area that has not been significantly altered by man and contains floral or faunal species, geological formations, cultural or historical examples of scientific, educational or national importance.

Must be large enough to allow the continuation of natural ecological processes

Only conservation, research, educational or recreational activities are permitted, with prior authorisation from INDERENA.

**Reserva Natural (Natural Reserve)** An area containing floral or faunal species that, owing to its natural characteristics, is suitable only for conservation and scientific research purposes.

Only activities relating to conservation, scientific research or education are permitted, with prior authorisation from INDERENA.

**Area Natural Unica (Unique Natural Area)** An area containing singular examples of floral or faunal species or of exceptional natural scenic beauty.

Only conservation, scientific research or educational activities are permitted, with prior authorisation from INDERENA.

**Santuario de Flora (Floral Sanctuary)** An area set aside for the conservation of flora species or communities

Only activities relating to conservation, scientific research, education or management, with the aim or recuperation, are permitted. Prior authorisation from INDERENA required

**Santuario de Fauna (Faunal Sanctuary)** An area set aside for the conservation of species or communities of wildlife

Permitted activities as for Floral sanctuary

**Vía Parque (Parkway)** An area bordering a road that contains ecosystems, or historic or cultural examples of national interest

Conservation, educational and recreational activities are permitted.

**Source:** Original legislation

**Title:** Decree No. 622, Reglamento parcial del Decreto Ley No. 2811 de 1974 sobre el Sistema de Parques Nacionales, la Ley 23 de 1973 y la Ley 2a de 1959 (Partial regulation of Decree Law No. 2811 of 1974, of Law No. 23 of 1973 and Law No. 2a of 1959)

**Date:** 16 March 1977

**Brief description:** The conservation objectives of the national natural park system are restated and detailed regulations for protected area management are given. The six categories of protected area described by Decree Law No. 2811 are to be sub-divided into different management zones, as defined under these regulations. A master management plan is to be drawn up for each protected area, following this system of zonation. General prohibitions are given. National natural parks are compatible with indigenous reserves and indigenous communities will not be removed from protected areas, but an agreement will be reached between the respective administrative authorities to comply with the state conservation objectives.

**Administrative authority:** INDERENA, within the Ministry of Agriculture

**Designations:**

***Parque Nacional Natural (Natural National Park), Reserva Natural (Natural Reserve), Area Natural Unica (Unique Natural Area), Santuarios de Fauna y Flora (Floral and Faunal Sanctuaries) and Vía Parque (Parkway)*** Shall be sub-divided into the following management zones:

***Zona Primitiva (Primitive Zone) Zone*** Unaltered or only minimally altered by human intervention and remains in its natural state

***Zona Intangible (Intangible Zone)*** Area in which the environment has maintained its integrity, although there may be some human intervention

***Zona de Recuperación Natural (Natural Recuperation Zone)*** Area which has been substantially altered and is to be restored, by suitable methods, to its natural state. Once recovered, the zone will be assigned to the appropriate category.

***Zona Histórico/Cultural (Historical/Cultural Zone)*** Area where archaeological or historic relics are found, or where cultural events of national importance occurred.

***Zona de Recreación General Exterior (General External Recreation Zone)*** Area which, owing to its natural characteristics, offers certain recreational facilities, without requiring or causing significant alteration to the environment

***Zona de Alta Densidad de Uso (High-Density Use Zone)*** Area where natural characteristics and location allow recreational and educational activities to take place, producing the least amount of environmental alteration as possible

***Zona Amortiguadora (Buffer Zone)*** An area in which the human intervention in the surrounding zones is diminished, to prevent such activities causing disturbances or alterations to ecosystem and wildlife of those areas.

**Source:** Original legislation



## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Natural National Parks</i>			
1	Amacayacú	II	293,000	1975
2	Cahuinari	II	575,500	1987
3	Catatumbo-Barí	II	158,125	1989
4	Chingaza	II	50,374	1977
5	Chiribiquete	II	1,280,000	1989
6	Corales del Rosario	II	19,506	1977
7	Cordillera de los Picachos	II	439,000	1989
8	Cueva de los Guácharos	II	9,000	1960
9	El Cocuy	II	306,000	1977
10	El Tuparro	II	548,000	1970
11	Farallones de Cali	II	150,000	1968
12	Isla Gorgona	II	49,200	1984
13	Isla de Salamanca	II	21,000	1969
14	La Paya	II	422,000	1984
15	Las Hermosas	II	125,000	1977
16	Las Orquideas	II	32,000	1974
17	Los Katíos	II	72,000	1973
18	Los Nevados	II	58,300	1959
19	Macuira	II	25,000	1977
20	Munchique	II	44,400	1977
21	Nevado del Huila	II	158,000	1977
22	Paramillo	II	460,000	1977
23	Pisba	II	45,000	1977
24	Puracé	II	83,000	1968
25	Sanquianga	II	80,000	1977
26	Sierra Nevada de Santa Marta	II	383,000	1964
27	Sierra de la Macarena	II	630,000	1989
28	Sumapáz	II	154,000	1977
29	Tamá	II	48,000	1977
30	Tatamá	II	54,300	1987
31	Tayrona	II	15,000	1964
32	Tinigua	II	201,785	1989
33	Utría	II	54,300	1987
	<i>Natural Reserve</i>			
34	Laguna de Sonso	IV	2,045	1979
	<i>Fauna and Flora Sanctuaries</i>			
35	Ciénaga Grande de Santa Marta	IV	23,000	1977
36	Galeras	IV	17,600	1985
37	Iguaque	IV	6,750	1977
38	Los Colorados	IV	1,000	1977
39	Los Flamencos	IV	7,000	1977
	<i>Natural National Reserves</i>			
40	Nukak	I	855,000	1989
41	Puinawúai	I	1,092,000	1989
	<i>Special Management Areas</i>			
42	Ariari-Guayabero	VIII	1,022,339	1989
43	La Macarena Norte	VIII	467,010	1989
44	La Macarena Sur	VIII	33,200	1989
	<i>Forest Reserves</i>			
45	Amazonía	VIII	32,632,920	1959

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
46	Central	VIII	1,619,800	1959
47	Pacífico	VIII	7,398,075	1959
48	Río Magdalena	VIII	2,107,750	1959
49	Serranía de Los Motilones	VIII	477,978	1959
50	Sierra Nevada de Santa Marta	VIII	600,000	1959
51	Sierra del Cocuy	VIII	579,250	1959
<i>Protection Forest Reserves</i>				
52	Bosque Oriental de Bogotá	V	17,625	1976
53	Caños La Esperanza, Negro y la Lindosa	V	5,600	1982
54	Cerro Quinini	V	1,800	1987
55	Cuchilla Penas Blancas	V	1,630	1983
56	Cuchilla Sucunuca	V	1,710	1989
57	Embalse El Peñol-Río Guatapé	V	13,100	1985
58	Escarpas Occidental y Malpaso	V	3,160	1982
59	Frontera Colombo-Panameña	V	62,375	1977
60	Lago Sochagota	V	8,150	1986
61	Laguna La Cocha y Cerro de Patascoy	V	8,500	1973
62	Páramo El Atravesado	V	3,044	1971
63	Páramo Urrao	V	4,000	1975
64	Páramo de Chingaza	V	20,000	1971
65	Páramo de Sumapaz	V	30,000	1971
66	Predio La Bolsa	V	2,700	1990
67	Predio La Planada	V	1,667	1984
68	Predio Río Sucio	V	1,360	1987
69	Quebrada La Tablona #1	V	1,420	1981
70	Quebrada La Tablona #2	V	2,700	1991
71	Quebrada Mutatá	V	1,500	1985
72	Quebrada Piedras Blancas	V	11,825	1970
73	Río Algodonal	V	8,200	1984
74	Río Blanco-Olivares	V	4,900	1989
75	Río Cravo Sur	V	5,000	1985
76	Río Las Ceibas	V	6,370	1983
77	Río León	V	29,000	1971
78	Río Mocoa	V	34,500	1984
79	Río Nembí	V	5,800	1984
80	Río San Francisco	V	2,880	1981
81	Río Satocá	V	4,200	1989
82	Río Tame	V	1,900	1985
83	Río Tejo	V	2,500	1984
84	Ríos Blanco y Negro	V	11,925	1982
85	Ríos Chorreras-Concepción	V	4,450	1991
86	Ríos Escalarete-San Cipriano	V	5,400	1982
87	Serranía de Coraza y Montes de María	V	6,370	1983
88	Sierra El Peligro	V	1,650	1988
89	Zona Musinga-Carauta	V	4,000	1975
<i>Indigenous Reserves</i>				
90	Afilador	VII	9,325	
91	Alto Río Guainía	VII	477,200	
92	Alto y Medio Río Inirida	VII	2,762,500	
93	Bajo Río Guainía y Río Negro	VII	759,200	
94	Barrancón	VII	2,500	
95	Caimán Nuevo	VII	7,500	
96	Carraipía	VII	5,115	
97	Corocito Yopalito Gualabó	VII	8,257	
98	Cuiari-Isana	VII	926,500	
99	El Unuma	VII	1,273,600	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
100	La Fuga	VII	8,360	
101	La Sal	VII	3,275	
102	Luzón	VII	2,500	
103	Macucuana	VII	5,700	
104	Medio Río Guainia - Serrania Naquen	VII	853,320	
105	Motilón Barí	VII	83,000	
106	Paujü	VII	52,120	
107	Río Atabapo	VII	513,720	
108	Río Verde	VII	9,200	
109	Ríos Muco y Guarrojo	VII	84,000	
110	San José de Lipa	VII	18,500	
111	San Rafael, Abaribá, Ibibi	VII	61,525	
112	Santa Rosa de Sucumbíos	VII	5,129	
113	Santa Rosa del Guamuez	VII	3,750	
114	Tauretes Agua Blanca	VII	8,000	
115	Yarina	VII	9,813	
	<i>Resguardos</i>			
116	Aduche	VII	370,100	
117	Agua Clara y Bella Luz del Río Ampora	VII	9,850	
118	Agua Negra	VII	2,000	
119	Aguanegra	VII	1,474	
120	Almidón-La Ceiba	VII	40,960	
121	Alta y Media Guajira	VII	959,104	
122	Alto Río Bojayá	VII	50,160	
123	Alto Río Buey	VII	13,151	
124	Alto Río Cuta	VII	22,362	
125	Alto Río Tagachí	VII	21,260	
126	Alto del Rey	VII	1,244	
127	Amenanac o Charco del Niño Dios	VII	6,990	
128	Arara	VII	12,300	
129	Arhuaco de la Sierra Nevada	VII	195,900	
130	Arquíá	VII	2,343	
131	Arrecifal	VII	4,560	
132	Atana Pirariami	VII	48,800	
133	Avirama	VII	2,518	
134	Bachaco Buena Vista	VII	73,280	
135	Bajo Río Vichada o Santa Rita	VII	424,320	
136	Barranco Ceiba y Laguna Araguato	VII	24,940	
137	Barranquito Laguna Colorado	VII	19,132	
138	Belaicazar	VII	6,000	
139	Bellavista y Unión Pitalito o Río Siguirisua	VII	29,260	
140	Beté, Auro Beté y Auro del Buey	VII	11,580	
141	Buenvista	VII	4,500	
142	Burujón o La Unión San Bernardo	VII	6,960	
143	Cabeceras o Puerto Pizarío	VII	2,920	
144	Caimanero de Jampapa	VII	1,742	
145	Calenturas	VII	3,066	
146	Calle Santa Rosa	VII	21,320	
147	Campoalegre y Ripialito	VII	7,815	
148	Cañamoho	VII	1,036	
149	Caño Bachaco	VII	6,074	
150	Caño Bocón Brazo Amanaven	VII	10,085	
151	Caño Cavasi	VII	36,000	
152	Caño Guáripa	VII	7,705	
153	Caño Jabón	VII	9,040	
154	Caño La Hormiga	VII	4,327	
155	Caño Mochuelo - Hato Corozal	VII	94,600	

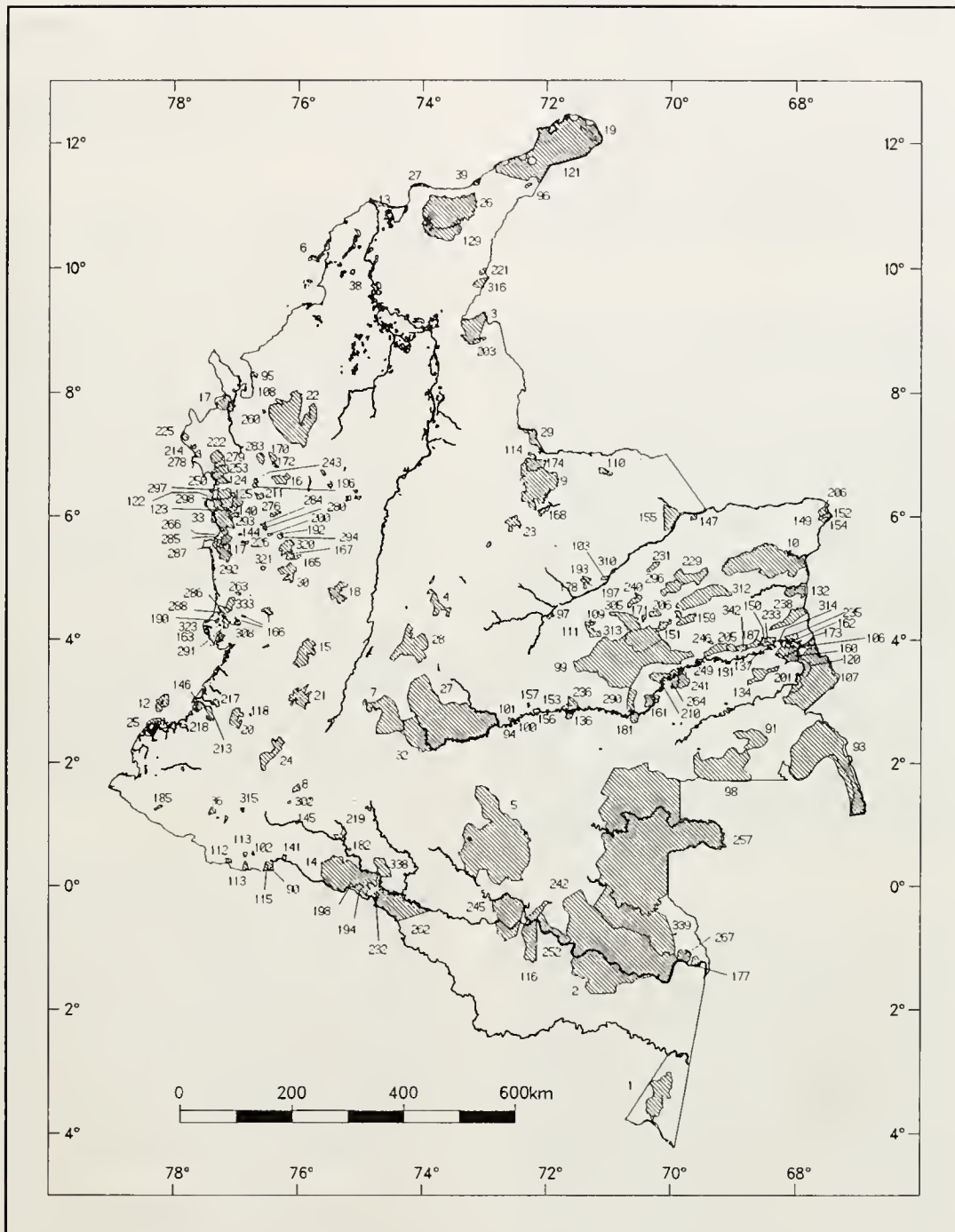
Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
156	Caño Negro	VII	1,833	
157	Caño Ovejas o Betania-Corocito	VII	1,720	
158	Caño Zama	VII	73,380	
159	Caños Cuna Tsepajibo Warracaña	VII	56,000	
160	Caranacoa-Yurí-Laguna Morocoto	VII	45,840	
161	Carpintero Palomas	VII	40,680	
162	Carrizal	VII	9,870	
163	Chachajo	VII	2,240	
164	Chagpién-Tordó	VII	22,460	
165	Chamí Margen Izquierda R S Juan	VII	7,030	
166	Chamí Río Garrapatas	VII	15,730	
167	Chamí Río San Juan Margen Derecha	VII	17,770	
168	Chaparral-Barronegro	VII	14,230	
169	Chimborazo	VII	2,112	
170	Chimuro y Nedo	VII	13,185	
171	Chololobo-Matatu	VII	6,385	
172	Chuscal y Tuguriducito	VII	5,122	
173	Coayare-El Coco	VII	11,840	
174	Cobaría	VII	45,400	
175	Coconuco	VII	3,424	
176	Colimbs	VII	1,600	
177	Comeyafú	VII	19,180	
178	Consejo	VII	4,500	
179	Coquiona	VII	6,239	
180	Córdoba	VII	4,000	
181	Corocoro	VII	33,500	
182	Coropoya	VII	3,923	
183	Cota	VII	1,859	
184	Cuaiquer o Awua del Alto Albí	VII	4,760	
185	Cuambí -Yaslambí	VII	3,000	
186	Cuayuyaco	VII	1,260	
187	Cumaral Brazo Amanaven	VII	23,355	
188	Cumbal	VII	8,000	
189	Cusay o la Colorada	VII	1,200	
190	Docordó-Balsalito	VII	4,140	
191	Egua Guariacana	VII	15,390	
192	El Doce o Quebrada Borbollón	VII	1,185	
193	El Duya, San Juanito y Paravare	VII	21,300	
194	El Hacha	VII	6,637	
195	El Quince	VII	1,200	
196	El Saladillo	VII	1,595	
197	El Suspiro o Rincón del Socorro	VII	1,978	
198	El Tablero	VII	4,336	
199	El Unuma	VII	418,840	
200	El Veinte, Playalta y El Noventa	VII	3,334	
201	El Venado	VII	34,160	
202	El Zaino, Guayabito, Muriaytuy	VII	1,175	
203	Gabarra Catalaura	VII	13,300	
204	Gaño Claro	VII	1,633	
205	Giro Brazo Amanaven	VII	20,310	
206	Guacamayas-Mamiyare	VII	18,700	
207	Guachavez	VII	1,052	
208	Guachicono	VII	13,932	
209	Guachucal	VII	3,000	
210	Guaco Bajo y Guaco Alto	VII	49,660	
211	Guaguando	VII	13,260	
212	Guambia	VII	18,529	



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
213	Guangüí	VII	24,100	
214	Guayabal de Partadó	VII	4,376	
215	Honduras	VII	21,121	
216	Huila	VII	41,402	
217	Iguana	VII	10,900	
218	Infí	VII	4,200	
219	Inga de Nineras	VII	3,394	
220	Ipiales	VII	5,156	
221	Iroka	VII	8,600	
222	Jagual-Río Chintadó	VII	28,175	
223	Jambaio	VII	23,476	
224	Jirijiri	VII	4,960	
225	Juradó	VII	16,700	
226	Kananeruba	VII	9,150	
227	Kilómetro 6 y 11 - Carretera Leticia-Tarapacá	VII	7,500	
228	La Esmeralda	VII	2,762	
229	La Llanura	VII	74,000	
230	La Montana	VII	20,300	
231	La Pascua	VII	19,120	
232	La Samaritana	VII	4,185	
233	Laguna Anguilla-La Macarena	VII	16,130	
234	Laguna Curvina-Sapuara	VII	3,350	
235	Laguna Negra y Cacao	VII	18,480	
236	Macuare	VII	24,000	
237	Mallama	VII	1,281	
238	Matavén Fruta	VII	84,453	
239	Mayasquer	VII	3,000	
240	Merey La Veraita	VII	3,107	
241	Ministas Miralindo	VII	40,200	
242	Mirití-Paraná	VII	1,162,500	
243	Mocagua, Macedonia, El Vergel y Zaragoza	VII	16,750	
244	Mondo-Mondocito	VII	1,232	
245	Monochoa	VII	376,800	
246	Morocoto Buenavista	VII	49,940	
247	Mosoco	VII	12,025	
248	Muellanues	VII	2,000	
249	Murciélago-Altamira	VII	7,960	
250	Napipí	VII	21,910	
251	Nazareth	VII	1,300	
252	Nunuya de Villazul	VII	142,620	
253	Opogadó	VII	29,020	
254	Panam	VII	4,000	
255	Pancitara	VII	9,636	
256	Papayo	VII	2,460	
257	Parte Oriental del Vaupés	VII	3,354,097	
258	Pioya	VII	1,600	
259	Pirayo	VII	5,000	
260	Polines	VII	2,538	
261	Potosí	VII	1,800	
262	Predio Putumayo	VII	5,230,552	
263	Puadó, Mataré, La Lerma Y Terdó	VII	12,662	
264	Pueblo Nuevo Laguna Colorada	VII	44,845	
265	Pueblo Nuevo	VII	5,000	
266	Puerto Alegre y la Divisa	VII	22,365	
267	Puerto Córdoba	VII	39,700	
268	Puerto Libre-Río Pepe	VII	2,069	
269	Puerto Naranjo, Penas Rojas, Cuerdo y El D.	VII	3,000	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
270	Puerto Sábalo y los Monos	VII	303,700	
271	Puracé	VII	6,203	
272	Quebrada Cañaveral Río San Jorge	VII	2,815	
273	Quichaya	VII	1,500	
274	Quizgo	VII	10,000	
275	Remanzo-Chorro Bocon	VII	73,680	
276	Río Bebarama	VII	8,875	
277	Río Blanco	VII	5,000	
278	Río Curiche	VII	8,965	
279	Río Domingodó	VII	24,590	
280	Río Ichó y Quebrada Baratudo	VII	5,342	
281	Río Jarapetó	VII	5,583	
282	Río Mumbú	VII	3,000	
283	Río Murindó	VII	18,270	
284	Río Neguá	VII	5,463	
285	Río Nuquí	VII	9,500	
286	Río Orpua	VII	22,290	
287	Río Pangui	VII	7,870	
288	Río Pichimá	VII	9,024	
289	Río Quiparadó	VII	9,860	
290	Río Siare o Barranco Lindo	VII	47,320	
291	Río Taparai	VII	14,212	
292	Ríos Catrú y Dubasa	VII	48,980	
293	Ríos Jurubidá, Chorí y Alto Baudó	VII	80,350	
294	Ríos Lanas o Capá	VII	6,400	
295	Ríos Pato y Jengado	VII	3,162	
296	Ríos Tomo Weberi	VII	60,540	
297	Ríos Uva y Pogue	VII	47,500	
298	Ríos Valley Boroboro	VII	21,020	
299	S. Andrés de Sotavento	VII	6,219	
300	Salaqui-Pavarandó	VII	107,000	
301	San Andrés de Pisimbaia	VII	3,365	
302	San Antonio del Fragua	VII	1,400	
303	San Francisco I	VII	15,064	
304	San José	VII	11,037	
305	San Luís del Tomo	VII	25,100	
306	San Matías o Jai-Dukama	VII	1,371	
307	San Sebastián	VII	1,300	
308	Santa María de Pángala	VII	9,500	
309	Santa Rosa	VII	1,587	
310	Santa Rosalía	VII	5,700	
311	Santa Sofía y el Progreso	VII	4,200	
312	Santa Teresita del Tuparro	VII	180,000	
313	Saracure y Río Cadá	VII	174,000	
314	Sejalito-San Benito	VII	4,823	
315	Sibundoy Parte Alta	VII	3,252	
316	Sokorpa	VII	25,000	
317	Sta Cecilia Quebrada Rio Choco	VII	5,723	
318	Suin	VII	10,533	
319	Tacueyo	VII	27,885	
320	Tahamí del Andágueda	VII	50,000	
321	Tarena	VII	4,888	
322	Tigres y Monchique	VII	8,254	
323	Tiosilidio	VII	4,560	
324	Toez	VII	7,687	
325	Togoromá	VII	8,640	
326	Toribio	VII	9,018	

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
327	Totoro I	VII	4,161	
328	Totoro II	VII	1,906	
329	Trapiche-Río Pepe	VII	1,008	
330	Trupiogancho y la Meseta	VII	2,309	
331	Tumbichucué	VII	4,300	
332	Tunebo de Angostura	VII	3,282	
333	Unión Chocó-San Cristóbal	VII	21,400	
334	Valdivia	VII	3,985	
335	Valle del Sibundol	VII	3,252	
336	Vitonco	VII	7,245	
337	Wayúu de Lomamoto	VII	1,572	
338	Witora	VII	67,200	
339	Yaigoje-Río Apaporis	VII	518,320	
340	Yanguillo	VII	4,230	
341	Yuquiva	VII	16,380	
342	Yurí Brazo Amanaven	VII	15,836	
<hr/>				
	<i>Biosphere Reserves</i>			
	Cinturón Andino	IX	855,000	1979
	El Tuparro	IX	928,125	1979
	Sierra Nevada de Santa Marta	IX	731,250	1979



Protected Areas of Colombia





# ECUADOR

**Area** 272,045 sq. km

**Population** 9,648,189 (1990)

Natural increase: 2.25% per annum

## **Economic Indicators**

GDP: US\$ 1,069 per capita (United Nations, 1987)

GNP: US\$ 910 per capita (Banco Central del Ecuador, 1991)

**Policy and Legislation** No national conservation policy providing for the protection of natural resources has been stated (Cabarle *et al.*, 1989). In 1974, the Preliminary Strategy for the Conservation of Outstanding Natural Areas in Ecuador (Estrategia Preliminar para la Conservación de Areas Silvestres Sobresalientes del Ecuador) was initiated by the Ministry of Agriculture and Livestock (Ministerio de Agricultura y Ganadería) (MAG) in collaboration with the UNDP and the FAO (Cifuentes *et al.*, 1989). The Preliminary Strategy was published in 1976 and sets out what may be considered a national conservation objective, but in very general terms. It also includes an inventory of natural areas (DINAF, 1988; Putney, 1976). It is cited in subsequent legislation as the foundation for protected area definition and establishment.

One of the primary objectives of the strategy is to coordinate government planning at the national and regional levels. However, the 1985-1988 national development plan does not specify objectives for natural resource protection, and current development policies are oriented more towards exploitation than conservation (Cabarle *et al.*, 1989; Cifuentes *et al.*, 1989).

The government participates in the FAO Tropical Forest Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. In 1987, a national Forestry Action Plan (Plan de Acción Forestal) was formulated, adapting the principles of the TFAP to suit national objectives (Cabarle *et al.*, 1989; DINAF, 1988; MAG, n.d.). A coordinating committee was established to supervise the implementation of the plan in conjunction with the National Development Council (Consejo Nacional de Desarrollo) (CONADE). Details of the extent of implementation are currently not known.

The 1971 National Parks and Reserves Law (Ley de Parques Nacionales y Reservas), Decree No. 1306, was the first law to provide for protected area establishment at the national level. Parks and reserves are selected by the MAG, and designated by inter-ministerial accord. The law also gives regulations for visitors to parks and reserves, but definitions of these two management categories are not given.

With reference to Decree No. 1306, the MAG and the Ministry of Industry, Commerce and Finance (Ministerio de Industrias, Comercio e Integración) signed the Interministerial Agreement No. 322 in 1979. This agreement declares that the Preliminary Strategy for Conservation of Outstanding Natural Areas constitutes the fundamental policy for natural resource conservation. Provision is made for the creation of four national parks, three ecological reserves, two national recreation areas and one faunal production reserve, and comprehensive definitions for these four categories of protected area are given (see Annex).

The main law providing for protected area establishment and resource use currently in effect is the 1981 Law of Forestry and the Conservation of Natural Areas and Wildlife (Ley Forestal y de Conservación de Areas Naturales y Vida Silvestre) No. 74, which consolidates much of the earlier legislation relating to wildlife and protected areas. Previous forestry legislation is repealed. All forested land is regulated under this law, but the state recognises private ownership rights. A natural area has distinctive conservation, scientific, educational or scenic importance, and is state-owned. State forests and natural areas are inalienable, and ownership rights cannot be acquired. Provision is made for expropriating private land for the creation of protected areas where necessary. Definitions are given for production and protection forests and forest reserves, and for the seven categories of protected area which comprise the State Heritage of Natural Areas (Patrimonio de Areas Naturales del Estado) (see Annex). Management plans are to be drawn up for each area. Encroachment on state-owned land, or damage to ecosystems, is prohibited and a series of penalties are prescribed. Wild fauna also belongs to the state, and provision is made for its protection and rational use.

Problems arise over the definitions of management categories given in the 1981 Law. No clear distinction is made between the designations of national park and ecological reserve, which gives rise to conflict over their management. Two categories are named in the legislation but are not defined or used in practice: wildlife refuge (refugio de vida silvestre) and hunting and fishing area (area de caza y pesca). On the other hand, geobotanical reserve (reserva geobotánica), whilst not mentioned in any official legislation, does exist in practice and even forms part of the protected areas system (G. Oviedo, pers. comm., 1992). One other category is used, namely marine resource reserve (reserva de recursos marinos) although it is not included in the system of protected areas, and not covered by the 1981 Law. Thus, the protected areas sub-system is currently made up of six active categories of protected area: national park, ecological reserve, biological reserve, faunal production reserve, national recreation

area and geobotanical reserve (G. Oviedo, pers. comm., 1992).

Decree No. 1529, (1983) General Regulation under the 1981 Law of Forestry and the Conservation of Natural Areas and Wildlife (Reglamento General de Aplicación de la Ley Forestal y de Conservación de Areas Naturales y Vida Silvestre), gives further details of natural resource management, general conservation objectives, and activities permitted within protected areas. All commercial exploitation of natural resources is prohibited. Permission for other activities may only be granted by the MAG. Administration of protected areas must follow the management plans specific to each area, and visitors are obliged to abide by the regulations established in the 1981 Forest Law.

Legislation is inconsistent and uncoordinated, and as a result, no coherent legal framework exists by which national conservation objectives may be implemented (Cabarle *et al.*, 1989; DINAF 1988). The lack of policy and legislation has resulted in conflicts between government sectors over resource use. In many cases, the policies of the MAG have been overridden by other sectors, and state-aided colonisation and migration, together with mineral exploitation, have been encouraged, particularly in forested areas (Cabarle *et al.*, 1989)

For example, the 1988 Hydrocarbon Law (Ley de Hidrocarburos) No. 1743, an interministerial agreement between the MAG and the Ministry of Energy and Mines (Ministerio de Energía y Minas) (MEM), regulates environmental rehabilitation during oil and gas exploration, and extraction in national parks and other protected areas. This is clearly in conflict with the 1981 Law of Forestry and the Conservation of Natural Areas and Wildlife prohibits all commercial activities in designated protected areas. The Hydrocarbon Law is also in conflict with existing legislation, which declares that an activity explicitly prohibited by law cannot be regulated by an interministerial agreement (MAG, n.d.). This agreement has led to exploitation by oil companies in several protected areas, and fundamentally undermines the legal protection of Ecuador's natural resources (MAG, n.d.).

**International Activities** Ecuador signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940, with subsequent ratification. Ecuador signed the Amazon Cooperation Treaty (Tratado de Cooperación Amazónica) on 3 July 1978, an agreement between the eight countries with territory in the Amazon region, to establish regulations for managing natural resources, and to propose conservation-directed alternatives to the management of multinational projects. The Convention for the Conservation and Management of Vicuña (Convenio para la Conservación y Manejo de la Vicuña)

was signed by Argentina, Bolivia, Chile, Ecuador and Peru in 1979.

Ecuador participates in the Unesco Man and the Biosphere Programme, with two sites accepted as biosphere reserves, and ratified the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) on 7 September 1990 with two sites inscribed. Ecuador ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 16 June 1975. Two natural sites have been inscribed on the World Heritage list.

**Administration and Management** Throughout the various legislative acts, the Ministry of Agriculture and Livestock has been responsible for resource management through its different departments (MAG, n.d.). The first division within the MAG vested with this responsibility was the Forestry Service (Servicio Forestal), created in 1952. Since then, there has been much restructuring of the Ministry, and the scope of its responsibility has grown (MAG, n.d.).

The Forestry Service, in collaboration with the National Tourist Office (Oficina Nacional de Turismo) and the General Fisheries Directorate (Dirección General de Pesquería), was responsible for national parks and reserves from the enactment of the 1971 National Parks and Reserves Law until 1981. In 1973, the Department of Natural Areas and Wildlife (Departamento de Areas Naturales y Vida Silvestre) (DANVS) was created as part of the Forestry Service to manage protected areas and wildlife. The DANVS was instrumental in developing the 1976 Preliminary Strategy for the Conservation of Outstanding Natural Areas in Ecuador (MAG, n.d.). In 1981, the Forestry Service was replaced by the National Forestry Programme (Programa Nacional Forestal) (PRONAF), and the DANVS was transformed to a division (División de Areas Naturales y Vida Silvestre) within it. The PRONAF and the DANVS are declared responsible for forest and other natural resources under the provisions of the 1983 Regulations to the 1981 Law of Forestry and the Conservation of Natural Areas and Wildlife.

Further restructuring of the MAG took place in 1990, raising the forestry sector to the level of Subsecretariat of Forests and Natural Resources (Subsecretaría Forestal y de Recursos Naturales Renovables) (SUFOREN), under the Ministry of Agriculture. The operative level within SUFOREN is composed of the National Forestry Directorate (Dirección Nacional Forestal) (DINAF), which replaces the former PRONAF. The DINAF is responsible for implementing the policies of the MAG, and comprises three divisions, one for each of its functions: reforestation, investigation and training; management and utilisation; natural areas and wildlife (DANVS). At the local level, there are 21 district forestry districts (distritos forestales) under the respective provincial stockbreeding directorates (direcciones



provinciales agropecuarias). DANVS employs 275 people, 198 of whom are park guards (Figueroa, 1992).

There are numerous other governmental organisations with interest in forests and natural resources, but ultimate responsibility for formulating forest policies and coordinating the activities of the various organisations lies with the SUFOREN. Policies are implemented by the DINAF and its respective divisions; the DANVS is responsible for managing national parks and reserves, whereas most national forests are the responsibility of the DINAF itself. Most protection forests are privately-owned and are the responsibility of private individuals or institutions, including non-governmental conservation organisations, although administrative assistance is provided by the DINAF. The Traditional Land of the Awá Indigenous Community is managed jointly by the Equadorian Technical Unit of the Awá Plan (Unidad Técnica Equatoriana del Plan Awá) (UTEPA) and the indigenous Awá community (Cabarle *et al.*, 1989; Cifuentes *et al.*, 1989; G. Oviedo, pers. comm., 1992).

There are around 50 non-governmental organisations (NGOs) working in environmental issues, the majority of which were created since 1978 (Cabarle *et al.*, 1989; G. Oviedo, pers. comm., 1992). Some concentrate on specific regions of the country, such as the Charles Darwin Foundation (Fundación Charles Darwin) which focuses on the Galapagos Islands. Others work at the national level, such as EcoScience (EcoCienca) which was founded in 1989 by a group of biologists and is active in conducting scientific research for conservation purposes in several protected areas, and promotes environmental education programmes (L. Suárez, pers. comm., 1991). Ecological Action (Acción Ecológica) monitors and campaigns against mineral exploitation in protected areas, one of the most serious threats to Equadorian ecosystems. One of the largest national NGOs, the Natura Foundation (Fundación Natura), was established in 1978, and in 1989 signed an agreement with the MAG to participate in protected area management (MAG, n.d.). The Natura Foundation has managerial responsibility for two protected forests, and is involved in others (G. Oviedo, pers. comm., 1992). The Foundation also runs important training programmes for protected area staff (Figueroa, 1992). In 1988, the Natura Foundation (aided by WWF and TNC) realised a debt-for-nature swap to the value of US\$ 10 million (Oviedo, 1991). Funds are being used for the "conservation of biological diversity *in situ* through the management of natural areas according to the principles of sustainable development". A large part of the programme is directed at the national system of protected areas, and management is carried out in conjunction with the state. Five national parks, three ecological reserves and one faunal production reserve are the first protected areas to benefit from the programme, which comprises a broad range of activities from environmental education and research to legislation and area management (Oviedo, 1991).

To improve protected area planning and management, a Conservation Data Centre (Centro de Datos para la Conservación) (CDC) was established in June 1990 within the National Council of Science and Technology (Consejo Nacional de Ciencia y Tecnología) (CONACYT), under an agreement between the Natura Foundation, The Nature Conservancy and CONACYT. The CDC collects information on natural areas to assess their protection needs, and on the current situation of existing protected areas including the effectiveness of their administration (L. Suárez, pers. comm., 1991).

Protected area management is hampered by lack of equipment, trained personnel, and inter-institutional cooperation, as well as confusion over land tenure (Cifuentes *et al.*, 1989; Figueroa, 1992). These problems are a direct result of a lack of high-level governmental support and the subsequent lack of funding, restricting the efficiency of protected area management (Cabarle *et al.*, 1989; Cifuentes *et al.*, 1989; Figueroa, 1992). The protected areas system is self-financing by means of revenue from tourism, particularly from Galapagos National Park. Thus, the state pays only 60% of salaries and services, leading to a severe lack of economic resources for management (Figueroa, 1992). There is little communication between regional management and central administration, which prevents adequate coordination. Increasing the autonomy of regional offices would greatly improve their administrative ability (Cabarle *et al.*, 1989; DINAF, 1988). Owing to lack of management resources, production forests could not be regulated, and the government no longer issues concessions for timber extraction in specified reserves. Exploitation takes place in unreserved forest areas with no legal management status, resulting in degradation of forest resources across the country (Suárez, 1990).

**Systems Reviews** Topographically, Ecuador consists of three distinct regions: Western Ecuador or coastal plain; inter-Andean or Sierra; and Eastern or Amazonian (Cabarle *et al.*, 1989; Cifuentes *et al.*, 1989). National territory also includes the Galapagos Islands in the Pacific Ocean. The geographical contrast, from sea level to 6,310m, gives rise to a number of distinct ecosystems, and a high degree of biodiversity. Following Holdridge's (1967) ecological classification system, 25 life zones are represented (Cabarle *et al.*, 1989).

The western region, or coastal plain encompasses the area between the foothills of the Andes and the Pacific Ocean, accounting for 24.7% of total land area (MAG, n.d.). Annual precipitation varies from 2000mm in the south, to 8800mm in the north-east where the most important remaining tropical humid forests are found (Cabarle *et al.*, 1989; MAG, n.d.; Cifuentes *et al.*, 1989). The coastal soils of the alluvial plain are the most fertile and farming is intense, producing almost all the nation's crops. The region is also the centre of industry, and population growth in coastal cities is the highest in the country. Deforestation in the western region has been substantial, with estimates of remaining forest cover varying from 6% (Cabarle *et al.*, 1989) to 24% (DINAF,



1988). Extensive destruction of mangrove forests along the coast has led to serious coastal erosion (Cabarle *et al.*, 1989).

The Sierra region comprises the highlands, above 900m in altitude, and accounts for 24% of total land area. Two chains of the Andes mountains run parallel down the length of the country, creating a system of valleys which are farmed intensively. Volcanic activity has shaped much of this region, and soils are derived from volcanic ash. Precipitation is 750mm per year, and forests range from premontane dry forest, to montane rain forest (MAG, n.d.). Only around 9% of the total area of the Sierra region remains covered by natural vegetation (Cabarle *et al.*, 1989). Cultivation methods are not suited to the varied and difficult terrain, and soil erosion in this region is the worst in the country, with around 15% of the area affected (MAG, n.d.).

The Eastern or Amazonian region, accounting for 48% of total land area, extends from the eastern base of the Andes to the Peruvian and Colombian borders, below 900m in altitude (MAG, n.d.). Agricultural development is greatest at the base of the mountains (Cabarle *et al.*, 1989). Around 51% of the eastern region remains forested.

Natural resource protection began in 1936 with the declaration of the Galapagos Islands as a protected area. Further protected areas were declared across the country, but a lack of continuity in their selection and management restricted their effectiveness (Paucar, 1984; Ponce, 1982). The Preliminary Strategy for the Conservation of Outstanding Natural Areas, completed in 1976, identified priority areas and provided guidelines for their management. This formed the basis for developing a coordinated national system of protected areas (Cifuentes *et al.*, 1989; Ponce, 1982).

The national system (sistema nacional) is to be established in two stages. Nine priority areas were identified initially to form the Minimum System of Conservation (Sistema Mınimo), with a further 20 for the Extended System (Sistema Ampliado). The first nine areas were established under provision of the 1979 Interministerial Decree, and a minimum infrastructure for effective protection implemented. Management plans for each area are obligatory to ensure a coherent system. The DINAF intends to increase the number of protected areas to include the Extended System over a period of 12 years, on condition that the budget for administration will increase by 30% annually (DINAF, 1988). Ecuador participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperacion Tecnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres) through the DINAF (FAO, n.d.). Following the FAO definition, Ecuador has a coherent national system (Ormazabal, 1988).

The non-governmental sub-system arose as a result of private sector response to alarming rates of deforestation

(G. Oviedo, pers. comm., 1992). Areas of natural vegetation and forest that had not been included in the national system were taken on by private individuals and institutions for conservation purposes (Cabarle *et al.*, 1989).

By 1989, the national system comprised 15 natural protected areas under the administration of the DINAF, covering 3,173,915ha, or 11.73% of total land area (Fundacion Natura and SUFOREN, 1992). Of the 15 areas, nine have management plans, three have preliminary plans and the remaining three do not have either (MAG, n.d.). Only one management plan has been evaluated, and none has been updated (Figueroa, 1992). Lack of funding and support from central government results in many protected areas being severely under-staffed, reducing the effectiveness of protection. Some areas do not have any staff and private reserves face pressure from agricultural encroachment (Cabarle *et al.*, 1989).

Assessments of the protected area coverage indicate that the current system has serious gaps in coverage, and does not provide adequate protection for representative examples of native flora and fauna (Cabarle *et al.*, 1989; Cifuentes *et al.*, 1989). Five of Ecuador's 25 life zones are not represented in protected areas (Figueroa, 1992). The most under-represented of all regions is the coastal plain, with only three protected areas. The mangroves and reefs found in this region are vital to the prevention of coastal erosion and are severely under-represented (Cabarle *et al.*, 1989; Figueroa, 1992). The largest number of protected areas is located in the Sierra region. The DINAF intends to extend protected area coverage by including the 20 areas proposed in the Extended System. Lack of funds, however, seriously restricts implementation of the system (DINAF, 1988; Ponce, 1982).

In 1989, an extensive study of the existing protected areas was undertaken by the DINAF and Fundacion Natura, with international assistance, to initiate the implementation of the second phase in developing the national system. Existing areas were reviewed in detail, and recommendations made to improve their conservation effectiveness. The study proposed more comprehensive management categories with clear definitions, introducing three new categories: natural monument (monumento natural); indigenous territory or bio-anthropological reserve (territorio indıgena/reserva bioantropologica); and biosphere reserve (reserva de la biosfera) (G. Oviedo, pers. comm., 1992). The study also proposed new areas for inclusion in the extension of the national system: it recommends a minimum system (sistema mınimo) comprising 24 protected areas, and an optimum one (sistema optimo) made up of 32. Conservation objectives are given in detail, and high level governmental support for the national system is sought (Cifuentes *et al.*, 1989).

Limitations of the protected areas system are lack of political support in the higher levels of government,

inadequate institutional coordination, poor training, lack of participation of rural communities in decisions over protected areas and their management, inadequate economic resources, lack of environmental education, and the absence of monitoring and follow-up (Cabarle *et al.*, 1989; Figueroa, 1992). Figueroa (1992) cites development projects carried out without environmental considerations as the most serious threat to the protected area system. Transnational oil and mining companies violate protected area legislation (Cabarle *et al.*, 1989; MAG, n.d.; Figueroa, 1992). Oil companies are involved in exploration and extraction inside two protected areas, and mining activities are carried out in five areas. Further developments within protected areas are planned. The concessions for these activities were issued with no coordination with protected area administration. However, they are condoned by the 1988 Interministerial Agreement (MAG, n.d.). The infrastructure associated with such exploitation invariably leads to colonisation and, in some cases, 30% of the affected protected area has become occupied (MAG, n.d.). Many protected areas, including four of Ecuador's six national parks, are affected by commercial logging. Other problems include hunting and illegal colonisation (Figueroa, 1992).

## Addresses

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title:** Acuerdo Interministerial  
(Interministerial Agreement) No. 0322

**Date:** 1 November 1979

**Brief description:** Between the Minister of Agriculture and Livestock (Ministro de Agricultura y Ganadería) and the Minister of Industry, Commerce and Finance (Ministro de Industria, Comercio y Integración) that defines and declares reserved zones and national parks, with reference to Decree No. 1306, 1971. The National Strategy for Conservation of Outstanding Natural Areas is cited as the basis for the conservation policies and objectives of this Law. Provision is made for the creation of four national parks, three ecological reserves, two national recreation areas and the one fauna production reserve, giving comprehensive details of their exact location and boundaries.

**Administrative Authority:** Provision is given for the national government to designate the administrative body responsible for each protected area. For national parks, the National Park Service (Servicio del Parque Nacional) is named. For reserves, responsibility is simply vested in "the respective governmental organisation".

**Designations:**

**Parque Nacional (National Park)** An area extending over a minimum of 10,000ha, with one or more ecosystem remaining in its natural state and possessing ecological diversity, floral or faunal species or geological formations of national, scientific and educational importance.

Visitors are permitted entry solely for educational, recreational or investigative purpose.

**Zona de Reserva (Reserve Zone) Reserva Ecológica (Ecological Reserve)** An area extending over a minimum of 10,000ha, with wild floral or faunal species of national importance, particularly those in danger of extinction, or geological formations or natural areas of national interest.

Natural resources are to be maintained in their natural state. Exploitation or occupation of any type is prohibited. Only educational, investigative and recreational activities are permitted.

**Reserva de Producción Faunística (Faunal Production Reserve)** Area of no less than 1,000ha with wildlife species of commercial value, including those areas that have

traditionally been used for subsistence by indigenous communities

The administrative organisation responsible will regulate the use of wildlife species and promote scientific investigation in order to allow continuing propagation.

Visitors are allowed to hunt or collect specimens following the established regulations.

**Area Nacional de Recreación (National Recreation Area)** An area of not less than 1,000ha characterised by scenic beauty, resources of touristic or recreational importance, whose ecosystem is natural or semi-natural and which allows easy access for the public.

Hunting is allowed, following management regulations.

**Source:** Original legislation

**Title:** Ley Forestal y de Conservación de  
Áreas naturales y Vida Silvestre (Law of  
Forestry and the Conservation of Natural  
Areas and Wildlife) No. 74

**Date:** 14 August 1981

**Brief description:** Defines seven categories of protected area and four of forested area: state permanent production forest, private permanent production forest, protection forest and special forest. Protected areas under these given categories collectively comprise the State Heritage of Natural Areas (Patrimonio de Áreas Naturales del Estado). All forested land and the wildlife therein constitutes the State Forest Heritage (Patrimonio Forestal del Estado). The Law declares natural areas inviolable and inalterable and to which no rights may be acquired. Private forest reserves are recognised and are given governmental assistance to comply with this law.

**Administrative Authority:** The Ministerio de Agricultura y Ganadería (Ministry of Agriculture and Livestock) (MAG) is responsible for state-owned forested land and nature areas.

**Designations:**

**Bosque Protector (Protection Forest)** Forested area, either natural or man-made, which possess one or more of the following characteristics: its principal function is soil or wildlife conservation; important as a watershed or is adjacent to an important water source; functions as a windbreak, or strategic zones



for national defence; forms part of a protected area; or is important for forest research

***Reserva Forestal (Forest Reserve)*** Forested area that, owing to its location, species composition or national importance, is to remain in its natural state so that it may be brought into the integrated development of the country at some future, though not immediate, date.

***Parque Nacional (National Park)*** An area extending over a minimum of 10,000ha, with one or more ecosystem remaining in its natural state and possessing ecological diversity, floral or faunal species or geological formations of national, scientific and educational importance. Visitors are permitted entry solely for educational, recreational or investigative purpose.

***Reserva Ecológica (Ecological Reserve)*** An area extending over a minimum of 10,000ha, with wild floral or faunal species of national importance, particularly those in danger of extinction, or geological formations or natural areas of national interest. Natural resources are to be maintained in their natural state. Exploitation or occupation of any

type is prohibited. Only educational, research and recreational activities are permitted.

***Refugio de Vida Silvestre (Wildlife Refuge)*** An area of any size, essential for ensuring the continued existence of resident or migratory wildlife, for scientific, educational or recreational purpose.

***Reserva Biológica (Biological Reserve)*** An area of any size, whose ecosystem remains in its natural condition and is set aside for wildlife conservation.

***Area Nacional de Recreación (National Recreation Area)*** An area of no less than 1,000ha in size, which contains scenic, tourist or recreational attractions in their natural state. The area must have easy public access.

***Reserva de Producción Faunística (Faunal Production Reserve)*** Named as a classification for state nature area, but no definition is given

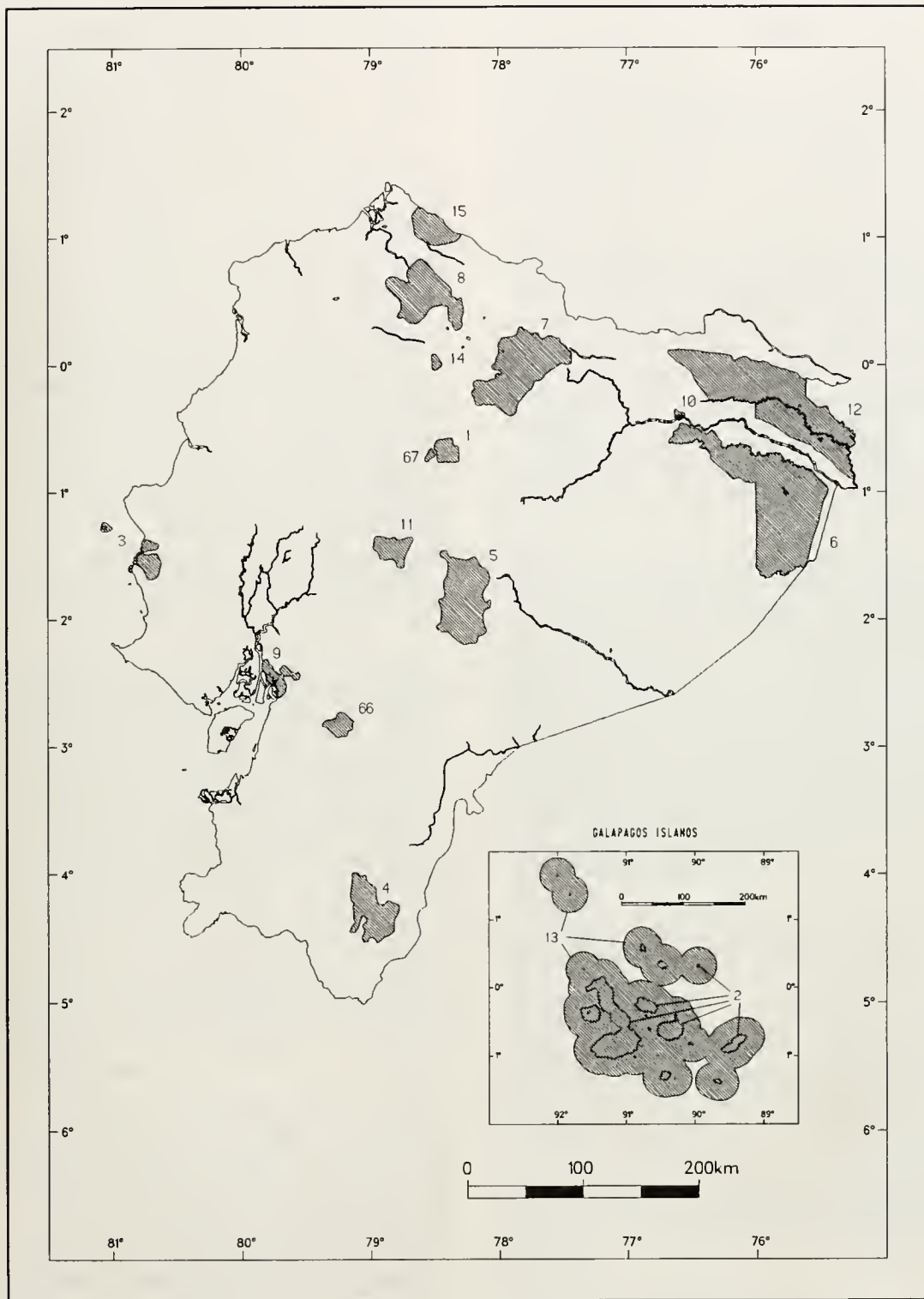
***Area de Caza y Pesca (Hunting and Fishing Area)*** Named as a classification for state nature area, but no definition is given

Source: FAO (1982)

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Cotopaxi	II	33,393	1975
2	Galápagos	II	727,800	1959
3	Machalilla	II	55,000	1979
4	Podocarpus	II	146,280	1982
5	Sangay	II	517,725	1975
6	Yasuní	II	982,300	1979
	<i>Ecological Reserves</i>			
7	Cayambe-Coca	I	403,103	1970
8	Cotacachi-Cayapas	I	204,420	1968
9	Manglares-Churute	I	35,042	1979
	<i>Biological Reserve</i>			
10	Limoncocha	IV	4,613	1985
	<i>Faunal Production Reserves</i>			
11	Chimborazo	VII	58,560	1987
12	Cuyabeno	VII	655,781	1979
	<i>Marine Resource Reserve</i>			
13	Galápagos	IV	7,990,000	1986
	<i>Geobotanical Reserve</i>			
14	Pululahua	V	3,383	1978
	<i>Forest Reserve Zone</i>			
15	Asentamiento Trad. de la Comunidad Indígena Awa	VII	101,000	1988
	<i>Protection Forests</i>			
16	Aguallaca	VIII	1,724	1988
17	Bosque Petrificado de Puyango	V	2,658	1987
18	Bosque Puyango	VIII	2,658	1987
19	Canta Gallo Jipijapa	VIII	8,170	1989
20	Carrisal Chone	VIII	75,700	1988
21	Cashca Totoras	VIII	6,537	1988
22	Cerros Guinzales	VIII	3,338	1985
23	Chilanes Bucay	VIII	1,857	1989
24	Cinturón Verde Loja	VIII	9,373	1988
25	Cinturón Verde de Quito	VIII	21,929	1988
26	Comuna Loma Alta	VIII	1,858	1989
27	Cordillera Chongón	VIII	2,000	1989
28	Cordillera de Cutucu	VIII	311,500	1990
29	Cordillera de Molleturo	VIII	28,100	1968
30	Cuenca Alta del Guayllabamba	VIII	13,800	1989
31	Cuenca Daule Peripa	VIII	220,835	1987
32	Cuenca Río Coca y Panza	VIII	6,630	1979
33	Cuenca Río Cube	VIII	4,925	1990
34	Cuenca Río Paute	VIII	195,161	1985
35	Cuenca Ríos Atacames	VIII	10,620	1990
36	Cuenca del Río Portoviejo	VIII	17,500	1972
37	El Guabo	VIII	2,213	1988
38	Hollín Loreto Coca	VIII	110,046	1987
39	Ingenio Santa Rosa	VIII	2,410	1987
40	Jeco	VIII	2,324	1987
41	Jima Limitada	VIII	2,104	1991
42	La Floresta	VIII	3,122	1988

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
43	Loma del Corazón y Bretana	VIII	7,081	1990
44	Manglares	VIII	362,802	1987
45	Maquipucuna	VIII	2,700	1989
46	Matiavi Salinas	VIII	1,857	1988
47	Mindo Nambillo	VIII	19,200	1988
48	Mindo y Nambillo	VIII	19,200	1988
49	Napo, Area Boscosa	VIII	235,000	1978
50	Parque Jerusalem	VIII	1,110	1989
51	Pasochoa	VIII	3,196	1982
52	Pichincha	VIII	8,096	1983
53	Presa Tahuin	VIII	14,911	1989
54	Santa Rita	VIII	2,145	1988
55	Santa Rosa y Yasquel	VIII	2,597	1987
56	Shishimbe-Chillanes	VIII	1,064	1987
57	Subcuenca Río Blanco	VIII	5,410	1990
58	Subcuenca Río Dudahuayco	VIII	2,000	1982
59	Suiza-Pucara	VIII	1,000	1980
60	Sumaco	VIII	100,045	1987
61	Sun Sun Yanasacha	VIII	3,850	1982
62	Toachi Pilaton	VIII	212,000	1987
63	Toaza	VIII	1,247	1989
64	Volcán Pichincha	VIII	8,096	1985
65	Zarapullo	VIII	21,585	1986
<i>National Recreation Areas</i>				
66	Cajas	V	28,808	1979
67	El Boliche	V	1,077	1979
<i>Biosphere Reserves</i>				
	Archipiélago de Colón (Galápagos)	IX	766,514	1984
	Yasuní	IX	679,730	1989
<i>Ramsar Wetlands</i>				
	Machalilla	R	55,000	1990
	Manglares-Churute	R	35,000	1990
<i>World Heritage Sites</i>				
	Galapágos	X	766,514	1978
	Sangay	X	271,925	1983



Protected Areas of Ecuador





# FRENCH GUIANA

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**Area** 84,000 sq. km

**Population** 114,600 (1990)

Natural increase: 5.8% per annum

## **Economic Indicators**

GDP: No information

GNP: US\$ 6,700 (1989) (ECO-ATLAS, 1991-92)

**Policy and Legislation** The first French settlement in the area currently known as French Guiana was established in 1604. The region became a French possession in 1643 (although occupied by Britain from 1809 to 1817). On 19 March 1946 its status changed to an overseas department of France, and in 1974 it also became an administrative region. The region is covered, therefore, by French policy and legislation. There is currently no environmental policy for the region (Hughes, 1992). However, on a recent tour to French Guiana, the French Environment Minister unveiled plans for the conservation and responsible development of the country. The plans split the country into three areas; the first, a coastal strip dedicated to economic development; the second, an inland band reserved for tourism and managed hunting; and the third, an inviolable sanctuary for forest wildlife and people in the remote interior (Lewis and Wood, 1991).

A complete list of legislation concerning protected areas under French jurisdiction is given with the country sheet for France (see Volume 2). The first protected area within the region, La Mirande, was created by decree of 4 July 1942. Further legislation relevant to French Guiana's protected areas is contained within Law No. 76/629 concerning Nature Protection (Loi no. 76/629 relative à la protection de la nature) (see Annex). Decrees Nos 77-1298 to 77-1301 of 25 November 1977 relate to the implementation of this Act. Law 76/629 provides, amongst other things, a definition of nature reserve (réserve naturelle), and allows for the preservation of biotopes of plant and animal species by means of prefectural orders called biotope protection orders (arrêtés de protection du biotope), which provide for a very low level of protection. Kaw Reserve was protected under Biotope Protection Order No. 1-964 ID/4B of 4 September 1989.

State biological reserves (réserves biologiques domaniales)(RBD) were the subject of a convention between the Ministry of the Environment, the Ministry of Agriculture and the National Forest Office. Two types of RBD are to be established: strict (intégrale) RDB, in which all human intervention is excluded, and managed (dirigée) RDB, in which conditions necessary for the survival of species in need of protection are maintained, whilst at the same time the areas may be inhabited, and intervention by foresters is permitted. Zones currently proposed for establishment belong to the second category, but may

include strictly protected zones (J.J.de Granville, pers. comm., 1992).

"Espaces du Conservatoire" are areas in which all forms of urbanisation are prohibited. They are open to the public, and management is undertaken with the cooperation of local collectives (J.J.de Granville, pers. comm., 1992).

Under the seventh title of the Forest Code Legislation and Regulations, in conformity with Article 73 of the French constitution, the Forest Code is applicable to overseas departments, subject to modifications and adaptations listed under this title. The first (legislative) section of the French Forest Code, given in Law No. 85-1273 of 4 December 1985, contains a clause (Article L. 172-1) which states that certain parts of this law are not applicable to French Guiana. Similarly, although most of the second (regulations) part of the Forest Code is relevant, Articles R. 172-1 to 172-5 and 562-1 list those parts which do not apply in this department of France.

The forest regime was first established under a law (arrêté) of 1926, although the first forest service within the territory was not established until 7 February 1931. Under a law of 27 March 1931, the Bureau of Mines was responsible for the Forest Service, there not yet being an agent for the Water and Forests (Eaux et Forêts) department, within the region. A further law of 2 June 1932 provided for the separation and reorganisation of the Mines department from that of Water and Forests. Following this, a law of 12 May 1934 provided for state forests (forêts domaniales) to be managed by the Water and Forest service, as well as for the establishment of state concessions, and for the duties of forest agents (Valeix and Mauperin, 1990).

The legislative and regulations sections of the Forest Code both provide for the current responsibilities of the National Forest Office (Office National des Forêts).

**International Activities** Conventions to which France is a member, which are of relevance to French Guiana, include the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region (both of which were ratified by France on 13 November 1985) and a second Protocol Concerning Specially Protected Areas and Wildlife, signed by France in 1991. Together, the Convention and associated protocols are known as the Cartagena Convention.

**Administration and Management** The French governmental body responsible for the establishment of parks and reserves (and setting hunting regulations) is the Department of Nature Protection (Direction de la

Protection de la Nature), originally part of the Ministry of the Environment (Ministère de l'Environnement). Since 1991 the Ministry of the Environment has been represented in the region by a Regional Department for Architecture and the Environment (Direction Régionale de l'Architecture et de l'Environnement) (DRAE), created in 1990, which has been responsible for proposing protected areas, including a coastal regional national park (J.J.de Granville, pers. comm., 1992; D.Girou, pers. comm., 1992).

The National Forest Office (Office National des Forêts)(ONF), was first established in the region in 1965 for the establishment of paper industries. The ONF is currently under the supervision of the Ministry of Agriculture (Ministère d'Agriculture), but was previously under the Ministry of Colonies (Ministère des Colonies), which later became the Ministry of France Overseas (Ministère de la France Outre-Mer). The ONF is now responsible for managing forested land and land to be reforested (listed in Decree No. 86-154 of 30 January 1986), as well as state biological reserves (réserves biologiques domaniales) (J.J.de Granville, pers. comm., 1992). Since 1978 the ONF has undertaken an important experimental programme, the emphasis of which is on the protection and regeneration of natural forest, whilst at the same time establishing plantations of fast growing species (Groene, 1990; Sarrailh, 1990; Valeix and Mauperin, 1990).

All of France's main national research institutes have projects and stations in Guiana, and scientific research there has been widespread and longstanding. However, little or no pressure for a conservation policy has been exerted by scientists (Hughes, 1992). ORSTOM, the French Scientific Research Institute for Development through Cooperation (Institut Français de Recherche Scientifique pour le Développement en Coopération), recently secured the creation of the first two nature reserves, but the government is proceeding slowly with future plans for national park development, due to concern for its present programme of economic development (Lewis and Wood, 1991).

SEPANRIT, the Society for the Study, Protection and Management of Nature in Inter-Tropical Regions (Société pour l'Etude, la Protection et l'Aménagement de la Nature dans les Régions Inter-Tropicales), and SEPANGUY, the Society for the Study of Protection and Management of Nature in Guyana (Société d'Etude de Protection et d'Aménagement de la Nature en Guyane), are very active locally (J.J.de Granville, pers. comm., 1992).

The universities of Paris, Montpellier, the French Antilles and French Guiana and the Paris Museum of Natural History are active in conservation (research includes fauna and flora, marine resources and pollution). The Conservatory for the Littoral Zone (Conservatoire du Littoral), which is responsible for "espaces du conservatoire", has proposed to "buy" 13,000ha of land between the rivers COUNAMAMA and

YIYI to create a protected zone (K. Wood, pers. comm., 1992). The CNES (Centre National d'Etudes Spatiales) (the space port at Kourou) proposes to close access to Malmanoury Creek, which will effectively create a reserve along 40km of coast that belong to the space base, but still needs to negotiate with the Ministry of Marine Affairs so that a reserve can be created which would include the tidal mudflats (K. Wood, pers. comm., 1992).

The "Arrêté de Biotope", under which Kaw Reserve is gazetted, is not only a very weak measure, but also little respected. Fires set in the marshes have led to several hundred hectares being burnt (K. Wood, pers. comm., 1992).

**Systems Reviews** Located slightly north of the equator, French Guiana is the smallest and least populated territory in South America. The climate is equatorial, with two brief dry seasons. Annual mean precipitation is generally greater than 2000mm, although in some areas it exceeds 8000mm. Three ecosystems predominate: littoral, river corridors and rain forest. The littoral region is exceptional in comparison with other countries in the north of South America, as it is the only coast where the granitic massif of the Guyanan plain reaches the sea. Mangroves occupy approximately 80% of the coast. Large (c. 200,000ha) areas of swamp occupy the land immediately inland from the coast (de Granville and Sanité, 1992).

More than 80% of the country is covered in rain forest, less than 5% of which is secondary forest. The country is characterised by a fairly high level of species diversity, the flora comprising an estimated 6,000 species. Currently, 12 species new to science, and 200 species new to French Guiana are described each year (de Granville and Sanité, 1992), and an estimated 10% of tree species remain to be described (Sabatier and Prévost, 1989). In general, forest exploitation has not occurred more than 50km from the coast (Groene, 1990). However, in percentage terms there is as much destruction of primary forest as in the Amazon (Hughes, 1992). Only the coastal alluvial strip, where most of the country's inhabitants live, is exploited agriculturally, the soils of the interior being too poor to support anything other than shifting agriculture (K. Wood, pers. comm., 1992).

Until Kaw Reserve was gazetted in 1989, the only protected area was one forest reserve, Mirande, classified as a nature reserve in 1942 (de Granville, 1975, 1985). This was transferred to the state forest domain in 1967 (de Granville and Sanité, 1992).

Establishment of further protected areas has been discussed many times since 1967. In 1970, a proposal was made for a 5,000ha reserve to be established along the estuary of the Cascades and Tonnégrande. This would have been partly strictly protected and partly open to the public. At the same time a proposal was made for a large reserve to be established inland, adjacent to the



southern border. In 1972, SEPANRIT and SEPANGUY, with scientific help from ORSTOM and the Natural History Museum, proposed establishment of two coastal bird reserves near Organabo and Sinnamary. A year later development of a further bird reserve was proposed by ORSTOM, near Mana (de Granville and Sanité, 1992). From 1974-1975, an ecological study was made of coastal areas, with a view to creating nature reserves, under the auspices of the Ministry of the Environment and ORSTOM. As a result of this study, classification of five protected zones was proposed (Condamin 1974, 1975; de Granville and Sanité, 1992). Again in 1975, soon after this coastal areas project, a series of 15 reserves, comprising inland forested sites as well as the previously proposed five coastal areas, was proposed. In 1976, following a visit by the Secretary of State for the Environment, the need to upgrade reserves to national park status was acknowledged, with priority being given to Basse Mana, Sinnamary-Iracouba, Saul and Kaw. Later, the Regional Delegate for the Environment made a case for all the southern part of the country to be established as a national park, followed, in 1979, by similar cases being made for Basse Mana and Sinnamary Iracouba being established as nature reserves (de Granville, 1986).

By 1983 none of these proposals had got past the planning stage. In 1985, the regional department of the National Forest Office, with technical assistance from ORSTOM, developed a project for the creation of eight state biological reserves to cover 213,665ha. These included the eight most threatened of the fifteen reserves proposed in 1975, in the northern part of the country, with the proposed reserve at Kaw being extended to include part of Kaw Mountain. The category of state biological reserve had been the subject of a recent convention between the Ministry of the Environment, the Ministry of Agriculture and the National Forest Office (de Granville, 1986). However, permission for development of the reserves was refused, as the land was deemed necessary for economic development (Valeix, n.d.).

The most recent propositions concerning protected areas were presented in a "Schéma d'Aménagement Régional" (D. Girou, pers. comm., 1992). These comprise the establishment of 16 nature reserves, including a national park in the south, three newly-proposed state biological reserves in the north and a coastal regional nature park (parc naturel régional) in the north (J.J. de Granville, pers. comm., 1992).

Legislation has been drawn up for Grand Connétable Nature Reserve, and awaits signature. The documentation has already been accepted in practice by the local municipality and General and Regional Consul (de Granville and Sanité, 1992). Six other reserves are due to be established in 1992 (J.J. de Granville, pers. comm., 1992).

A comprehensive description of both the country and the protected areas system is described in detail by de Granville and Sanité (1992), in the chapter concerning French Guiana in *¿Espacios sin habitantes? Parques nacionales de América del Sur*. They conclude that the country has been relatively unspoilt to date, due to the low population pressure, but that there is now a pressing need for the development of national parks to ensure the future conservation of the country.

Threats to the proposed protected areas system come from numerous sources. According to Lewis and Wood (1991), much of the current environmental degradation has been financed by French money, which has poured into the country during the past 20 years during the establishment of the Kourou space base. Development of the new launch-pad has led to areas of forest being flattened, while the waste products of test-launching have been dumped indiscriminately. The French authorities are currently constructing a large dam on the River Sinnamary to generate electricity for Kourou, which will flood 310 sq. km of dense, unbroken rain forest, although this is in contradiction to official government support for forest protection. Three other dam projects are planned, although again no environmental impact assessments have been made (Anon., 1992; Hughes, 1992; Pearce, 1991). New roads are opening up the country in all directions. A new coastal road through mangroves is likely to precipitate an influx of Brazilian slash-and-burn colonists. A new centralised capital is planned at Saul, previously an isolated town of 56 inhabitants, in the heart of the rain forest, with a new road linking this to the coast. In the past, state-sanctioned gold mining was responsible for pouring mercury into the rivers, most of the raw mercury dating from the 1865-1940 period. Fortunately this now seems to be under control. However, mining still remains a problem indirectly, due to the hunting practised by gold miners around their camps, which has led to local extinction of many forms of wildlife. In general, extensive hunting occurs throughout the country, aided by outboard motors, generators, freezers and the growing road network and encouraged by the booming population (Hughes, 1992; Kempf, 1991; K. Wood, pers. comm., 1992). There is little enforcement of hunting regulations. In 1991, the Guianese Regional Environment Congress reported a 50% drop in numbers of bird species, concluding that hunting is already depleting wildlife to such an extent as to endanger whole ecosystems (Lewis and Wood, 1991).

Of the 600 or so rain forest species in Guiana, 70 are exploitable commercially. Management has led to non-commercial tree species being killed chemically, a process which causes more forest damage than logging. A new, intensive rice-field programme in the lowlands has engulfed over-wintering grounds of numerous migrant bird species. The EDF (Électricité de France) is already prospecting sites for a second dam, either on the River Mana, the Approuage or the Oyapock (K. Wood, pers. comm., 1992).



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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title:** Loi no. 76-629 relative à la protection de la nature

**Date:** 10 July 1976

**Brief description:** Provides definition of nature reserve, including biotope protection order

**Administrative authority:** Directorate for Nature Conservation

**Designations:**

*Biotope protection order (Arrêté de protection de biotope)* Intended to protect the habitat of endangered species of flora and fauna, individual orders are declared by the prefect after consultation with the farmers' professional organisation (Chambre départementale d'agriculture). Regulations vary but typically restrict human activities, particularly agricultural practices such as the use of pesticides and the burning of vegetation.

*Nature reserve* No definition given

**Sources:** Original legislation in French

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**SUMMARY OF PROTECTED AREAS**

Map ref.	Name of area	IUCN management category	Area (ha)	Year notified
1	<i>State Biological Reserve</i> Monts lucifers et Dekou Dekou	VIII	108,000	



# GUYANA

Area 214,970 sq. km

Population 796,000 (1990)

Natural increase: 0.81% per annum

## Economic Indicators

GDP: US\$ 346 per capita (1987)

GNP: US\$ 340 per capita (1989)

**Policy and Legislation** Guyana gained full independence from Britain in 1966, and the present constitution was instigated in 1979.

The National Environmental Policy was formulated and approved in 1990 by Cabinet. The policy states that, in order to conserve and improve the environment, the government of Guyana will endeavour to maintain ecosystems and ecological processes essential for the functioning of the biosphere. The government will endeavour to preserve biological diversity, and to observe the principle of optimum sustainable yield in the use of renewable natural resources ecosystems, both on land and the sea. In addition, the government will ensure that conservation is treated as an integral part of the planning and implementation of development activities (S. Griffith, pers. comm., 1992).

Guyana participates in the FAO Tropical Forest Action Plan (TFAP), an international strategy to promote the development of forestry sectors in participating countries, allowing greater contribution to national economy while maintaining conservation principles. The National Forestry Action Plan was completed in 1989 by the Guyana Forestry Commission, and the Canadian International Development Agency (CIDA), to interpret the global designs of the TFAP into specific national needs (GFC/CIDA, 1989). The plan comprises several projects, including a revision of forestry policy and legislation, and developing a protected area system (GFC/CIDA, 1989; Hanif and Ravndal, 1988). However, the National Forestry Action Plan does not take mangrove forests into account as it does not consider them to be part of the state forest domain. No measures are taken for their management or conservation (Hussain, 1990). Information on the extent of implementation of this plan is currently not available.

As a policy, Guyana aims to set aside not more than 10% of its forested areas, or 4 million ha, as a protected area system (D.A. Black, pers. comm., 1992).

Two distinct policies regarding forestry use currently exist, one drafted by the State Planning Commission and the other by the Guyana Forestry Commission in 1988 (GFC/CIDA, 1989; Hanif and Ravndal, 1988). From the perspective of the State Planning Commission, forest resources are to be used to provide a source of food and materials, and emphasis is placed on increasing exploitation without taking sustainable use into

consideration (GFC/CIDA, 1989; W. King, pers. comm., 1991). The national forestry policy proposed by the GFC includes measures: to protect certain forested land with the objective of conserving genetic resources and promoting research; to protect mangrove forests; to establish a wildlife reserve and a bird sanctuary within the state forest; and to maintain natural habitat to protect endangered species. Increased forest resource exploitation is also emphasised, but in compliance with the protection objectives (Hanif and Ravndal, 1988). None of the objectives of the national forest policy has been implemented, although some conservation measures are incorporated into the National Forestry Action Plan as proposed projects (GFC/CIDA, 1989; Hanif and Ravndal, 1988).

The Forest Act, 1973 defines state forest, and gives regulations for issuing leases and sales agreements for forest resources exploitation. The Forestry Service is declared responsible for implementing these regulations. In 1979, the Guyana Forestry Commission Act No. 2 provided for the establishment of the Guyana Forestry Commission as the organisation responsible for administering forested land within state forest, replacing the Forestry Department.

Three pieces of legislation deal with protected areas. The National Parks Commission Act, 1977 gives the National Parks Commission, within the Ministry of Public Works, responsibility for designating, maintaining and regulating the use of national parks and other protected areas (Hanif and Ravndal, 1988). A national park is established by publishing a notice in the newspaper following consultation with the local government authority. No legislation exists to provide for the establishment of protected area categories other than national park or biosphere reserve (Hanif and Ravndal, 1988). The other two pieces of legislation are the 1973 Laws of Guyana, Chapter 20:02 of which provides for the establishment of Kaieteur National Park, and the Draft Guyana Biosphere Reserves Bill, 1983.

The land ownership rights of native communities was recognised by Act No. 6, 1976 which describes 65 areas to be set aside for the exclusive use of Amerindians (Persaud and Stewart, 1988).

Legislation concerning environmental management and conservation is incomplete, and does not allow the objectives given in the national forestry policy to be carried out (GFC/CIDA, 1989). No clearly defined regulations regarding natural resource use are stated in any legislation, and the relevant legal measures that do exist are not fully implemented owing to the lack of institutional capability (Hanif and Ravndal, 1988; Persaud and Stewart, 1988). Three new legislative acts are currently in the process of being formulated; the Environmental Protection Bill, Fisheries Act, and the



Wildlife Conservation Act. The Environmental Protection Bill reflects the underlying principles of the National Environmental Policy. It will provide for the preservation, protection and improvement of the environment, the prevention or control of pollution, and the assessment of the environmental impact of economic development and the sustainable use of natural resources (S. Griffith, pers. comm., 1992).

Other pieces of environmental legislation which are still pending include the Guyana Biosphere Reserves Bill, 1983, and the Conservation of Wildlife Bill, 1987 (S. Griffith, pers. comm., 1992).

The Guyana Agency for Health Sciences Education, Environment and Food Policy (GAHEF) was created under the Public Corporation Act in June 1988.

Legislation is briefly reviewed in the Environmental Policy of Guyana (Anon., n.d.). According to this, a thorough review of all existing legislation relating to the environment should be undertaken as first priority, with a view to determining overlaps, inconsistencies and deficiencies. The necessary comprehensive legislative reforms should then be formulated.

Environmental legislation is also reviewed as part of the Sector Plan for the Conservation of Tropical Forest Ecosystems, part of the Tropical Forestry Action Plan (Hanif and Ravndal, 1988).

**International Activities** Guyana has not signed the 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention). Guyana joined the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources, in 1976. Guyana has not yet signed the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and the related Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region and Protocol Concerning Specially Protected Areas and Wildlife (SPAW).

Guyana is one of the eight countries with territory in the Amazon region, that signed the Amazon Cooperation Treaty (Tratado de Cooperación Amazónica) on 3 July 1978, an agreement to establish regulations for managing natural resources in Amazonia, and to propose conservation directed alternatives to the management of multinational projects.

Guyana ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 30 June 1977, but no sites have been inscribed to date. Guyana is not a party to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar

Convention), neither does it participate in the Unesco Man and the Biosphere Programme.

**Administration and Management** Lack of environmental legislation has precluded the development of an institutional framework to administer natural resources in a structured process. No organisation specifically undertakes the conservation or management of natural resources. A number of different governmental departments participate in activities concerning natural resources and forested areas, but only within their field of interest. This has resulted in a lack of coordination, and, in some cases, conflict of interest between organisations (GFC/CIDA, 1989; Persaud and Stewart, 1988). In total, four ministries, two institutions and one state corporation have natural resource management responsibilities to some extent (Hanif and Ravndal, 1988).

The Guyana Forestry Commission was created in 1979 as part of the Ministry of Forest, and is the organisation responsible for administering forested land within the state forest. The GFC has been concerned almost exclusively with the administration of logging activities for the domestic and foreign market, and very little forest management is actually practised (Hanif and Ravndal, 1988). In January 1989 the GFC was placed under the responsibility of the Guyana Natural Resources Agency (GNRA), an institute that has been concerned primarily with mining activities and only touched on environmental issues as far as they related to their interests (GFC/CIDA, 1989). Inadequate funds, personnel and facilities have reduced the GFC's activities to the allocation of harvesting rights, the control of timber export and revenue collection. It has been unable to implement the conservation measures given in the National Forestry Policy it formulated (GFC/CIDA, 1989).

The Ministry of Agriculture is responsible for administering state lands, comprising all land outside state forests, Amerindian land and privately-owned land (GFC/CIDA, 1989).

The Guyana Agency for Health Sciences Education, Environment and Food Policy (GAHEF) (previously the Ministry of Medical Health, Environment and Food Policy) is responsible for the development of national environmental policy, environmental monitoring, coordination and training. The Environmental Division within GAHEF, which currently has a staff of 11, was created in 1988 (Hanif and Ravndal, 1988; S. Griffith, pers. comm., 1992). The main objectives of the Environmental Division are to develop environmental education programmes, and to monitor environmental activities of other organisations throughout the country. GAHEF is advised by an Advisory Environmental Council, chaired by the Executive Chairman of the GAHEF, and comprising representatives from ministries and agencies which have some responsibility for the environment (Anon, n.d.).

The National Parks Commission, which presently falls within the GAHEF (S. Griffith, pers. comm., 1992), is responsible for maintaining all national parks and city recreational parks, the zoo and botanical gardens in Georgetown. However, the Commission lacks the expertise to administer protected areas, and has a very limited budget which restricts its activities (Hanif and Ravndal, 1988).

The two institutions involved with natural resource management are the University of Guyana, which is introducing a course in forestry management, and the Institute of Applied Science and Technology. The latter is the main research institute, with an Environmental Research and Information Unit providing advice to decision-makers regarding sustainable use of natural resources, conservation and management (Hanif and Ravndal, 1988). A state corporation, Demerara Timbers Ltd (formerly Demerara Woods Ltd), is also involved in resource management. The corporation has recently completed a management plan for activities in its timber concession, which takes into consideration the possible environmental consequences of logging. The plan was completed with the assistance of TROPENBOS, a Dutch ecological study unit presently operating within Guyana (S. Griffith, pers. comm., 1992).

During 1988, the government changed its policy regarding non-governmental organisations (NGOs), and now supports their existence. There is currently one active NGO in Guyana, the Guyana Biodiversity Society which was formed in 1991 and is still in its infant stage (S. Griffith, pers. comm., 1992). No information is available concerning its activities.

The lack of a capable administrative structure severely restricts the implementation of environmental legislation. Many institutions lack clear policies regarding their responsibilities and function in natural resource management (Hanif and Ravndal, 1988). A shortage of personnel is a problem for almost every sector, as the country has experienced large-scale emigration in recent years. The country's one national park is under constant pressure from itinerant miners, who continue to exploit the mineral resources illegally (mainly gold and diamonds) from the streams and rivers. The larger forms of wildlife, both terrestrial and avian, have practically been exterminated by hunting parties which supply wild meat to dredging crews upstream of the waterfall (Hanif and Ravndal, 1988).

The Programme for Sustainable Tropical Forestry in Guyana was proposed two years ago, but process has since been stalled due to lack of funds (Sullivan, 1990). Recently, the programme, due to run for five years, was adopted by the Global Environment Facility, a fund established by the World Bank and the UN Development Programme (Pearce, 1992). The programme has four main objectives, including: establishment and maintenance of a wilderness reserve in the centre of the country; to maintain a segment of the forest in a pristine condition, to be zoned for scientific research; and

establishment of an international research and training centre.

As part of the Tropical Forestry Action Plan, a proposal for the conservation of forest ecosystems was formulated by Hanif and Ravndal (1988). Among the recommendations made to improve protected area management was the transfer of such responsibilities from the National Parks Commission, under the Ministry of Communications and Works, to a new Protected Area Commission, under the Ministry of Medical Health, Environment and Food Policy. The Ministry of Communications and Works has since had its name altered to the Guyana Agency for Health Sciences Education, Environment and Food Policy (S. Griffith, pers. comm., 1992). Hanif and Ravndal (1988) further recommend that to clarify governmental policy the two existing forest policies should be incorporated into one.

**Systems Reviews** Guyana consists of five main biogeographical regions: coastal plain; sandy rolling lands; tropical savanna; Pre-Cambrian lowlands; and the Pakarima mountain range (GFC/CIDA, 1989; Persaud and Stewart, 1988).

The coastal plain is a narrow alluvial belt, comprising around 5% of total land area, that runs the length of the coast, and extends inland from 15km to 60km (Hilty, 1982; Persaud and Stewart, 1988). The plain lies between 0.5m and 1.0m below sea level, and is therefore subject to frequent flooding. Protection barriers have been erected along the coast since the days of Dutch colonisation in the late 16th century. Rainfall in the coastal region ranges from 2000mm to 2500mm. This is the most important agricultural region in the country, and over 90% of the population lives here (GFC/CIDA, 1989; Hilty, 1982; Hussain, 1990). However, owing to the shifting of sand banks, large-scale erosion along the coast is taking place (Hussain, 1990). Coastal ecosystems are also threatened by pollution and exploitation of critical resources such as mangroves (Hanif and Ravndal, 1988).

Little information is available on the current extent of mangrove vegetation in the country, but mangroves once stretched along the length of the coast. There has been a serious depletion of mangroves in the past 30 years, due to the joint effect of natural causes such as wave action and human use for fuel (Hanif and Ravndal, 1988; Hussain, 1990). Mangrove vegetation could play an important role in protecting the coastal region against erosion, except where wave action is very intense and the width of the mangrove belt very narrow. Although the national forest policy makes provision for their protection and regeneration, mangrove vegetation is not considered part of the state forest, and no conservation measures have been implemented (Hussain, 1990).

Just south of the coastal plain, in the north-east of the country, sandy rolling plains stretch inland (Persaud and Stewart, 1988). This region is gently undulating with altitudes varying from 5m-120m above sea level and



vegetation types from savanna grasslands to forest. The white, sandy soil is permeable and low in nutrients, and forms the most vulnerable ecosystem in Guyana (Hilty, 1982; Persaud and Stewart, 1988).

Tropical savanna covers around 11% of total land area, extending in the west from the southern part of the sandy rolling plains to the Rio Branco savannas of Brazil. The main grasslands are known as the Rupununi savannas, characterised by intense dry periods (Hanif and Ravndal, 1988; Hilty, 1982). Two different savanna types may be distinguished within the Rupununi region: the north savanna, associated with a 6,000m deep rift valley; and the south savanna, associated with the Pre-Cambrian plain, and interspersed with rock formations up to 900m (Persaud and Stewart, 1988). The Pre-Cambrian lowland region extends from the coastal plain throughout the length of the country to the Akarai mountains in the south. The region is gently undulating and varies from 90-120m in the north to 180-210m in the south, with intruding ridges 300-900m high which form waterfalls when they cross a river. The vegetation is dominated by tropical rain forest (Persaud and Stewart, 1988).

The Pakaraima mountain region was created by the uplift of the Roraima formation and elevation varies from 500m in the south of the range to the highest peak Mt Roraima (2,773m) in the north. The Pakaraima mountains, Pre-Cambrian lowlands and tropical savanna together comprise the interior region and account for 84% of total land area (Hilty, 1982). The interior is very sparsely populated, principally by native Amerindian communities, which total around 5% of the population of the whole country (Persaud and Stewart, 1988). The government has set aside considerable areas of forested land for exclusive use of native communities, in which they maintain their traditional livelihoods. The Forestry Action Plan includes proposals to train Amerindians in natural resource management, and to encourage the commercial production of non-timber forest products in both native and non-native communities (GFC/CIDA, 1988). Major threats to forest ecosystems arise from logging, uncontrolled fires, soil erosion and over exploitation of wildlife resources (Hanif and Ravndal, 1988).

Around 76% of total land area remains forested (Persaud and Stewart, 1988; W. King, pers. comm., 1991). The extent of intact natural ecosystems results more from the low population density and lack of population pressure than from any systematic conservation planning (GFC/CIDA, 1989; K.S.Fuller, pers. comm., 1991). Development plans for the near future and large investments by multi-national timber and mineral corporations threaten to reduce the forest cover drastically (GFC/CIDA, 1989; Lewis, 1991).

There is only one legally established protected area, Kaieteur National Park. A proposal exists to extend the park to 400,000ha (D.A. Black, pers. comm., 1992). This is controversial as it will compete with mining activities. There are no permanent park guards to prevent migration

into the park, and the wildlife and ecosystems are under constant threat from the activities of gold and diamond miners (Hanif and Ravndal, 1988; K.S.Fuller, pers. comm., 1991).

Sixty five Amerindian reservations have been set aside for native communities, covering a total area of 1.39 million ha. Amerindian land is managed and regulated by the resident communities, and no formal distinction between production and protection areas is made (Persaud and Stewart, 1988; D.A. Black, pers. comm., 1991). However, more than twice the total land allotted to Amerindians has been conceded to foreign organisations for logging (K. Wood, pers. comm., 1991).

A report dating from 1980 identifies two areas suitable for establishment as biosphere reserves, and a further two as World Heritage sites (Putney, 1980). However, there is no evidence that these recommendations have been acted on.

An area of 300,000ha of virgin tropical rain forest has been set aside as the Commonwealth-Government of Guyana Iwokrama Rain Forest Project, part of which will be kept as a wilderness preserve and part for research into sustainable use. This area currently lies within state forest but will be excluded from it by legislation in due course (D.A. Black, pers. comm., 1992).

A new road, which borders Kaieteur National Park, and which runs from Brazil to the Guyana coast, is due to be opened by the end of 1992. It is feared that the road will pose a serious threat to the park. The government is handing out logging licences to landless farmers and gold miners for many forests which neighbour the park, and it is feared that the park will inevitably be invaded.

## Addresses

Guyana Forestry Commission (GFC), 1 Water Street, PO Box 1029, GEORGETOWN (Tel: 2672715; Tlx: GY 2262; Cable: Wallaba)

Guyana Agency for Health Sciences Education, the Environment and Food Policy, Liliandaal, GREATER GEORGETOWN (Tel/Fax: 592 57523)

Guyana Natural Resources Agency, 41 Brickdam and Boyle Place, Stabroek, PO Box 1074, GEORGETOWN (Tel: 56720, 66549, 56111; Tlx: 3010 GNRA GY)

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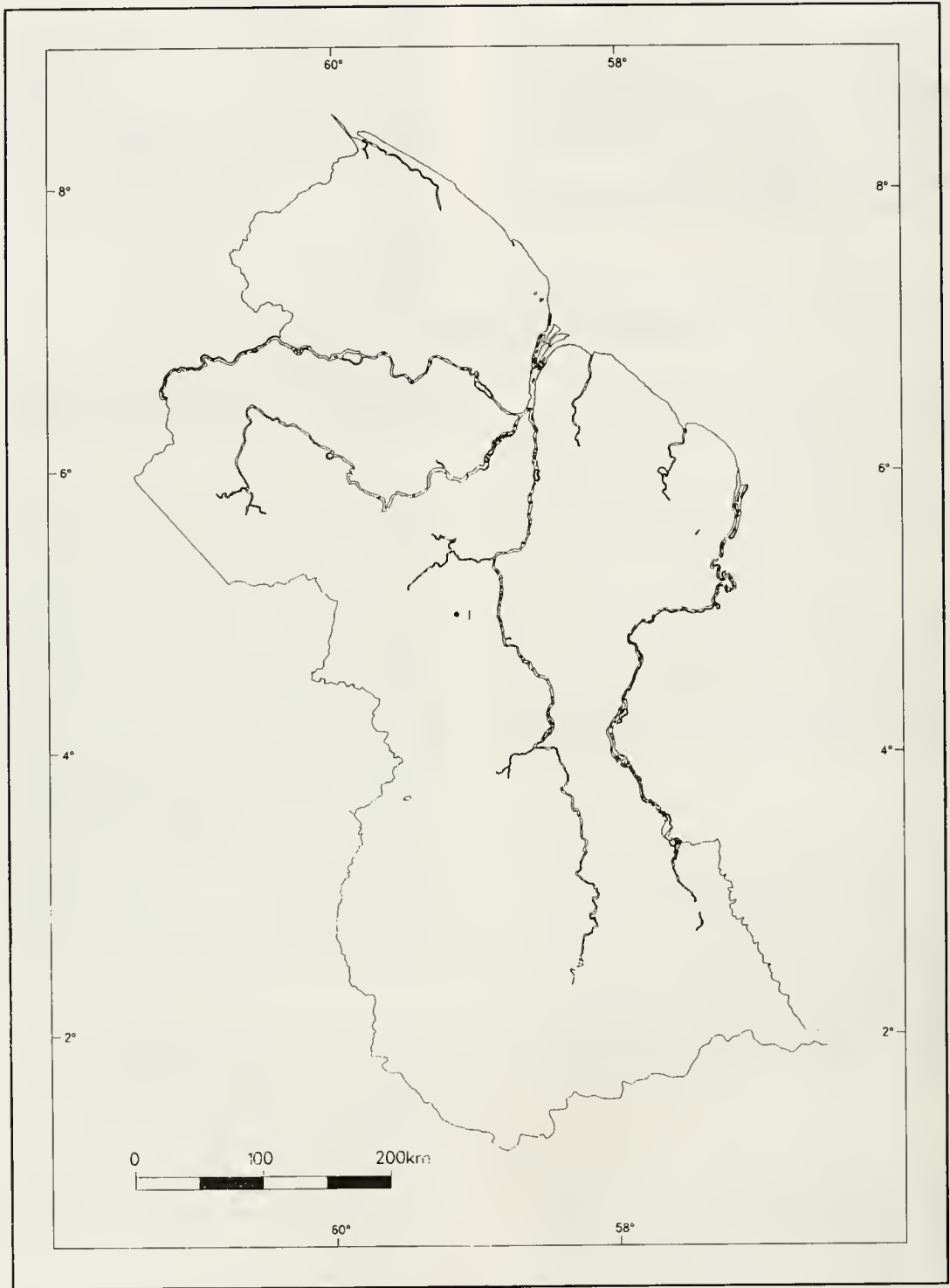
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### SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	National Park Kaieteur	II	58,559	1929





**Protected Area of Guyana**

# PARAGUAY

**Area** 406,752 sq. km

**Population** 4,277,000 (1990)

Natural increase: 2.69% per annum

## **Economic Indicators**

GDP: US\$ 1,155 per capita (1987)

GNP: US\$ 1,030 per capita (1989)

**Policy and Legislation** The 1967 Constitution was the first in Paraguayan history to acknowledge the government's responsibility to protect the environment. It declares that the state will conserve forest and other renewable natural resources in the country, and will establish regulations for their rational use. Since this declaration, there has been a profusion of legal measures regarding environmental protection. No coherent conservation policy has been stated, but constitutional provisions have precedence over all other laws (Anon., 1985).

The first national legislation for natural resource protection was the 1973 Forestry Law (*Ley Forestal*) No. 422 which declares it in the public interest to protect and conserve forest resources. Objectives include conserving and improving forested land, protecting watersheds, and incorporating the forestry sector into national economic development. Definitions are given for permanent, protected and special forest reserves (Annex). The exploitation of resources in these areas is decided by the state. The 1973 Forestry Law makes provision for the creation of the National Forestry Service (*Servicio Forestal Nacional*) (SFN) within the Ministry of Agriculture and Livestock (*Ministerio de Agricultura y Ganadería*), and an Advisory Council (*Consejo Asesor*). The Council comprises representatives from the Ministry of Agriculture and Livestock and other governmental organisations with interests in rural affairs, to assess the activities of the SFN and ensure compliance with objectives stated in the legislation.

Regulation of the Forestry Law (*Reglamento de la Ley Forestal*), Decree No. 11.681, 1975 gives further details of natural resource protection and management. Provision is made for the creation of the Department of Forest, National Parks and Wildlife Management (*Departamento de Manejo de Bosques, Parques Nacionales y Vida Silvestre*) within the SFN, to be responsible for natural resources, including the selection and administration of national parks. All responsibilities assigned to former governmental organisations for forest and wildlife administration, are transferred to the SFN. The 1975 Regulation refers to the creation and administration of national parks, but does not give a detailed designation.

Decree No. 18.831, Environment Protection Law (*Protección del Medio Ambiente*), 1986 reinforces the

principle of the 1973 National Forestry Law that rational resource use is in the public interest. Both private and state-owned land is subject to regulation under this Law which declares protected forests and natural reserved zones inviolable, and gives general regulations for natural resource conservation. A 100m-belt of protected forest is to be left on both sides of rivers, streams, water sources and lakes, and may be increased according to the importance of the water source.

In 1987, Decree No. 19.165 provided for the creation of an organisation specifically responsible for protected area management, namely the National Parks and Wildlife Office (*Dirección de Parques Nacionales y Vida Silvestre*) (DPNVS). The DPNVS is under the State Subsecretariat of Natural Resources and the Environment (*Subsecretaría de Estado de Recursos Naturales y Medio Ambiente*) of the Ministry of Agriculture and Livestock.

The lack of clear definitions for protected area designations in national legislation gives rise to confusion over regulations and management (DPNVS/CDC, 1990; Wetterberg *et al.*, 1985). Decrees establishing individual protected areas may give more details of their designation, but a single legislative act, to coordinate protected area regulations and state national conservation objectives, is needed (C. Acevedo, pers. comm., 1991).

**International Activities** Paraguay signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940, which has since been ratified. Paraguay ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (*World Heritage Convention*) on 28 April 1988. No sites have been inscribed to date.

In June 1991 an agreement was signed between the Moisés Bertoni Foundation, the Paraguayan government, the United Nations and The Nature Conservancy (TNC) in the United States for the purchase of 57,510ha of tropical forest. This is known as Mbaracayú Natural Forest Reserve (*Reserva Natural Forestal Mbaracayú*) and does not form part of the national system. Three of Paraguay's protected areas participate in TNC's Parks in Peril Program (Acevedo and Pinazzo, 1992).

**Administration and Management** Protected areas come under three administrative groups according to land tenure: state-owned; privately-owned; and others, primarily Itaipú Binacional Company (C. Acevedo and J. Pinazzo, pers. comm., 1991).

Since 1987, protected areas on state-owned land have been the responsibility of the DPNVS, as described in the legislation. Prior to the creation of the DPNVS, protected areas were included in forestry administration and were the responsibility of the SFN. Forests remain under the SFN, whose functions include formulating forest policies, conducting inventories, and regulating conservation of forest resources. It comprises a central directorate and technical department, and district forestry units (distritos forestales) and Centres of Training and Forest Research (Centros de Capacitación e Investigación Forestal) throughout the country. Each district forestry unit has a regulation enforcement service comprising inspectors, sub-inspectors and two levels of forest guards.

The DPNVS comprises five departments, one for each area of responsibility: protected area administration and development; wildlife; environmental education and information; Conservation Data Centre; and biological inventories (C. Acevedo, pers. comm., 1991; E. Bragayrac and R. Villamayor, pers. comm., 1991). At the local level, there is a total of eight administrators and 36 park guards working in maintenance and regulation enforcement in protected areas (E. Bragayrac and R. Villamayor, pers. comm., 1991).

The Conservation Data Centre (Centro de Datos para la Conservación)(CDC) was established in 1986, to collect and process information on biological diversity and the situation of protected areas. At its creation, the CDC was an office of the Minister of Agriculture and Livestock, but became a department within the DPNVS in 1990. It provides information to national and international conservation organisations.

Four protected areas that were established by the Itaipú Hydroelectric Project in 1983 are managed by the Itaipú Binational Company. The areas have been declared by law and legally designated as biological reserves and biological refuges. There is little coordination between this management and the DPNVS (DPNVS/CDC, 1990).

Management of privately-owned reserves is the concern of the land owner, and may take place in conjunction with non-governmental organisations (NGOs) or cooperatives. The areas do not receive protection by means of a legal designation (C. Acevedo and J. Pinazzo, pers. comm., 1991). One of the largest NGOs, the Moisés Bertoni Foundation for the Conservation of Nature (Fundación Moisés Bertoni para la Conservación de la Naturaleza), was established in 1988 to support conservation and protected areas, and is actively involved with the management of private reserves. The foundation works closely with international organisations and the government, to secure areas of land for protection, particularly in the eastern region (Gauto, 1989).

**Systems Review** Paraguay is a flat, land-locked country with many waterways, all of which drain into the Paraná River and on to the Río Plata system, hence

providing access to the Atlantic Ocean (Ríos and Zardini, 1989). The highest point in the country does not exceed 800m (DPNVS/CDC, 1990).

The two main biogeographical regions are divided by the Paraguay River: the western region or Chaco and the eastern region. The climate is continental sub-tropical, with precipitation varying from 400mm in the extreme north-west of the Chaco, to 1800mm in the eastern region.

The Chaco is a large, alluvial plain, extending over 247,000 sq. km with extreme variation from humid to dry conditions. Much of the area is flooded and swampy due to impermeable subsoils (DPNVS/CDC, 1990). The eastern region covers 159,000 sq. km and is the centre of most economic activities in the country, particularly agriculture and forestry (CDC, 1990; Ríos and Zardini, 1989). Most of this region was once covered in warm, moist forest (Holdridge, 1969), or subtropical humid forest (Hueck, 1978). Forests cover 45% the total land area, 33% of the eastern region, and 46% of the Chaco (Anon., n.d.).

Few studies have been done on biological diversity, and those that exist are now very old (DPNVS/CDC, 1990). Holdridge (1969) identified two life zones; temperate humid forest and temperate dry forest. Hueck (1978) classified the country into four vegetation regions: central Chaco forest, including the western Chaco; eastern Chaco forest extending from dry to semi-humid; deciduous subtropical and mesophytic forest including the eastern region near Brazil; and park land along the eastern margin of the Chaco (SNF, 1982).

Population distribution is very unequal, with 98% concentrated in the eastern region, and only 2% in the Chaco (Kohler, 1989). As a result, the eastern region has been substantially deforested and suffered general ecological degradation (Kohler, 1989). By the late 1980s, 63% of the population still lived in rural areas, and agriculture accounted for 43% of the employment (Anon., n.d.). Many changes have taken place since the coup in February 1988 which ended the Strossner dictatorship. Most significantly, additional land was put under production, and many forests have been severely overexploited as a result (Anon., n.d.).

Natural resource protection dates from the 1931 Rural Code (Código Rural), which prohibited the hunting of many wildlife species. Areas have been protected under the designation "reserve" since 1945, when a decree was passed declaring reserved zones along all roads in the country (DPNVS/CDC, 1990; Villamayor, 1988). Several other reserved zones were subsequently formed, but suffered modifications and no longer exist (Villamayor, 1988). It was several years before a governmental organisation was established to manage protected areas (DPNVS/CDC, 1990).

In 1966, the first area of sufficient size to fulfil its protection objectives was created under the designation



of faunal reserve (DPNVS/CDC, 1990). In 1973, the Ministry of Agriculture and Livestock initiated the legal process of protecting areas, passing decrees for the creation of several national parks. The National Forestry Service and the first protected forest were also created in 1973 (Villamayor, 1988). Following the creation of the DPNVS, the majority of protected areas established were designated national parks. A national conservation system (sistema nacional de conservación) was declared, unifying protected areas under the one management organisation (Villamayor, 1988). Since 1987, private reserves have been created, particularly in the eastern region. They make a significant contribution to the national system of protected areas (DPNVS/CDC, 1990).

By 1990, a total of 2.75% of the total land area was under protection (DPNVS/CDC, 1990; Villamayor, 1988). Two new national parks were created during 1990 (E. Bragayrac, pers. comm., 1991). Four more protected areas may also be included in the system, although they are managed by the Itaipú Binational Company; two biological reserves and two biological refuges. However, the lack of a clear definition of these designations at the governmental level has impeded the development of the areas in compliance with national conservation objectives (DPNVS/CDC, 1990).

Paraguay participates in the Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, otras Areas Protegidas, Flora y Fauna Silvestres) through the DPNVS (FAO, n.d.). Following the definition given by the FAO Latin American Network programme, Paraguay did not have a national system of protected areas by 1986, but was in the process of developing one (Ormazábal, 1988).

The distribution of protected areas is very unequal. In the Chaco, 4.45% of the total area is protected, whereas in the eastern region, only 0.13% is protected (Villamayor, 1988). Therefore, the national system does not protect all representative ecosystems (DPNVS/CDC, 1990; Ríos and Zardini, 1989).

Reviews of the protected area system have been carried out by Villamayor (1988) and the DPNVS and the CDC together (1990), the latter concentrating on potential protection for the eastern region. The main problem is the lack of clear definitions of the designations used (DPNVS/CDC, 1990). Without standard criteria for classification and regulations that reflect a national conservation objective, the establishment of an effective national system is prevented (DPNVS/CDC, 1990).

#### Addresses

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

#### Title: Ley Forestal (Forestry Law) No. 422

Date: 22 November 1973

**Brief description:** Declares it in the public interest to protect and improve forest resources in the country and establishes regulations for their use.

**Administrative Authority:** Under provision of this law, the Servicio Forestal Nacional (National Forestry Service) is created as part of the Ministerio de Agricultura y Ganadería (Ministry of Agriculture and Livestock) to be responsible for natural resource administration.

#### Designations:

**Bosque de Producción (Production Forest)** Forested areas suitable for annual or periodical extractive use

**Bosque Protector (Protection Forest)** Forested area protection of which is important for water regulation, soil stabilisation, public health, national defence or as a refuge for protected floral or faunal species.

**Bosque Especial (Special Forest)** Forested area that is to be conserved for scientific, educational, historical or touristic reason.

Source: Original legislation

#### Title: Reglamento de la Ley Forestal No. 422

Date: 6 January 1975

**Brief description:** Giving further details of forest resource management and use. Makes first reference to national parks at the national level and assigns administrative responsibility.

**Administrative Authority** Servicio Forestal Nacional (National Forestry Service), under the Ministerio de Agricultura y Ganadería (Ministry of Agriculture and Livestock) is responsible for selecting and administering national parks.

#### Designations:

**Parque Nacional (National Park)** An area given inviolable protection and administered exclusively by the National Forestry Service. All natural resource exploitation is prohibited.

Source: Original legislation

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Caaguazu	II	16,000	1976
2	Cerro Cora	II	12,038	1976
3	Defensores del Chaco	II	780,000	1975
4	Teniente Encisco	II	40,000	1980
5	Tinfunque	II	280,000	1966
6	Ybycui	II	5,000	1973
7	Ybytyruzú	II	24,000	1990
8	Ypacarai	II	16,000	1990
	<i>Biological Reserves</i>			
9	Itabo	V	11,260	1983
10	Limo'y	V	14,332	1983
	<i>Biological Refuges</i>			
11	Mbaracayu	V	1,356	1983
12	Tatiyupi	V	2,245	1983
	<i>Forest Reserve</i>			
13	Capüivary	VIII	13,500	1987
	<i>Protection Forests</i>			
14	Nacunday	IV	1,000	1975
15	Yaku'y	IV	1,000	1973



Protected Areas of Paraguay

# PERU

**Area** 1,285,220 sq. km

**Population** 221,550,000 (1990)

Natural increase: 2.5% per annum

## **Economic Indicators**

GDP: US\$ 2,183 per capita (1987)

GNP: US\$ 1,010 per capita (1989)

**Policy and legislation** A commitment to preserve the environment is given in the National Constitution of 1979, which states that all Peruvians "have the right to live in a healthy environment, which is in ecological equilibrium, and suitable for the development of life and preservation of the landscape and nature". Environmental protection is the responsibility of all citizens, and the state has the obligation to prevent and control environmental pollution.

In 1986 the government began to participate in the FAO Tropical Forestry Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. The National Programme for Forestry Action (Programa Nacional de Acción Forestal) was established by Supreme Decree No. 016-88-AG in 1988 to interpret the global designs of TFAP into a specific national action plan which had been drawn up in 1987 (DGFF, 1987). International assistance has been received for implementing many of the projects included in the national action plan, such as reforestation and education (DGFF, 1991).

In 1988, a proposal for a national conservation strategy was drawn up by a nongovernmental organisation, the Peruvian Foundation for Nature Conservation (Fundación Peruana para la Conservación de la Naturaleza) (FPCN), to preserve genetic diversity, maintain essential ecosystems and ensure sustainable use of natural resources. Recommendations include a revision of conservation legislation and education campaigns to increase public awareness (FPCN, 1988). Following this, the government established the National Commission (Comisión Nacional) by Presidential Decree on 5 June 1989, comprising representatives from various sectors and the international community, to detail and implement the national strategy. The final document, Basis for a National Conservation Strategy and Sustainable Development (Bases para una Estrategia Nacional de Conservación y Desarrollo Sostenible) was submitted to the government in 1991 (E. Cardich, pers. comm., 1991; G. Suárez de Freitas, pers. comm., 1991). This plan has not been put into action due to lack of funds, but it is currently being reproduced in certain regions across the country in the form of regional conservation strategies (estrategias regionales para la conservación) (G. Suárez de Freitas, pers. comm., 1991).

Regulations on natural resource use were first applied between 1956 and 1957 by declaring certain areas as national forests (bosques nacionales), within which only the state, or institutions granted permission by the state, may exploit natural resources. Congressional Law No. 13694, 1961 provided for the creation of the first national park, and marked the beginning of a legal system for designating different categories of protected areas, from controlled exploitation to inviolable protection. The Agrarian Reform Law (Ley de Reforma Agraria) No. 17716, 1969 declared that "national parks, national forests, forest reserves and archaeological zones declared by law cannot be considered for land distribution under agrarian reform."

Legal relations between indigenous peoples and protected areas are established by the Law of Native Communities and Agrarian Development for the Jungle and Forest Edge (Ley de Comunidades Nativas y Desarrollo Agrario de las Regiones de Selva y Ceja de Selva), Decree Law No. 20653, 1974 and No. 22175, 1978. This law recognises land rights of native communities and, where these overlap with protected areas, allows them to continue their activities as long as these are in keeping with the principles of protected area regulations (FAO, 1975; Ríos *et al.*, 1986).

Current regulations for natural resource use and definitions of protected area designations in effect were established by the Forestry and Wildlife Law (Ley Forestal y de Fauna), Decree Law No. 21147 (1975). Three management categories of forest reserves and four of protected areas, the latter called conservation units (unidades de conservación), are defined (see Annex). Individual conservation units are to be declared by supreme decree. Provision is made for the expropriation of privately-owned land by the state where it is required for the establishment of new conservation units. The Ministry of Agriculture (Ministerio de Agricultura) is responsible for all natural resources and protected areas.

Further details of protected area management relating to the 1975 Forestry and Wildlife Law are given in the Regulation of Conservation Units (Reglamento de Unidades de Conservación) Supreme Decree No. 160-77-AG of March 1977. Responsibility for formulating conservation policies and administering the conservation units is given to the General Directorate of Forestry and Fauna (Dirección General Forestal y de Fauna) (DGFF), within the Ministry of Agriculture. The four categories of conservation units, as defined in the 1975 Forestry law, collectively comprise the National System of Conservation Units (Sistema Nacional de Unidades de Conservación) (SINUC).

The Regulation of Conservation units requires that a management plan (plan maestro) be drawn up for each conservation unit and for SINUC as a whole. A system



of zonation is outlined, whereby each protected area is subdivided into zones according to the fragility of the ecosystems present. No conservation unit is to be used for recreational purposes until zonation has been implemented (Ríos *et al.*, 1986). A SINUC advisory board is established, and provision made for the formation of local conservation unit committees. The forestry police (policía forestal) are responsible for enforcing protected area regulations (Ríos *et al.*, 1986; Wetterberg, 1985). Two further categories of protected area, communal reserve (reserva comunal) and hunting reserve (coto de caza), are provided in the Regulation of the Conservation of Flora and Wildlife (Reglamento de Conservación de Flora y Fauna Silvestre), Supreme Decree No. 15877AG of March 1977 also relating to the Forestry and Wildlife Law (see Annex). A third designation, reserved zone (zona reservada), is mentioned but is to be used only as a transitional or provisional measure until studies allow a permanent designation to be assigned. Reserved zone is not a management category (Injoque *et al.*, 1991; Suárez de Freitas, 1990a; Suárez de Freitas, pers. comm., 1991).

The Organic Law of the Agrarian Sector (Ley Orgánica del Sector Agrario) No. 21 of April 1981 provides for the creation of a decentralised public body, the National Forestry and Fauna Institute (Instituto Nacional Forestal y de Fauna) (INFOR), to study agroforestry and wild fauna, and to implement projects to ensure the rational use and conservation of natural resources. Later in 1981, an agreement was reached between INFOR and the DGFF whereby the two institutions jointly managed conservation units. The division of administrative responsibilities and the functions of both INFOR and DGFF at the national and regional level are given in this organic law.

Although the 1975 Forestry Law, and regulations pertaining to it, still form the basis of all legislation regarding natural resource protection, by the mid 1980s it became clear that there was no coherent legal framework by which to implement governmental policies, owing to the large number of acts passed by different sectors with interests in resource use (DGFF, 1987). Major restructuring of the Agrarian Sector of the Ministry of Agriculture and changes in resource management responsibilities took place between 1987 and 1990.

The second Organic Law of the Agrarian Sector, No. 424 of January 1987, gives the DGFF sole responsibility for forest and wildlife resource management at the national level, and created agrarian units (unidades agrarias) to represent the Ministry of Agriculture at regional level. INFOR was dissolved and all responsibilities previously assigned to this institute and to its regional offices were incorporated into the DGFF and the agrarian units, respectively. Provision was made for the creation of three Vice-Ministers, including the Vice-Minister of Natural Resources and Rural Development (Vice Ministro de Recursos Naturales y Desarrollo Rural) at a

high level in central administration to whom the DGFF is itself responsible.

In March 1990, Supreme Decree No. 010-90-AG made provision for the creation of the National System of State Protected Natural Areas (Sistema Nacional de Areas Naturales Protegidas por el Estado) (SINANPE), comprising SINUC and all other categories of state protected area such as: national forest (bosque nacional), protection forest (bosque de protección), communal reserve and hunting reserve. Provision is also made for the creation of the National Programme of National Parks and Other State Protected Areas (Programa Nacional de Parques Nacionales y Otras Areas Protegidas), known simply as National Parks-Peru (Parques Nacionales-Perú), to be the organisation responsible for managing SINANPE (Injoque *et al.*, 1991).

The Organic Law No. 424 was replaced in 1990 by the Law of Organisation and Function of the Agrarian Sector (Ley de Organización y Funciones del Sector Agrario) No. 565, which finalised the structure of the public agrarian sector and the Ministry of Agriculture. The positions held by the three Vice-Ministers are abolished and their functions amalgamated into one, the Vice-Minister of Agriculture (Vice Ministro de Agricultura), who now supervises the DGFF. A regulation of this Law, Supreme Decree No. 048-900-AG, (1990), ratified the creation of National Parks-Peru and declared the DGFF responsible for its administration and management (DGFF, 1991; Injoque *et al.*, 1991).

On 7 September 1990, the Environment and Natural Resources Code (Código del Medio Ambiente y Los Recursos Naturales) Legislative Decree No. 613, first proposed in March 1983, was passed to simplify the legal situation by consolidating all previous policies regarding conservation and resource use into one act. The objectives of protected areas are restated and native communities' land ownership rights acknowledged. Their participation in managing natural resources is encouraged where such communities are found within protected areas, but natural resource use is limited to comply with the conservation objectives of the designation (Injoque *et al.*, 1991; G. Suárez de Freitas, pers. comm., 1991;). The Code does not replace existing environmental legislation but draws on past experience to form a coherent national management plan. The Code also repeals a previous law that seriously threatened the integrity of the Amazon region, the Law for the Basis of Rural Development of the Peruvian Amazon (Ley de Bases para el Desarrollo Rural de la Amazonia) No. 24994 of 1989, which promoted extensive agricultural development in the Amazon basin (Suárez de Freitas, 1990c; G. Suárez de Freitas, pers. comm., 1991).

Environmental legislation has not been able to stop informal development, such as spontaneous agricultural settlement, which threatens the ecosystems of many regions (Ferreyros, 1988; Suárez de Freitas, 1990d).

Threats to natural resource protection also arise from within the legal system itself. The mechanisms for establishing conservation units by supreme decree, as provided by the 1975 Forestry and Wildlife Law, can be undermined by laws of other sectors such as fisheries, mining or tourism because a supreme decree does not carry as much legislative weight as a law. A simple method of establishing conservation units by law is sought (Ferreiros, 1988).

**International Activities** Peru signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940, and it has since been ratified. The Convention for the Conservation and Management of Vicuña (Convenio para la Conservación y Manejo de la Vicuña) was signed in 1979 by Bolivia, Chile, Ecuador, Argentina and Peru.

Three agreements which deal exclusively with protecting Amazon regions have been signed by Peru. The Agreement for the Conservation of Fauna and Flora of the Amazon Regions of Peru and Brazil (Acuerdo para la Conservación de la Fauna y Flora de los Territorios Amazónicos de la República del Perú y de la República Federativa del Brasil) was signed in 1975; a similar agreement with Colombia in 1979; and the Amazon Cooperation Treaty (Tratado de Cooperación Amazónica) on 3 July 1978. The latter treaty was signed by the eight countries with land in the Amazon Basin to establish regulations for managing natural resources and to propose conservation directed alternatives to the management of multinational projects.

Peru ratified the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) in 1982. Four natural sites were inscribed in 1983, 1985, 1987 and 1990. Peru participates in the Unesco Man and Biosphere Programme, having had three biosphere reserves accepted in 1977, and signed the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) and has three sites inscribed.

Peru participates in the Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres) through the DGFF (FAO, n.d.).

**Administration and Management** The Ministry of Agriculture has been vested with the ultimate responsibility for managing natural resources since the 1950s. The first institute created within it specifically for this purpose was the Forestry and Hunting Service (Servicio Forestal y de Caza) in 1961. The Ministry of Agriculture took on its present structure with the passing of Decree Law No. 565 of April 1990. It has a broad field of responsibility and function covering agricultural and non-agricultural land, forests and protected areas. The

1975 Forests and Wildlife Law and its related Regulation assigned responsibility for conserving forest and wildlife resources and regulating their use, to the General Directorate of Forestry and Fauna (DGFF) within the Ministry of Agriculture.

Until the 1987 Organic Law took effect, protected area management was carried out by the DGFF together with the National Forestry and Fauna Institute (INFOR). In 1987 INFOR was dissolved and the DGFF took over its responsibilities under the Vice -Minister of Agriculture (Injoque *et al.*, 1991).

Within the DGFF are five sub-directorates, including the National Parks Directorate (Dirección de Parques Nacionales), the Flora and Wildlife Directorate (Dirección de Flora y Fauna Silvestres) and the Forest Management and Reforestation Directorate (Dirección de Manejo Forestal y Reforestación) (DGFF, 1987). National Parks-Peru was established within the DGFF to improve the administration of protected areas by unifying them within SINANPE, and allow them to better contribute to regional and national development (DGFF, 1991).

At the local level, the former regional organisations of the DGFF and INFOR, district forestry units (distritos forestales) and forestry development centres (centros de desarrollo forestal), respectively, have been integrated into 12 Agrarian Units. These are now the sole regional offices of the Ministry of Agriculture and have greater autonomy and responsibility for activities relating to forests and natural resources than previously, as part of the governmental process of decentralisation (DGFF, 1991; Injoque *et al.*, 1991). Enforcement of protected area regulations are carried out by park guards (guardaparques), part of National Parks-Peru: 93 were employed in the SINANPE in 1991 (Injoque *et al.*, 1991), compared with 143 in 1990 (WWF-US, 1990).

The National Office for Natural Resource Evaluation (Oficina Nacional de Evaluación de Recursos Naturales) (ONERN), a governmental organisation established in 1962, is responsible for identifying and evaluating natural resources and for commissioning projects to evaluate their conservation and use for socio-economic development. Since 1976, with funding from USAID, ONERN has been using Landsat imagery to formulate maps of natural resource distribution, and "life zones" using the Holdridge method.

There are around 80 non-governmental organisations (NGOs) concerned with ecology, wildlife conservation, protected areas and environmental issues, at local, national and international levels who are coordinated by the Peruvian Environmental Network (Red Ambiental Peruana) (E. Cardich, pers. comm., 1991). NGOs have contributed considerably towards improving the effectiveness of protected area management in the past decade, and often have more professionals working for them than the DGFF (DGFF, 1987; Injoque *et al.*, 1991). In particular, they have increased the number of qualified



personnel available, equipment, research and environmental education. Among the largest national level organisations are the Peruvian Foundation for Nature Conservation (Fundación Peruana para Conservación de la Naturaleza)(FPCN) established in 1985, which supports at least eight of the 25 areas in SINUC, including four of the seven national parks (G. Suárez de Freitas, pers. comm., 1991), and APECO, the Peruvian Association for Conservation (Asociación Peruana para la Conservación). The Conservation Association for the Southern Rainforest (Asociación de Conservación para la Selva Sur) (ACSS), founded in 1984, works specifically towards the protection of the southern region of rain forest. The Pachamama Society (Sociedad Pachamama), founded in 1990, is involved in sustainable development projects concerning protected areas, particularly in marine regions and dry tropical forest (E. Cardich, pers. comm., 1991).

The Conservation Data Centre (Centro de Datos para la Conservación del Perú) (CDC) at La Molina National Agrarian University (Universidad Nacional Agraria La Molina), formed in 1983 to provide information required for a management plan for SINUC, maintains a data base of biological diversity in Peru and runs a continual assessment of the effectiveness of resource conservation. It provides information for the FPCN, the DGFF, WWF-US, FAO and WCMC.

Protected area management has suffered from continuous changes within the Ministry of Agriculture and the lack of communication between central and regional administration. Combined with severe lack of funding owing to the economic situation, the effectiveness of natural resource regulation has been greatly reduced (DGFF, 1991). Amalgamating INFOR into the DGFF resolved some of the previous problems of divided responsibilities, but the reorganisations since 1987 have reduced the number of personnel working in central administration. The present government intends to reduce the number further, as part of a radical decentralisation process (DGFF, 1991). The lack of personnel is reflected in the fact that many areas do not have park guards. Only those conservation units in SINUC may be considered to fulfil some of the criteria for protected areas; the majority of the other areas that comprise SINANPE are only protected on paper (Injoque *et al.*, 1991).

A review of the current situation of protected area administration with proposals for institutional planning was carried out by Injoque *et al.* (1991). This study mentions that administrative problems have arisen partly from the fact that there has never been an autonomous institute responsible for protected areas whose sole objective is their administration and management, but this responsibility has always been assigned to institutions within a larger organisation (Injoque *et al.*, 1991). Among the suggestions to improve management is the creation of a school for training park guards, and the elaboration of a master plan to provide policies and guidelines for detailed planning within National

ParksPeru. Fortunately, some training courses for park personnel are run by the Peruvian Foundation for Nature Conservation (FPCN) in conjunction with the National Agrarian University and National Parks-Peru. Since 1989 they have received support from WWF-US (WWF, 1990).

Suárez de Freitas (1990b) cites inconsistencies in the designation of protected areas as another factor contributing to administrative inefficiency. For example, areas evaluated as locally important may not receive sufficient support from central government. A cohesive national system and compliance with internationally recognised protected area designations is needed to prevent local exploitation of resources. Closer working relations between the DGFF and NGOs should improve local administration (DGFF, 1987). The systems of SINUC and SINANPE are afforded low priority by the government, resulting in inadequate salaries and training and a continuing reduction in the number of personnel (Ferreiros, 1988; Suárez de Freitas, 1990d; Injoque and Suárez de Freitas, 1992).

Reviews of protected area systems conducted by CDC-Perú (1991), Suárez de Freitas (1990a) for the FPCN, Ferreyros (1988), and Dourojeanni (1985) with particular reference to Andean regions, all cite administrative complexity as a major problem.

**Systems Review** Topographically, Peru consists of three district regions; costa (coastal), sierra (central Andean Mountains) and selva (lowland slopes of Amazonian drainage basin). The climate is strongly affected by the Andean Mountains inland and by the Peruvian, or Humboldt, current which warms the coastal regions, giving rise to a number of distinct ecosystems across the country. As a result, Peru may harbour the richest biodiversity on earth and 84 "life zones", of the 103 proposed by Holdridge (1967) for the world, have been identified (Dourojeanni, 1985; Lamas, 1979).

The major ecosystems were originally defined in a classification system devised by Brack, and given in Ferreyros (1988) as: tropical Pacific Ocean; coastal desert; dry equatorial woodlands; páramo (dry altiplano); puna (mountain plains) and high Andes; high jungle; low jungle and the Pampas del Heath (wet grassland on the border with Bolivia). Two of these regions, coastal desert and the high Andes above 3,000m, are naturally non-forested, the others having been subjected to human interference (Gentry, n.d.). Around 60% of the country is still forested, with the largest tracts of forest (96% of the remaining forested land) found in the Amazonian lowlands (Burley, 1987). The major threat to the forest ecosystems in these regions is from widespread use of slash and burn agricultural techniques. Since the early 1970s migration to the Amazonian lowlands has taken place on a large-scale (Burley, 1987; Gentry, n.d.; Suárez de Freitas, 1990d). Despite this, nearly 90% of the Peruvian Amazonian forest remains intact (E. Cardich, pers. comm., 1991).

Much of the land is unsuitable for intensive agriculture, being too dry, steep or poorly drained for crops and only 3% is cultivated (Burley, 1987). Some 40% is only suitable for forestry, but the uneven distribution of the population, 90% of which lives in the Sierra and Costa regions which comprise only 40% of the total area, has put severe pressure on the environment. Deforestation, over-grazing and nutrient depletion through agriculture result in soil erosion and desertification in those regions (Suárez de Freitas, 1990d). The most seriously affected are the central valleys which have been farmed since pre-Hispanic times. Agricultural productivity is generally very low.

Resource management began with the declaration of national forests in the 1950s, and the first national park was established in 1961 (Dourojeanni and Roche, 1984; Injoque *et al.*, 1991). However, without preliminary studies to develop a management plan or designate clear boundaries, it was largely ineffective. However, the event did lead to extensive research to identify important ecosystems around the country, with a view to their protection (Ferreiros, 1988). Since then, protected areas have been declared under various designations from those allowing regulated exploitation, to inviolable protection accordingly.

SINUC, the National Network of Conservation Units, was established in 1975, and incorporated into the National System of State Protected Areas (SINANPE) in 1990. By 1991, SINUC comprised 25 conservation units (national parks and reserves, historical and national sanctuaries) covering 5,513,425ha or 4.29% of total land area (CDC-Perú, 1991; Suárez de Freitas, pers. comm., 1991). SINANPE comprised the 25 conservation units of SINUC covering 13,265,111ha, or 10.32% of total land area (DGFF, 1991; Injoque, *et al.*, 1991). The number of national forests has been reduced considerably from 17 in 1975, reflecting disinterest and inefficiency in forestry management (Suárez de Freitas, 1990d). The wealth of biological diversity present makes it difficult to extend protection to all types of life zones described. The marine and coastal region, particularly the tropical and temperate Pacific deserts, is one of the most notably underrepresented regions in the protected area system. The fragile ecosystems of the high altitude Puna also require urgent protection measures (CDC-Perú, 1986, 1991; E. Cardich, pers. comm., 1991;).

Following the definition given by the FAO Latin American Network programme, Peru has a coherent system (Ormazábal, 1988).

Many areas are not managed according to their legal definitions and within each category practical management regimes vary considerably. The majority of areas that comprise SINANPE are only protected on paper. Only those areas in the SINUC comprise what may be considered criteria for protected areas (Injoque *et al.*, 1991). Reserved zone (zona reservada) has been applied permanently to five areas, but it is not a

management category, but rather a transitory classification to be used only until further studies indicate the degree of protection if any required. The five areas subsequently lack a legal basis for protection (CDCPerú, 1986, 1991; Suárez de Freitas, 1990d).

Human settlement is a threat to the whole SINUC system. This is most apparent in the heavily populated Andean region (Dourojeanni, 1985) and in regions where coca is grown intensively such as the Hualлага Valley (E. Cardich, pers. comm., 1991). The production of coca for cocaine has caused serious social and environmental problems such as soil erosion, forest destruction and large amounts of pollution from fertilisers and chemicals used in processing. Increasing lawlessness in these regions makes environmental regulations difficult to implement. Some areas within SINUC (Tingo María and Junín) have been abandoned owing to subversive activities and the unstable social situation in the country (Injoque, *et al.*, 1991).

Land tenure threatens the implementation of conservation strategies in some regions (Dourojeanni, 1985). Peruvian legislation requires that national park land is state-owned, although the Act on Native Communities (1974 and 1975), and the Environmental Code (1990) acknowledge the right of indigenous communities to land ownership. In the Andean region, where most of the land is privately owned by individuals or communities, the sustainability of protected areas depends on the benefit that local people derive from them. Here, resources are protected by the designation of national reserves within which sustainable exploitation is carried out by the local people themselves (Dourojeanni, 1985). The problem of native community land rights is particularly apparent in the Peruvian Amazonian region where existing management systems have largely ignored rights. Increasing the extent to which native communities are involved in managing the Amazon region will help to improve the effectiveness of protection measures (E. Cardich, pers. comm., 1991).

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Ley Forestal y de Fauna Silvestre  
(Forestry and Wildlife Law)-Decree  
Law No. 21147

**Date:** 13 May 1975

**Brief description:** Forests and wild faunal resources belong to the public and rights to them cannot be acquired. This law provides for the establishment of protected areas and the rules governing the protection and use of forest and faunal resources.

**Administrative authority:** Ministry of Agriculture.

#### Designations:

**Bosque nacional (National forest)** Forests declared by Supreme Decree suitable for continuing production of timber, other forest products or wild fauna, made use of directly by the state, or by individuals with prior authorisation from the state and under special regulations and supervision. **Bosque de libre disponibilidad (Freely disposable forest)** Forest suitable for continuing production of timber, other forest products or wild fauna and used by any duly authorised person. Declared by Ministerial Resolution.

**Bosque de protección (Protection forest)** Forest whose characteristics and situation are conducive to soil and water conservation declared, by Supreme Resolution, as inviolable for the protection of agricultural land, road systems and other facilities. All exploitation is prohibited.

#### CONSERVATION UNITS (UNIDADES DE CONSERVACIÓN):

**Parque nacional (National park)** Area of wild floral and faunal and scenic beauty allocated for inviolable protection. All exploitation is prohibited

**Reserva nacional (National reserve)** Area allocated to wild faunal species for protection and propagation in the nation's interest. Sustainable harvesting of wildlife is allowed. The use made of products from such reserves shall be a matter for the state. When a reserve is on agricultural land, the Ministry of Agriculture will authorise use of fauna

by those working the land and prescribe control measures accordingly.

**Santuario nacional (National sanctuary)** Inviolable area allocated for protection of any species, communities of plants or animals or any natural formations of scientific or scenic interest.

**Santuario histórico (Historic sanctuary)** Inviolable area allocated for protection of natural sites where important events in the nation's history took place.

**Source:** FAO, 1976

**Title:** Reglamento de Conservación de Flora y Fauna Silvestre (Regulation of the Conservation of Flora and Wildlife), Supreme Decree 15877AG, relating to the 1975 Forestry and Wildlife Law

**Date:** 31 March 1977

**Brief description:** Regulates the use of natural resources and gives definitions for two protected area designations and the possibility of a third, temporary classification

**Administrative authority:** Ministry of Agriculture

#### Designations:

**Coto de caza (Hunting reserve)** Area suitable for wildlife management. Land may be either private or publicly owned, and have an adequate infrastructure to allow sport hunting activities.

**Reserva comunal (Communal reserve)** Area set aside to conserve wildlife for the benefit of local populations whose livelihoods traditionally depend on wildlife products. May be established for native or peasant communities, or migrant hunters from the mountains, jungle or adjacent jungle

**Zona reservada (Reserved zone)** May be applied to an area to protect the wildlife and fauna present until studies are carried out to determine a suitable permanent designation. This is not a protected area management category and is only to be used in a transitory or provisional sense

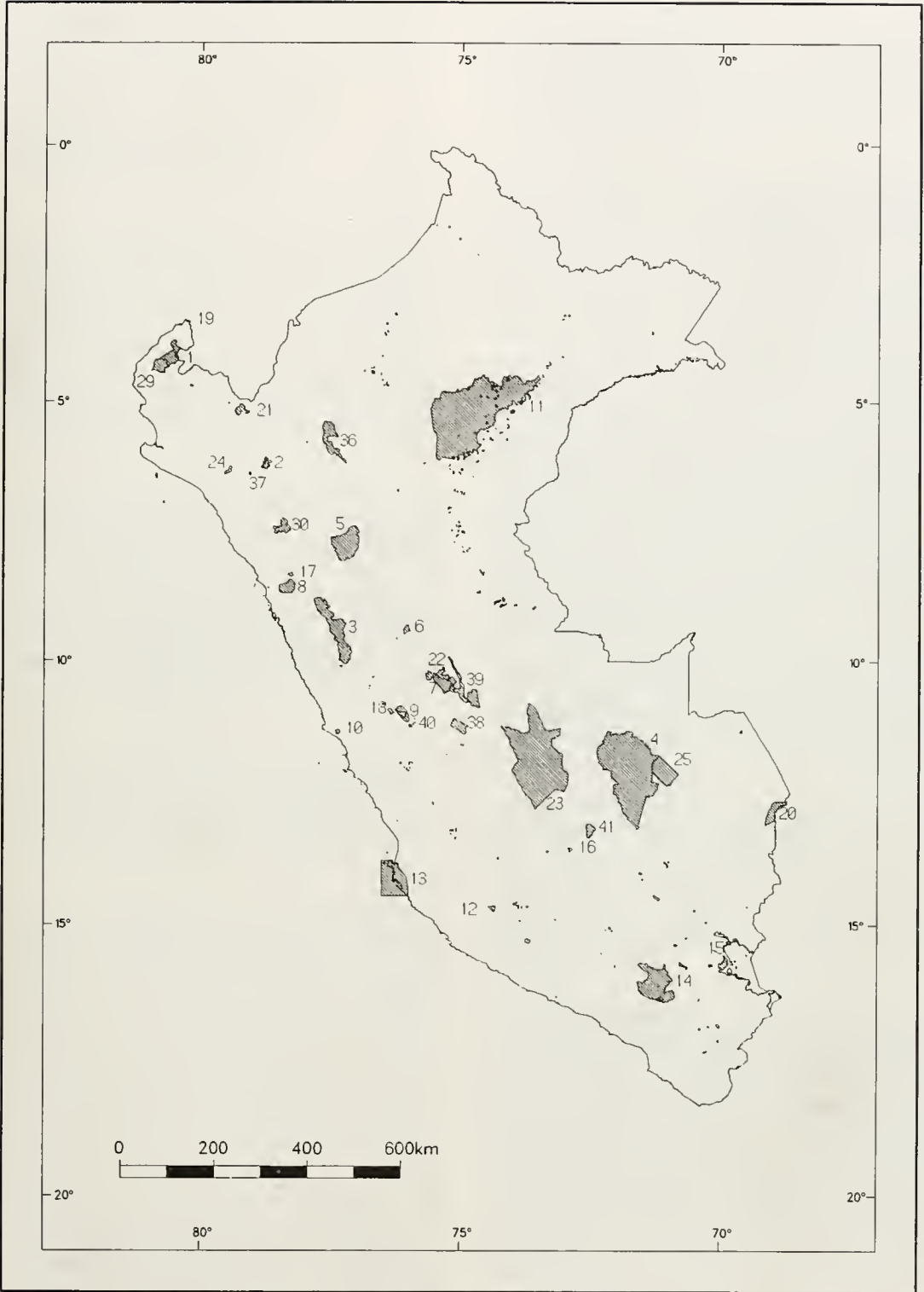
**Source:** Suárez de Freitas, 1990a

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Park</i>			
1	Cerros de Amotape	II	91,300	1975
2	Cutervo	II	2,500	1961
3	Huascarán	II	340,000	1975
4	Manu	II	1,532,806	1973
5	Río Abiseo	II	274,520	1983
6	Tingo María	II	18,000	1965
7	Yanachaga-Chemillén	II	122,000	1986
	<i>National Reserve</i>			
8	Calipuy	IV	64,000	1981
9	Junín	VIII	53,000	1974
10	Lachay	III	5,070	1977
11	Pacaya Samiria	VIII	2,080,000	1982
12	Pampa Galeras	VIII	6,500	1967
13	Paracas	VIII	335,000	1975
14	Salinas y Aguada Blanca	VIII	366,936	1979
15	Titicaca	V	36,180	1978
	<i>National Sanctuary</i>			
16	Ampay	V	3,635	1987
17	Calipuy	III	4,500	1981
18	Huayllay	III	6,815	1974
19	Manglares de Tumbes	III	2,972	1988
20	Pampas del Heath	III	102,109	1983
21	Tabaconas-Namballe	III	29,500	1988
	<i>Communal Reserve</i>			
22	Yanesha	VIII	34,744	1988
	<i>Reserved Zone</i>			
23	Apurímac	VI	1,669,290	1988
24	Laquipampa	IV	11,347	1982
25	Manu	VI	257,000	1980
26	Racali	V	6,433	1985
27	Tambopata-Candamo	III	1,478,942	1977
28	Udima	V	8,469	1991
	<i>Hunting Reserve</i>			
29	El Angolo	VIII	65,000	1975
30	Sunchubamba	VIII	59,735	1977
	<i>National Forest</i>			
31	Alexander von Humboldt	VIII	570,800	1965
32	Biabo-Cordillera Azul	VIII	2,068,500	1963
33	Mariscal Cáceres	VIII	137,448	1963
34	Pastaza, Morona, Marañón	VIII	375,000	1963
35	Tumbes	VIII	75,102	1957
	<i>Protection Forest</i>			
36	Alto Mayo	VIII	182,000	1987
37	Pagaibamba	VIII	2,078	1987
38	Pui-Pui	VIII	60,000	1985
39	San Matías-San Carlos	VIII	145,818	1987



Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Historical Sanctuary</i>			
40	Chacamarca	V	2,500	1974
41	Machu Picchu	V	32,592	1981
	<i>Biosphere Reserves</i>			
	Reserva de Huascarán	IX	399,239	1977
	Reserva del Manú	IX	1,881,200	1977
	Reserva del Noroeste	IX	226,300	1977
	<i>Ramsar Wetlands</i>			
	Reserva Nacional de Paracas	R	335,000	1992
	Reserva Nacional Pacaya-Samiria	R	2,080,000	1992
	Santuario Nacional Lagunas de Mejía	R	691	1992
	<i>World Heritage Sites</i>			
	Parque Nacional Huascarán	X	340,000	1985
	Parque Nacional Manú	X	1,532,807	1987
	Parque Nacional Río Abiseo	X	274,520	1990
	Sanctuario Histórico de Machu Picchu	X	32,592	1983



Protected Areas of Peru



# REPUBLIC OF SURINAME

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Area 163,800 sq. km

Population 422,000 (1990)

Natural increase: 1.76% per annum

## Economic Indicators

GDP: US\$ 2,760 per capita (1987)

GNP: US\$ 3,020 per capita (1989)

**Policy and Legislation** Provision for the establishment of protected areas is made in various pieces of legislation. In general, original legislation was passed during the time that the region was a colony of the Netherlands, and has since been updated, one or several times, both before and after independence. Suriname gained full independence from the Netherlands in 1975, since when the signatory authority of the Governor of the then colony has been transferred to the President of the Republic of Suriname.

The first piece of legislation covering the region was provided in Article 44 of the Police Penal Code, Government Bulletin (G.B.) No. 77, 1915 (updated by G.B. No. 152, 1942 with latest amendment in G.B. No. 107, 1964) (see Annex). This code contained the mechanism to establish areas where hunting or capturing of wildlife was only allowed following issue of a written permit. The first sanctuary was established, under this code, following Government Resolution (G.B. No. 12, 1953) on 15 February 1953.

Under the Law on the Issuance of State-owned Lands (Agarische Wet G.B. No. 53, 1937, updated by G.B. No. 53, 1953), later updated by Decree L-2 of 15 June 1982, nature parks and multiple-use management areas may be created (see Annex) (Baal, 1991).

In 1948, the Nature Conservation Commission (Natuurbeschermingscommissie) was established by Government Resolution in order to study conservation problems, and to propose legislation for conservation. This resulted in the Nature Preservation Law, 1954 (Government Gazette No. 26), under which the principles of nature conservation were first formulated, and which provided for the establishment of nature reserves by state resolution (see Annex). To date, five nature preservation resolutions have been passed, relating to this law. The 1986 resolution included a provision for the traditional rights and interests of indigenous people living in tribal communities, where these rights would affect the newly protected areas. These traditional rights were subject to various provisos, and essentially ensured the following: free choice for the settlement of villages; free choice of land for the establishment of shifting cultivation grounds; permission to hunt, fish and apply for a cutting permit (Baal, 1991).

A planning law (Planwet) of 1973 (G.B. No. 89) provides for the establishment of, amongst other things, special management areas (bijzondere beheersgebieden) (see Annex). However, not all agencies dealing with the execution of this law have been established, and it is not yet operational (Baal, 1991).

Forestry legislation currently comprises the Timber Law, 1947 (see Annex) which provides for reserving areas for exploration and exploitation, and for placing concessions at the disposal of the government. The Forest Service is authorised to manage certain of these areas as forest reserves. By Resolution 2824 of 21 July 1947 (G.G. No. 108, 1947), the Forest Service (Dienst's Lands Bosbeheer) was established to manage forest reserves and to ensure sustainable management of the nation's forests. A draft Law on Forest Management (Concept-Ontwerp Wet Bosbeheer), which will replace the Timber Law, currently awaits enactment by Parliament. It will distinguish three main categories of forest according to land use: permanent forest (blijvend bos); conversion forest (eenmalig leeg te kappen bos) and provisionally maintained forest (voorlopig in stand te houden bos). permanent forest comprises specially protected forest (speciaal beschermd bos), protection forest (schermbos) and permanent production forest (blijvend produktiebos) (Baal, 1991).

Protected areas legislation has been reviewed recently by Baal (1991). Recommendations arising from this report include evaluating the provisions in the legislation to bring definitions in line with those evolved during the IV World Parks Congress.

Suriname participates in the FAO Tropical Forestry Action Plan (TFAP), an international strategy for maximising the contribution of forestry sectors to national economic and social development while maintaining conservation principles. A national action plan has been formulated to interpret the global objectives of the TFAP to meet specific national requirements.

**International Activities** Suriname signed the 1940 Convention concerning the Protection of Flora, Fauna and Natural Scenic Beauty of the Americas (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention). Suriname is one of the eight countries with territory in the Amazon region that signed the Amazon Cooperation Treaty on 3 July 1978, an agreement to establish regulations for managing natural resources and to propose conservation directed alternatives to the management of multinational projects.

The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) was ratified on 18 March 1985, under



which one site has been inscribed. Suriname is not party to the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), neither does it participate in the Unesco Man and Biosphere Programme.

Suriname participates in the Western Hemisphere Shorebird Reserve Network. Under this network, three reserves, Coopenamemonding and Wia Wia Nature Reserves and Bigi Pan Multiple-Use Management Area, were officially established as hemispheric reserves on 4 March 1989. At the same time, these three protected areas were twinned with two protected areas in Canada, following a Memorandum of Understanding of 8 August 1987 concerning cooperation in the field of conservation by the Canadian Wildlife Services and the Suriname Forest Service.

**Administration and Management** The Ministry of Natural Resources (Ministerie van Natuurlijke Hulpbronnen) is responsible for policy direction, legislation, issuance of permits, budget allocation and interministerial coordination, and for all matters relating to natural resources. Three sections exist within this ministry. Two, the Forest Service and the Bureau of Lands, are responsible for protected areas. The third section, the Foundation for Nature Preservation, deals with sea turtles and nature tourism. The Director responsible for the first two sections is also responsible for enforcement of the Police Penal Code (under which sanctuaries may be established) (Baal, 1989, 1991; Held and Reichart, 1991). A high-level advisory body, the Nature Conservation Commission, was established in 1948 to advise the government on environmental and conservation issues and to assist in decision-making. Responsibilities of the commission include supervising the implementation of the Nature Preservation Law, and selecting areas for designation as nature reserves (Baal, 1989).

The Forest Service is in charge of the protection, control, and management of the forest resources, and both forest protection and production, as detailed in the 1954 Nature Preservation Law. Within the Forest Service, the Nature Conservation Division comprises four sections, one for each of its functions: nature reserves and wildlife management (including trade regulation); research; education; and Bureau for Commissions to issue permits (Baal, 1989). Regulation enforcement and patrolling of protected areas is carried out by forest guards of the Forest Service (Schulz, 1968). Nature reserves are managed primarily to afford protection for scientific research purposes, but tourism and environmental education are encouraged increasingly in the more accessible areas (Mittermeier *et al.*, 1990; Schulz, 1968). A second division within the Forest Service, the Special Protection Forest and Protection Forest Section, is responsible for formulating the new draft Law on Forest Management and for its implementation once passed (Held and Reichart, 1991).

The Bureau of Lands is responsible for long-term lease areas, including nature parks and multiple-use management areas.

In 1969, the Foundation for Nature Preservation (Stichting Natuurbehoud Suriname) (STINASU), a non-governmental organisation, was established to assist the Forest Service in managing nature reserves. The responsibilities of STINASU have grown, and it now plays an important role in conservation in the country. It is responsible for nature tourism, promoting public environmental awareness campaigns, including sponsoring and guiding the development of a Wildlife Rangers Club for young people, and conducting research on sea-turtles. STINASU also has sole management of one nature reserve (Baal, 1989; Mittermeier *et al.*, 1990). The Forest Service and STINASU work very closely together, and provide mutual assistance for their conservation activities.

A Conservation Action Plan was drawn up in 1990 (by WWF-USA, the Ministry of Natural Resources and STINASU) as part of the National Forestry Action Plan, to provide a framework by which conservation activities in Suriname may be amplified and strengthened (Mittermeier *et al.*, 1990). The Conservation Action Plan contains projected activities for a period of five years, including the formulation of management plans for each protected area, and establishment of an ecological database to provide up-to-date information on the status of ecosystems and species. These measures will assist in the administration of existing protected areas and in selecting new areas for protection. An increase in training opportunities for conservation workers is also recommended, such as providing fellowships for further education in conservation-related programmes with international assistance, at the University of Suriname, and foreign institutes (Mittermeier *et al.*, 1990). Further details of the National Forestry Action Plan and the extent of implementation are currently not available.

Management of protected areas is well organised, and is generally good. The factor most restricting its efficiency is a lack of funds and equipment. Five areas, however, do have administrative buildings and a guard force. Initially, in its enthusiasm to preserve wild habitats, the government did not give much consideration to the interests of tribal people (Held and Reichart, 1991). Despite this, government decisions have generally been respected, largely due to the low population pressure, and the existence of adequate land outside protected areas for tribal uses. Legislation has now been modified to take account of the needs of tribal people. In addition, the Forest Service and STINASU, when starting to manage protected areas, have strived to maintain good relationships with local villagers. Where possible, workers for the reserves and park are hired from the villages, and villagers are allowed to enter the reserves and park to fish, collect fuelwood and medicinal plants for personal use, and to perform cultural activities. However, the general laws on hunting, fishing, and forest exploitation have been complied with (Held and

Reichart, 1991). An important exception has been the resistance to attempts to reduce the extent of turtle egg harvest in Galibi Nature Reserve (Reichart, 1991). Conflicts that do arise may be split into three categories: Amerindian claims of traditional rights; intensive land use on park boundaries; conflicting interests in the multiple-use management area (Held and Reichart, 1991).

The Forest Service and STINASU have suffered from great financial problems, due to the economic recession of the country, especially during the last ten years. Nevertheless, financial and technical assistance is received from some international and foreign organisations, such as WWF-USA and WWF-The Netherlands, Conservation International, The Royal Institute for Nature Management in the Netherlands, the Canadian Wildlife Service and the Organisation of American States.

**Systems Reviews** Suriname has a typical tropical climate with average temperature of 27°C all year, and annual rainfall between 1750mm and 3000mm. Four main ecological regions may be distinguished: young coastal plain; old coastal plain; savanna belt; and the interior region (Mittermeier *et al.*, 1990). The young coastal plain lies between 0m-4m above sea level and consists of clay swamps with a natural vegetation of mangrove forests, open herbaceous swamps and several types of swamp forest. Just inland of this is the old coastal plain, lying between 4m-11m above sea level and consisting of clay swamps, sand ridges covered with grass and herbaceous swamps, swamp forests, dry forests and large areas of peat swamps (Mittermeier *et al.*, 1990). Behind the coastal region lies the savanna belt, between 10m-100m, and characterised by white sand ecosystems. The natural vegetation is xerophytic and mesophytic dry and swamp forests, and dry to wet grass and shrub savannas.

Extending inland from the savannas on the ancient Guiana Shield, the interior region covers three-quarters of the total area of the country (Mittermeier *et al.*, 1990). Altitudes range to 1,230m, and the region is almost entirely covered with primary tropical rain forest, interspersed with small patches of marsh forest along rivers and creeks. Around 95% of the total population lives in the coastal region where the capital city is located, and only around 5% lives in the interior. The forest in this sparsely uninhabited region is largely undisturbed and the rate of destruction is very low, around 0.1% annually (Mittermeier *et al.*, 1990). In total, nearly 90% of total land area is covered by forest.

Nature conservation activities are based on Dutch traditions and began around 50 years ago. The Nature Conservation Commission was established in 1948 to assist the government in all environmental conservation issues. The first attempt at management was the creation of the first game sanctuary in 1953, based on the 1942 Police Penal Ordinance (Baal, 1989; Schulz, 1968). In 1969 this area became Coppenamemonding Nature

Reserve, forming part of the first phase of protected areas (nine nature reserves and one nature park) that were gazetted between 1961 and 1972. Most of these protected areas are located in remote areas of the country. The second phase was the period after Suriname's independence. The need was felt to preserve interesting natural areas in lowland areas where the population, and therefore human pressure on the ecosystems, was higher. Four new nature reserves were therefore gazetted in 1986, and in 1987, part of the estuarine zone, Bigi Pan, was put at the disposal of the Ministry of Natural Resources, to be managed as a multiple-use management area (Held and Reichart, 1991). It has been proposed since 1976 that the whole estuarine area, including Bigi Pan Multiple-Use Management Area, could become a special management area. Brownsberg Nature Park is a long-term lease area issued to the Foundation for National Preservation in Suriname, which manages it as a national park (Baal, 1991).

By 1990 there was a total of 13 nature reserves, 1 nature park and 1 multiple use management area, collectively accounting for around 5% of total land area (Mittermeier *et al.*, 1990). In addition, two further nature reserves, two forest reserves and enlargements of existing areas are proposed, which would bring the total area under protection to 7%, and include representative samples of the majority of Suriname's characteristic ecosystems (Baal, 1989; Held and Reichart, 1991; Mittermeier *et al.*, 1990). There are, however, some protected areas near human settlements, where conflicts have arisen, or may arise in the near future (Held and Reichart, 1991).

Nature conservation is generally in good shape. The country has a well-planned programme for nature conservation and environmental protection, with a well managed network of protected areas, despite the economic problems facing the country since 1983. The lack of available funds is the most restricting factor in the implementation of these projects (Baal, 1991; Mittermeier, *et al.*, 1990). However, problems do exist. In particular, some parks in the interior have had their infrastructure damaged by recent army activities, and STINASU is now trying to raise the money required to rebuild them (K. Wood, pers. comm., 1991).

#### Addresses

Nature Conservation Department of the Forest Service, Ministerie van Natuurlijke Hulpbronnen (Ministry of Natural Resources), Cornelis Jongbawstraat 10-12, PO Box 436, PARAMARIBO (Tel: 71316/75845/10256; FAX: 597 72911; Tlx: 364 NHE SN)  
Stichting Natuurbehoud Suriname (Foundation for Nature Preservation in Suriname) (STINASU), PO Box 436, PARAMARIBO (Tel: 75845 ext. 343541)

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ANNEX

Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration

**Title:** The Police Penal Code, Government Bulletin (G.B.) No. 77, 1915 (updated by G.B. No. 152, 1942 with latest amendment in G.B. No. 107, 1964).

**Date:** 1915

**Brief description:** Provides for the establishment of sanctuaries.

**Administrative Authority:** Ministry of Natural Resources

**Designations:**

*Sanctuary* Hunting or capturing of wildlife is only allowed following issue of a written permit

**Source:** Baal (1989)

**Title:** Law on the Issuance of State-owned Lands (Agarische Wet G.B. No. 53, 1937, updated by G.B. No. 53, 1953), later updated by Decree L-2 of 15 June 1982, by which nature parks and multiple-use management areas may be created.

**Date:** 1937

**Brief description:** Provides for the establishment of nature parks and Multiple-Use Management Areas

**Administrative Authority:** Bureau of Lands

**Designations:**

*Multiple-Use Management Area* No information

*Nature park* No information

**Source:** Baal (1991)

**Title:** The Timber Law

**Date:** 1947

**Brief description:** Provides for the creation of forest reserves, and for placing concessions at the disposal of the Government

**Administrative Authority:** Forest Service

**Designations:**

*Forest reserve* For exploration and exploitation

**Source:** Baal (1989); Schulz (1968)

NB This Forest law is soon to be replaced by the existing draft Law on Forest Management (Concept-Ontwerp Wet Bosbeheer), which currently awaits enactment by Parliament.

**Title:** Natuurbeschermingswet (Nature Preservation Law) (Government Bulletin No. 26)

**Date:** 1954

**Brief description:** Provides for the establishment, by State Resolution, of protected areas under the designation nature reserve.

**Administrative Authority:** Suriname Forest Service

**Designations:**

*Nature reserve* An area of public land which is of scientific, aesthetic or cultural value. The area may not necessarily be of exceptional value, but may be a representative sample of an important national ecosystem.

The primary management objective of reserves is protection for scientific research purposes. Recreational and educational activities are possible in the more accessible reserves.

The area is selected for designation by the advisory board, the Nature Conservation Commission, created in 1948.

The carrying of firearms is not permitted, or any other means of hunting or capturing wildlife, including dogs.

Article 7 provides for the opportunity to have a business within the boundaries of the reserve (in accordance to an approved plan) to gather forest products, to graze cattle, or to fish when certain conditions are complied with.

**Source:** Baal (1989); Schulz (1968)



**Title:** Planning law (Planwet) (G.B. No. 89)

**Designations:**

**Date:** 1973

*Special management area* (Bijzondere  
Beheersgebieden)

**Brief description:** Provides, amongst other things, for the establishment of special management areas

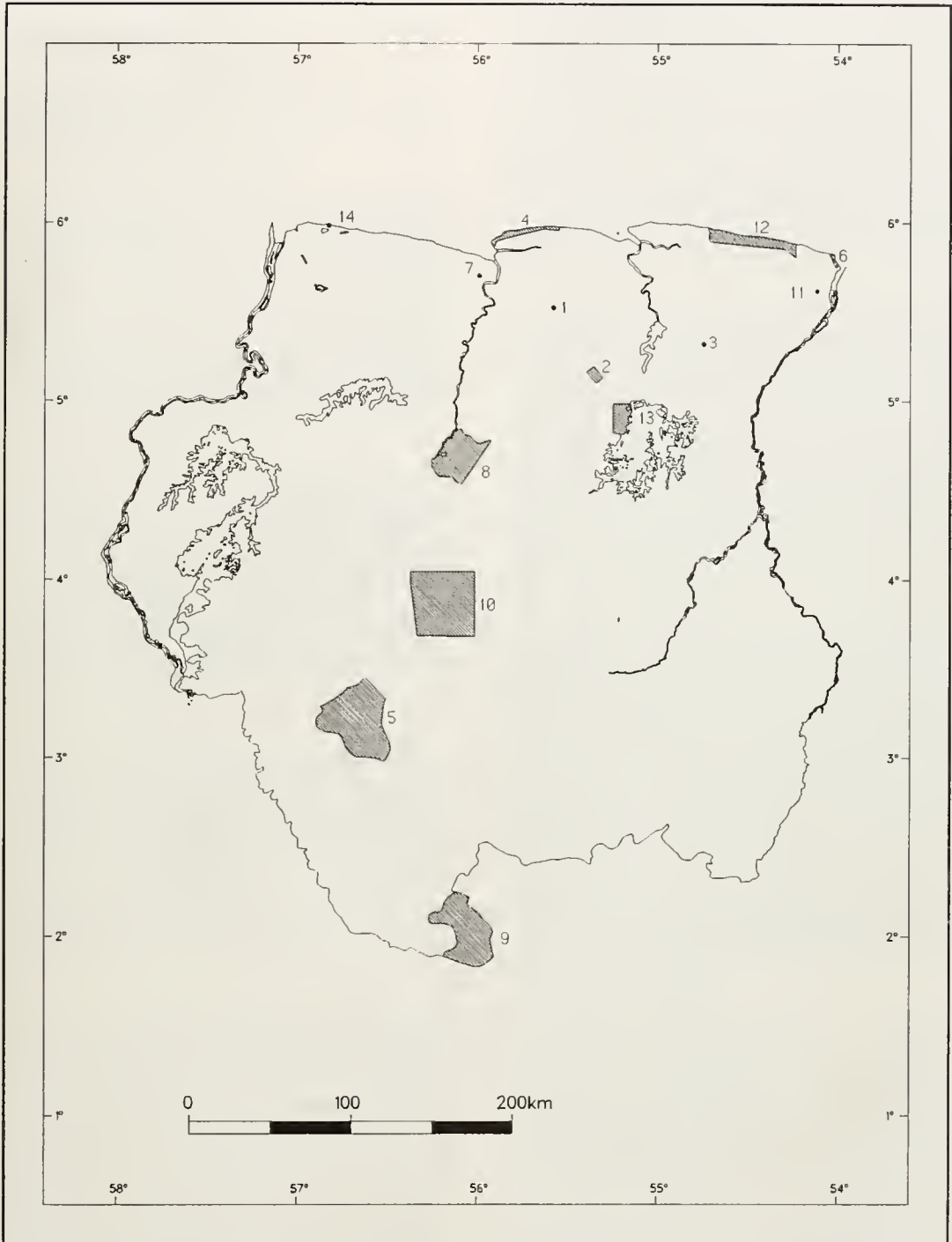
**Source:** Baal (1989)

**Administrative Authority:** Planning Bureau

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### SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Nature Reserves</i>			
1	Boven Coesewijne	IV	127,000	1986
2	Brinckheuvel	IV	6,000	1972
3	Copi	IV	28,000	1986
4	Coppename Monding	IV	12,000	1966
5	Eilerts de Haan	IV	220,000	1966
6	Galibi	IV	4,000	1969
7	Peruvia	IV	31,000	1986
8	Raleighvallen-Voltzberg	II	78,170	1966
9	Sipaliwini	IV	100,000	1972
10	Tafelberg	IV	140,000	1966
11	Wane kreek	IV	45,400	1986
12	Wia-wia	IV	36,000	1961
	<i>Nature Park</i>			
13	Brownsberg	II	8,400	1969
	<i>Multiple Use Management Area</i>			
14	Bigi Pan	VIII	68,320	1987
	<i>Ramsar Wetland</i>			
	Coppename Rivermouth	R	12,000	1985



Protected Areas of Suriname



# URUGUAY

**Area** 186,925 sq. km

**Population** 3,094,000 (1990)

Natural increase: 0.53% per annum

## **Economic Indicators**

GDP: US\$ 2,452 per capita (1987)

GNP: US\$ 2,620 per capita (1989)

**Policy and Legislation** No national conservation objectives have been stated in Uruguayan legislation or constitution (Anon., 1991; Oltremari, 1988). There has never been a written policy or defined strategy for resource protection and, as a result, environmental legislation is confused and dispersed (Nebel and Cravino, 1987). Conservation principles are spread across a number of legislative acts, but do not provide a coherent legal structure on which to base protected area establishment (Oltremari, 1988).

The first legislative act to make provision for the creation of protected areas was the 1968 Forestry Law (*Ley Forestal*) No. 13.723. Reference is made to parks and reserves, declaring them part of the state forest heritage (*patrimonio forestal del estado*), but definitions for such designations are not given. A fiscal forest is that part of the forest heritage not declared a national park. Exploitation is only possible under a management plan prepared by the Forestry Directorate (*Dirección Forestal*) of the MGAP.

In 1971, Law No. 14.053 provided for the creation of the Institute for the Preservation of the Environment (*Instituto para la Preservación del Medio Ambiente*), as part of the Ministry of Education and Culture (*Ministerio de Educación y Cultura*). This institute has a commission specifically for wildlife, environment and countryside matters. It has now been dissolved (see under Administration and Management) (R. Cal, pers. comm., 1992).

The 1968 Forest Law was repealed by the 1987 Forest Law (*Ley Forestal*) No. 15.939, currently in effect, which defines state-owned forested land as that which is not used for other productive use, and, owing to its specific characteristics, is best suited for permanent forest coverage. Provision is made for privately-owned forested land to be declared by the Forestry Directorate as protection or production forest, or unclassified general forests. Reforestation by the private owner is obligatory where necessary for conserving or restoring renewable natural resources, and provision is made to compel the owner to sell his land if he does not comply. The Forestry Directorate has been abolished, and its responsibilities have largely been transferred to RENARE's Flora and Protected Areas Division (*División de Flora y Areas Protegidas*) (DFAP) (R. Cal, pers. comm., 1992).

Two regulations under the 1987 Forestry Law have been made. Decree No. 450/988, 1988 states the need for a national forestation plan (*plan nacional de forestación*) to be established over a period of five years. Among the objectives of this plan is the promotion of forest resource renewal and environmental conservation. Decree No. 452/988, also of 1988, gives further details of regulatory measures and enforcement of the 1987 Forest Law. The conditions under which forests are declared productive, protection or unclassified are stated, but no clear definitions are given. It is prohibited to fell trees in protection forests.

There is no single piece of legislation that gives definitions for management categories, though a new bill is being written by RENARE (R. Cal, pers. comm., 1992). Definitions may be derived from decrees providing for the creation of individual protected areas, but these were passed with no national plan or structure to follow and are often vague or contradictory. For example, Law No. 9718 of 1937 declares Fort San Miguel a national monument and the surrounding area a national park, but Decree No. 533 of 1970 declares San Miguel and Santa Teresa National Parks as wildlife reserves (Wetterberg *et al.*, 1985).

**International Activities** Uruguay signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940, and ratified it in 1969. Uruguay ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 9 March 1989, but no sites have been inscribed; the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) on 22 May 1984, with one site inscribed; and participates in the Unesco Man and the Biosphere Programme with one site accepted as an internationally recognised biosphere reserve in 1976.

**Administration and Management** The Ministry of Livestock, Agriculture and Fisheries (MGAP) is responsible for natural resource use. Within the Ministry, the General Directorate of Renewable Natural Resources (*Dirección General de Recursos Naturales Renovables*) (RENARE) is the organisation vested with this responsibility. RENARE comprises two directorates, one of which is the Soils and Waters Directorate (*Dirección de Suelos y Aguas*). The other is the Flora, Fauna and Protected Areas Directorate (*Dirección de Flora, Fauna y Areas Protegidas*), which in turn is split into two divisions. The Flora and Protected Areas Division (*División de Flora y Areas Protegidas*) (DFAP) is responsible for the management of protected areas and for controlling the felling of native forest; it



also administers and manages all state-owned forests and protected areas, which account for over 60% of the protected areas. The Fauna Division (División de Fauna) manages the conservation and exploitation of native wildlife. The Forestry Directorate has now been dissolved, and its functions (except for reforestation, which is assigned to the national forestry plan, under MGAP) have been assumed by RENARE's Flora and Protected Areas Division (División de Flora y Areas Protegidas) (DFAP) (R. Cal, pers. comm., 1992).

The Institute for the Preservation of the Environment, established in 1971, used to work in close association with the former Forest Directorate to conserve natural resources, but this relationship did not produce any significant results (Oltremari, 1988). The Institute has now been dissolved and in its place a Ministry of Housing, Territorial Planning and Environment (Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente) (MVOTMA) has been created. Its role is to decide national conservation policy including that concerning protected areas. Its National Environment Directorate (Dirección Nacional de Medio Ambiente) does not possess protected area specialists and so RENARE staff act as consultants (R. Cal, pers. comm., 1992)

Although administration appears centralised, there are numerous institutions that, directly or indirectly, are also involved in protected area management (Nebel and Cravino, 1987). The Park Service of the Army (Servicio de Parques del Ejército) (SEPAE), within the Ministry of National Defence (Ministerio de Defensa Nacional), administers two areas, Santa Teresa and San Miguel Historic Monuments and National Parks (Anon., 1991; Oltremari, 1988). Some departmental administrations (intendencias departamentales), municipalities, and the State Insurance Bank (Banco de Seguros Del Estado) are involved in others (Oltremari, 1988; Oltremari and Nebel, 1988).

There are at least 30 non-governmental organisations (NGOs) working in conservation issues, at both the national and the regional level. Among the nationwide groups is the Friends of Environmental Preservation (Amigos de la Preservación Ambiental) (APA) which supports protected areas and environmental education. There is a need for greater cooperation between the various governmental and non-governmental organisations, in order to attain national conservation objectives (Oltremari, 1988), although Cal (pers. comm., 1992) reports that there is now a satisfactory level of cooperation.

The structure of the RENARE is relatively recent, and the divisions lack clearly assigned functions, resulting in instability and reduced capability. Following the 1987 Forest Law, the RENARE is vested with a wide range of functions and, therefore, coordination within the organisation is essential. In order to develop a plan for a coherent protected area system, a stable and strong

centralised administration with capable personnel is required (Oltremari, 1988; Oltremari and Nebel, 1988).

In 1980, lack of personnel was given as one of the main factors limiting the administrative effectiveness of the bodies responsible for protected areas: there were only three professionals, three technical staff, four administrative staff, five park guards and around 100 labourers in the entire protected area management organisation. Following studies conducted in 1988, the situation did not appear to have changed substantially (Oltremari, 1988), although there may have been improvements with the recent reorganisation of protected areas administration (R. Cal, pers. comm., 1992).

**Systems Reviews** Uruguay is primarily a pastoral country, with around 75% of the land used for livestock farming. Some 42% of the population lives in the capital city (Oltremari and Nebel, 1988; Paxton, 1990). The climate is warm temperate, with mild winters and warm summers. Average rainfall in the capital region is 950mm.

The wildlife appears to have been seriously affected by the intensity and extension of livestock-raising activities, mainly through loss and modification of habitat: as an indicator of this, 18% of the country's mammal species and 10% of its bird species are endangered or threatened (Oltremari and Nebel, 1988). A detailed assessment is currently not available. From extensive studies carried out during the development of a proposal for a protected area system, it appears that the south-east region is the richest in biodiversity, and contains ecosystems of the greatest national interest for conservation (Anon., 1991). The south-eastern region is known as the Atlantic plains, and may be divided into two sub-regions: the Atlantic basin comprising the water courses of several rivers; and the basin of Lake Merin, known as Bañados del Este (Eastern Marshes).

The Atlantic basin is totally flat, inundated temporarily or permanently, with poor drainage. Along the coast are extensive sand dunes, and the region is very rich in bird species. Except for the state-owned reserves already established there, the remaining land is under private ownership. Cattle ranching is extensive, and rice is grown along the waterways. The Eastern Marshes are low-lying, with grassland and palm trees, and rice is also grown extensively here. Annual temperatures in the south-east region are around 17°C, and rainfall ranges between 1000mm and 1100mm.

Protected area declaration began in 1915, but has been random, with no common objective (Oltremari and Nebel, 1988). Some 40% of the current protected area system was established during the 1960s. By 1988, there were 16 protected areas, covering a total of 33,538ha. None of the established areas has a management plan nor defined objectives clarifying its function. Many areas are not of sufficient size to afford protection to their resources and require reclassification (Oltremari, 1988).

In most cases, protected areas were not given clear boundaries in the legislation providing for their creation, and conflict over land use has resulted (Anon., 1991). The integrity of many protected areas is threatened by commercial plantation of rapidly growing tree species. For example, exotic trees were planted along coastal areas to stabilise the sand dunes, but their popularity with tourists attraction has led to planting in further areas (Oltremari and Nebel, 1988). However, Cal (pers. comm., 1992) states that this has affected only one natural monument. Most protected areas are located in the Rocha department in the south-east region.

In 1986, Uruguay began to participate in the FAO Latin American Network for Technical Cooperation in National Parks, other Protected Areas, Flora and Wildlife (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestre), which promotes integrated management of protected areas and exchanges of information in each participating country. At the time of joining, Uruguay was one of only two countries in Latin America that neither possessed nor had instigated proposals to establish a coherent national system of protected areas (Ormazábal, 1988). In 1989, the MGAP acknowledged the urgent need for a legal structure to improve protected area management, effectiveness and coverage, and a National Consultative Network (Red Nacional) was established, comprising delegates from private and governmental organisations involved in resource management, including DFAP, the Fauna Directorate and the SEPAE (Larrobla, pers. comm., 1990; R. Cal, pers. comm., 1992).

Following this, the National Environment Study (Estudio Ambiental Nacional) was initiated in 1990 in collaboration with the Organization of American States and the Interamerican Development Bank, which states the necessity for a coherent system of protected areas (Anon., 1991). The current problems are cited as the lack of a national conservation objective, the presence of several different administrative bodies, and land ownership. The cooperation of state, municipal and private organisations is required to implement a unified system, particularly as proposed areas are often on privately-owned land (Anon., 1991). The study provides for the future creation of an environmental information system (sistema de información ambiental) as a later stage in the development of a national environmental conservation strategy (Anon., 1991). These problems are now being tackled and the situation may be improving (R. Cal, pers. comm., 1992).

The main objective of the National Environment Study is to identify priority conservation areas and select those that will form the basis of a national system, ensuring that all biogeographical regions in the country are included. Cultural and historical importance of areas is also taken into account. The study identified 36 important areas, some of which are already protected, and others which are of potential value. Of these, 16

priority areas were selected for further investigation and drawing up of management plans (Anon., 1991).

The development of an effective protected area system requires, primarily, a legal structure to provide clear definitions of management categories and objectives (Oltremari, 1988). Detailed studies of individual areas, their present situation and biodiversity, have led to a comprehensive proposal for a national system of protected areas, with detailed definitions of the categories to be included (see Annex) (Anon., 1991).

Three categories of protected areas will be used in the national system, and definitions are given (see Annex). The reserve category can be expanded to include not only forests, but all natural resources, and allow varying degrees of use. Established areas will be reclassified as required, and all areas will remain under the administration of the MGAP. The proposed national system of protected areas covers 0.7% of the total country area, and contains characteristic ecosystems and important geological formations. However, the national environmental study cites the south-east region as the most important for conservation purposes, in terms of species richness and biodiversity. Efforts to increase protected area coverage have been concentrated in this area (Anon., 1991; Oltremari, 1988).

The proposed areas for the system is by no means a closed list, others may be included and the system should be flexible enough to incorporate new areas as the need arises (Anon., 1991). Details of the extent of implementation of the proposed system are not yet available.

#### Addresses

Dirección General de Recursos Naturales Renovables (RENARE), Ministerio de Ganadería, Agricultura y Pesca, Cerrito 322, 2do. piso, 11000 MONTEVIDEO (Tel: 958434/956741/959878; FAX: 956456)  
 Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente (MVOTMA), Zabala MONTEVIDEO (Tel: 950211/950421/963954)  
 Amigos de la Preservación Ambiental (APA), Somme 1612, MONTEVIDEO

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

#### Title: Proposal for a national system of protected areas

Date: 1988

**Brief description:** A proposal for a coordinated system of protected areas, giving definitions of the management categories to be used, that is to be established by law.

**Administrative Authority:** Ministerio de Ganadería, Agricultura y Pesca (Ministry of Livestock, Agriculture and Fisheries), via the Dirección General de Recursos Naturales Renovables (General Directorate of Renewable Natural Resources) (RENARE).

#### Designations:

**Parque Nacional (National Park)** An extensive area where a diversity of unique ecosystems are found, or ecosystems representative of the ecological diversity of the country, which have not been significantly altered by man.

The floral or faunal species or geological formations within the area are of scientific, educational or recreational interest, and are to be maintained in their natural state.

Only activities compatible with the continuity of the natural process are permitted, such as recreation, education or investigation.

#### *Monumento Natural (Natural Monument)*

An area usually of small size, characterised by the presence of native species of flora or fauna or cultural, scenic, educational or scientific importance. Only educational, recreational or investigative activities are permitted.

#### *Reserva Nacional (National Reserve)*

An area whose natural resources are important to be conserved owing to their particular fragility or susceptibility to be degraded and for their importance for the welfare of the community Particularly threatened species of wildlife or fauna, watersheds and for studies of sustainable use.

The concept of reserve may be expanded to include a variety of management categories such as multiple use reserve and forest reserve, the common factor being the preservation of specific resources and the obligation of a management plan.

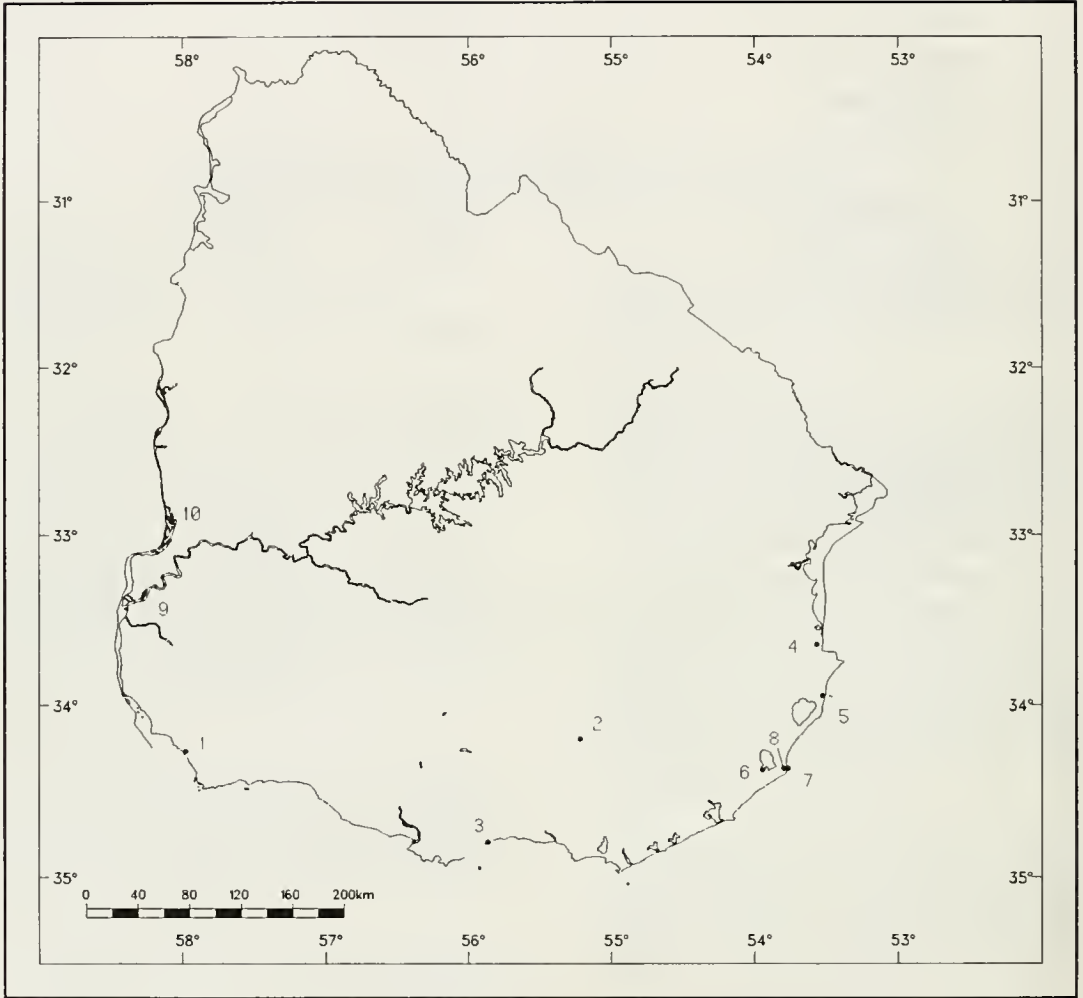
Source: Oltremari (1988)

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## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Anchorena	V	1,450	1978
2	Arequita	V	1,000	1964
3	Franklin Delano Roosevelt	V	1,500	1915
4	San Miguel	V	1,598	1937
5	Santa Teresa	V	3,288	1927
	<i>Faunal Reserve</i>			
6	Laguna de Castillos	IV	8,000	1966
	<i>Natural Monuments</i>			
7	Costa Atlántica	III	14,250	1966
8	Dunas de Cabo Polonio	III	1,000	1966
	<i>National Forests</i>			
9	Islas del Río Negro	VIII	1,850	1969
10	Islas del Río Uruguay	VIII	6,660	1921
	<i>Forest Reserve</i>			
11	Cabo Polonio	VIII	6,000	1942
	<i>Biosphere Reserve</i>			
	Bañados del Este	IX	200,000	1976
	<i>Ramsar Wetland</i>			
	Bañados del Este y Franja Costera	IX	200,000	1984





Protected Areas of Uruguay

# THE REPUBLIC OF VENEZUELA

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Area 912,047 sq. km

Population 19,735,000 (1990)

Natural increase: 2.36% per annum

## Economic Indicators

GDP: US\$ 2,450 per capita (1989)

GNP: US\$ 2,716 per capita (1987)

**Policy and legislation** Responsibility for protecting natural resources is given in the 1961 Constitution. It establishes the state as the main manager of resources, allowing sustainable exploitation for the benefit of the population (AID/NPS, 1981).

Major restructuring of the government departments responsible for environmental management and policy making took place during the 1970s, reflecting increased concern with reconciling socio-economic development and natural resource conservation (AID/NPS, 1981). A ministry specifically responsible for natural resources was established in 1976 and began its activities in 1977. Through it, the national policy of "development destined to meet the basic needs of the present and future population through the rational use of natural resources", was promulgated (AID/NPS, 1981).

A national conservation strategy, stating national conservation priorities, was drawn up in 1989 by a nongovernmental organisation (NGO), the Foundation for the Defence of Nature (Fundación para la Defensa de la Naturaleza) (FUDENA), and published with the support of IUCN and WWF. This sets out specific recommendations for utilising and protecting resources in accordance with the World Conservation Strategy (1980) are given (Anon., 1989). Information on the extent of implementation is currently not available.

Following signature of the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940, Venezuela passed a law in 1941 incorporating the principles of the Convention into its own legislation (Anon., 1987).

Under provisions of the Agrarian Reform Law (*Ley de Reforma Agraria*) Gaceta Oficial No. 611, March 1960, land under state protection for conservation cannot be used for agricultural purposes, and communities living within the area are compulsorily relocated (R. García, pers. comm., 1984). The 1943 Forest Law of Lands and Waters (*Ley Forestal de Suelos y Aguas*), revised in 1955 and 1965, made provision for the 1964 Partial Regulations of the Forest Law of Lands and Waters (*Reglamento Parcial de la Ley Forestal de Suelos y Aguas*), Decree No. 156. This defines forest reserves and

regulations pertaining to the exploitation of resources within them (see Annex).

The 1965 Forest Law of Lands and Waters (*Ley Forestal de Suelos y Aguas*), Gaceta Oficial No. 1004, details conservation and utilisation of natural resources, including forests and forest products, public and private water and soil. National parks, protection areas and forest reserves are defined and their administration is assigned to the Ministry of Agriculture (see Annex). Provision is made for the expropriation of private land to establish national parks. The regulations to the 1943 Forest Law remain in effect (FAO, 1965).

The 1970 Wildlife Protection Law (*Ley de Protección a la Fauna Silvestre*) declares the creation of faunal reserves, refuges and sanctuaries (*reservas, refugios y santuarios de fauna silvestre*) a public utility, and provides for the sustainable exploitation of wild fauna. Refuges and sanctuaries are given the absolute protection of the State (Gondelles, 1992).

The Organic Law of the Environment (*Ley Orgánica del Ambiente*) (1976) institutionalises environmental planning as part of the national planning system, and establishes committees for the "conservation, defence and improvement" of the environment in every municipality. The highest responsibility for national environmental policy rests with the President of the Republic and the Council of Ministers. Provision is made for the creation of the National Environment Council (*Consejo Nacional del Ambiente*) to be in charge of legal and institutional aspects of environmental management.

The Organic Law of Central Administration (*Ley Orgánica de la Administración Central*) passed on 22 December 1976, assigns environmental planning responsibilities to the appropriate bodies. Most importantly, it provides for the creation of the Ministry of the Environment and Renewable Natural Resources (*Ministerio del Ambiente y de los Recursos Naturales Renovables*) (MARNR), to be responsible for all natural resources, and for implementing environmental policy.

Environmental management responsibilities were shifted from the Ministry of Agriculture and Livestock to the new Ministry of the Environment under provisions of the 1977 Regulations of the Forest Law of Lands and Waters (*Reglamentos de la Ley Forestal y de Suelos y Aguas*). The National Institute of Parks (*Instituto Nacional de Parques*) (INPARQUES), an autonomous institute attached to MARNR, was created to manage national parks and natural monuments.

In 1983, the Organic Law for Territorial Planning (*Ley Orgánica para la Ordenación del Territorio*) is the most effective current protected area legislation (Gondelles, 1992). The law defines 25 categories of areas that require special administration owing to their particular

production, recreation or protection potential, and any threats to their integrity. Collectively, these form the system of Areas under Special Administrative Regime (Areas Bajo Régimen de Administración Especial) (ABRAE), and responsibility for their administration is to be assigned to the appropriate institutes (Annex). Because the ABRAE system comprises a wide variety of different categories, not all of which are for conservation ends, it is about to be superseded by a more modern Natural Protected Areas system (Areas Naturales Protegidas) (ANAPRO) (Gondelles, 1992; A. Luy, pers. comm., 1992).

The 1989 Partial Regulation of the Organic Law for Territorial Planning pertaining to Administration and Management of National Parks and Natural Monuments (Reglamento Parcial de la Ley Orgánica para la Ordenación de Territorio sobre Administración y Manejo de Parques Nacionales y Monumentos Naturales) Decree No. 276, details the regulations governing these two categories of protected area, including prohibited activities and measures for ensuring compliance with the law. National parks and natural monuments are divided into zones according to the activities compatible with the different ecosystems within them, and definitions are given. Management plans are mandatory for each protected area, to be revised every five years, and are legislated as presidential decrees (decretos presidenciales).

In January 1992, the Penal Law of the Environment (Ley Penal del Ambiente) was passed. Article 59, referring to national parks, establishes fines and arrests for persons found hunting wildlife (birds, amphibians, mammals and reptiles), or destroying shelter on which it depends. Protected areas are also mentioned in Article 58 (A. Luy, pers. comm., 1992).

During 1991, MARNR and INPARQUES formulated a proposal for a new and comprehensive Protected Natural Areas Law (Ley de Areas Naturales Protegidas), and the first draft is currently in revision (Pardo, pers. comm., 1991). Further details of the contents and objectives of this new law are currently not available.

**International Activities** The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) was signed by Venezuela in 1940, and ratified in 1941. Venezuela is one of the eight countries with territory in the Amazon region that signed the Amazon Cooperation Treaty (Tratado de Cooperación Amazónica) on 3 July 1978, an agreement to establish regulations for managing natural resources and to propose conservation-directed alternatives to the management of multinational projects.

In 1977 Venezuela joined the Caribbean Conservation Association (CCA), a regional, non-governmental, nonprofit organisation dedicated to promoting policies

and practices which contribute to conservation, protection and wise use of natural and cultural resources. The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (the Cartagena Convention), and the related Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region, were both signed by Venezuela on 24 March 1983 and ratified on 18 December 1986. The second protocol, Protocol Concerning Specially Protected Areas and Wildlife (SPA/W), was signed by Venezuela in June 1991, but has not yet been ratified.

The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) was signed in 1988, with one site listed by 1991. Venezuela ratified the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) in October 1990, but no sites have been inscribed. Venezuela is a signatory to the Unesco Man and the Biosphere (MAB) Programme and has a national MAB committee, although neither of its two biosphere reserves are internationally recognised (J.P. Rodríguez, pers. comm., 1992).

INPARQUES, EcoNatura and Wildlife Conservation International (WCI) are currently carrying out a US\$ 1 million programme for the Consolidation of the Venezuelan National Parks System (Fortalecimiento del Sistema de Parques Nacionales de Venezuela) with support from the European Community (C.J. Sharpe, pers. comm., 1992).

**Administration and Management** The present structure of the protected areas management system began with the creation of MARNR in 1976, and the start of its activities in 1977. MARNR is responsible for the conservation, protection and regulation of all natural resources, and all environmental activities previously assigned to the Ministry of Agriculture and Livestock under the 1965 Forest Law. It executes work either directly or through appropriate institutes, and is, therefore, the main agency for devising and implementing Venezuela's environmental policy (AID/NPS, 1981).

At the national level, MARNR comprises four Sectoral General Directorates (Direcciones Generales Sectoriales), a structure which is repeated at the regional level in the 24 administrative areas by which MARNR divides the country. The regional agencies, although autonomous, execute the Ministry's basic programmes.

Several autonomous management bodies with responsibilities to manage forests, wildlife and the Amazon Federal Territory were formed in 1989, all dependent on MARNR: the Venezuelan Forestry Service (Servicio Forestal Venezolano) (SEFORVEN); the Wildlife Service (Servicio Autónomo para la protección, restauración, fomento y racional aprovechamiento de la fauna silvestre y acuática del país) (PROFAUNA); and the Autonomous Service for Environmental Development of Amazon Federal



Territory (Servicio Autónomo para el Desarrollo Ambiental del Territorio Federal Amazonas) (SADA-AMAZONAS).

SEFORVEN is responsible for managing the country's forested land, and, in particular, for regulating the exploitation of forest resources in compliance with current forestry legislation. It does not manage protection forests that form part of protected areas in the ABRAE system. PROFAUNA regulates the exploitation of terrestrial and aquatic wildlife, implements conservation programmes, and is responsible for the administration of areas that are designated as ABRAEs because of their wildlife resources.

SADA-AMAZONAS is responsible for the conservation, protection and improvement of the environment in the Amazon region. SADA-AMAZONAS coordinates and supervises activities in the implementation of the Planning of Amazon Federal Territory (Plan de Ordenación del Territorio Federal Amazonas), which is based on the national Organic Law for Territorial Planning, and promotes scientific research in the region to identify areas for protection. The respective institutes responsible for managing those ABRAEs that are located in the Amazon Federal Territory work closely with SADA-AMAZONAS to achieve the conservation objectives of the region. A Consultative Council (Consejo Consultivo) assesses the activities of SADA-AMAZONAS.

All national parks and natural monuments are managed by INPARQUES, and, following the 1989 regulations, management plans must be drawn up for each area. By 1991, INPARQUES had formulated management plans for seven national parks, which have subsequently been approved and passed into the legislation in the form of decrees (C. Pardo, pers. comm., 1991).

INPARQUES has at its disposal two bodies for the protecting natural resources and upholding regulations pertaining to their use: a body of civilian park guards, and the Environmental Guard (Guardería Ambiental) made up of armed forces from the National Guard (Guardia Nacional) and officials of MARNR (Anon., 1987; J.P. Rodríguez, pers. comm., 1992). The Environmental Guard is empowered by law to prevent and curtail activities detrimental to the environment within national parks or natural monuments. Activities carried out by the armed forces include: border patrol; tourist information and education programmes; building and maintaining conservation centres and controlling resource use by enforcing regulations (Anon., 1987; IUCN, 1986).

The institutes responsible for managing other categories in the ABRAE system, are selected by MARNR (C. Pardo, pers. comm., 1991).

There are a large number of NGOs concerned with conservation and environmental issues. The two largest

are the Foundation for the Defence of Nature (Fundación para la Defensa de la Naturaleza) (FUDENA), established in 1975, and the Venezuelan Foundation for the Conservation of Biological Diversity (Fundación Venezolana para la Conservación de la Diversidad Biológica) (BIOMA), established in 1986. FUDENA promotes research projects and action plans to protect wildlife and fauna, helps to manage one protected area and has formulated a national conservation strategy. BIOMA identifies, evaluates and supports the administration of protected areas (BIOMA, 1987). In addition, BIOMA owns and manages four private reserves totalling 3,225 ha (Romero, 1992b). BIOMA's Conservation Data Centre (Centro de Datos para la Conservación) (CDC) was formed in 1988 to identify areas of conservation value within the country (Anon., 1989).

Among the other NGOs that work in aspects of the declaration and/or management of protected areas are PROVITA, the Venezuelan Audubon Society (Sociedad Conservacionista Audubon de Venezuela), the Educational Association for Nature Conservation (EcoNatura), and a large number of organisations that concentrate their work on a particular region or individual national park. In 1991, 17 NGOs from all over the country met to form the Network of Nongovernmental Conservation Organisations (Red de Organizaciones Conservacionistas No Gubernamentales) to encourage an exchange of information and coordinate activities (C.J. Sharpe, pers. comm., 1992).

The increased deployment of armed forces within national parks is a reflection of problems and weakness in the management of protected areas. Insufficient funds for training park guards and providing equipment results in poor administration and encroachment by migratory farmers and mining companies in some cases (Anon., 1987; IUCN, 1986). As a result, INPARQUES called on the services of the armed forces to maintain the integrity of the national park system by assisting in their management (Anon., 1987; IUCN, 1986).

The potential for improving the efficiency of protected area management was greatly increased by introducing the system of zonation, by which activities within national parks and natural monuments are consigned to suitable zones, as detailed in the 1989 Regulations to the Organic Law of Territorial Planning pertaining to the Administration of National Parks and Natural Monuments. Together with the provision for mandatory management plans for each area, a coherent structure with detailed regulations is being created, on which to base all protected area management (MARNR, 1989).

A System of Computerised Information on National Parks (Sistema de Información Computerizada sobre los Parques Nacionales de Venezuela) (SIPANA) is being developed by INPARQUES to improve administration of both national parks and natural monuments and allow more efficient selection of new areas. Data on the integrity of ecosystems; species abundance; equipment, personnel and infrastructure; and activities taking place



in each area will allow management plans to be regularly updated (M. Bevilacqua, pers. comm., 1991; M. Gabaldón and M. Bevilacqua, pers. comm., 1990).

The role of INPARQUES in declaring and managing protected areas is often compromised by the interests of superior government bodies, such as the Ministry of Energy and Mines (Ministerio de Energía y Minas) and other departments and autonomous services of MARNR. As a result, mining concessions have been granted within national parks. Protected areas may also be degazetted in order to permit mineral and hydrocarbon exploitation (Anon., 1992; M.L. Goodwin, 1992; C.J. Sharpe, pers. comm., 1992).

**Systems Reviews** All the characteristic Neotropical biogeographic regions are represented in Venezuela: high mountains, coastal ranges, arid and semi-arid regions, mangroves and marine coastal wetlands, seasonally flooded plains, areas of high endemism, very disturbed tropical forest north of the Orinoco River, and relatively undisturbed areas to the south (Anon., 1989).

Following Holdridge's classification (1967), 23 life zones occur in Venezuela (Anon., 1982). The most important ecosystems are: the Caribbean coast (2,813 km in length) and islands (more than 100 large islands); the Atlantic coast with deltas and mangrove forests; the Andean mountains which include cloud forests, páramos, tundra-like zones, and permanently-snowed peaks (up to 5,007m); the cloud forests of the Coastal Cordillera; llanos, flat lands with savanna vegetation and many seasonal and perennial rivers and lagoons; arid zones with xerophytic vegetation, and true deserts with moving sand dunes; Amazonian rain forest, the Gran Sabana, a grassland area on a 16,000 sq. km plateau at 1,000m with tepuyes or table mountains. Tepuyes are also found in the Amazon region (Salinas, n.d.).

Venezuela has around 400,000 sq. km of intact natural forest, most of which is located in the area south of the Orinoco River. This area accounts for around 50% of total land area and includes the Amazon Federal Territory, itself comprising 20% of the total land area but containing only 0.5% of the population (AID/NPS, 1981; Anon., n.d.; C. Pardo, pers. comm., 1991). Ninety per cent of the population lives north of the Orinoco River, a distribution that leads to critical environmental problems, such as soil erosion and deforestation in the Andean and west central regions where agricultural activity is intense (Anon., n.d.). Cattle raising is one of the most important land uses, taking up nearly one-third of the total national territory, and is particularly extensive in the llanos region. Only 4% of the total land area is used for arable agriculture (AID/NPS, 1981; Anon., n.d.).

The first protected area, a national forest, was declared in 1936 and raised to the status of national park in 1937. The legal framework for distinct categories of protected areas, from controlled exploitation to inviolable

protection, began with the declaration of the first national park in 1937 (García, 1989). By 1991, 39 national parks and 17 natural monuments had been declared, accounting for around 15.07% of the total national territory. Together with other management category designations, a total of 44.39% of national territory is under at least minimal legal protection in the ABRAE system (C. Pardo, pers. comm., 1991). In addition, a small number of private reserves are run by the NGO BIOMA.

Venezuela participates in the FAO Latin American Network of Technical Cooperation in National Parks, Other Protected Areas, Flora and Wildlife programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres) through MARNR (FAO, n.d.; Ormazábal 1988). According to the definition given by the FAO Network, Venezuela has developed a comprehensive national system.

Information on protected area coverage and the degree of protection subsequently afforded to the major ecosystems in Venezuela indicates that there are deficiencies. These are chiefly due to lack of legislation; conflicting policies between government departments; few possibilities for the involvement of NGOs in protected area management and decision-making; and lack of economic resources (Luy and Ochoa, 1991; Romero, 1992a; C.J. Sharpe, pers. comm., 1992). Many of these problems stem from the low priority given to conservation by the government, reflected in the lack of political support given to INPARQUES. On the other hand, efforts have been made to increase protection in the Amazon Federal Territory. In 1978, timber extraction in the region was limited by Decree No. 2552 (A. Luy, pers. comm., 1992). Half of the territory is now protected under various management categories (J.P. Rodríguez, pers. comm., 1992). A research centre, the Alejandro de Humboldt Amazonian Environmental Investigation Centre (Centro Amazónico de Investigación Ambiental Alejandro de Humboldt), has been established (FAO, 1991).

Problems in the protected area system arise, in many cases, as a result of selection procedures and inadequate planning processes (IUCN, 1986; C. Pardo, pers. comm., 1991). Twenty-five different management categories, many of which are not for conservation purposes, are described in Venezuelan legislation, making the protected area system too complex for efficient implementation of management plans (Anon., n.d.; Putney, 1987). The new ANAPRO system is designed to supercede ABRAE but has not yet been approved (A. Luy, pers. comm., 1992). Lack of funding for the park service reduces its ability to enforce regulations, and encroachment by fishing and mining industries poses a serious threat to some protected areas. Equipment and trained staff are lacking. By 1989, only three training courses for park guards had taken place, and nationwide 187 park guards were dispersed between 21 parks, leaving nine other parks without protection (Anon., 1987; García, 1989; INPARQUES, 1983).

Land tenure, hunting, and fires are also problems (Anon., 1987; García, 1989; Amend and Amend, 1992). Rights of ownership are not clarified in law, and continued occupation, new colonisation and conflict within protected areas is common (Anon., 1987).

Reviews of the national protected areas system have been carried out by: INPARQUES (1983), IUCN (1986), an international committee including INPARQUES, MARNR, IUCN, and MAB/UNESCO (Anon., 1987), Putney (1987, 1988), FUDENA (1989), García (1989), and Anon. (n.d.). A review of marine and coastal parks was undertaken by INPARQUES in 1990.

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Decree No. 156 Reglamento Parcial de la Ley Forestal de Suelos y Aguas (Regulations under part of the Forest Law of Lands and Waters)

**Date:** 18 August 1964

**Brief description:** Defines forest reserves, and provides for the rational exploitation of their resources

**Administrative authority:** Ministerio de Agricultura y Cría (Ministry of Agriculture and Livestock)

**Designations:**

**Reserva Forestal (Forest Reserve)** A wooded area with recognised productive capacity

Boundaries are to be defined by Executive Decree.

Rational exploitation is allowed, in accordance with the general principles laid down in the Final Act of the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, signed by Venezuela in October 1941.

Exploitation is carried out either directly by the Forestry Service, or by public bidding for timber stands within reserves.

Management plans establish the quantity of timber that may be exploited annually.

**Source:** FAO (1964)

**Title:** Ley Forestal de Suelos y Aguas, Gaceta Oficial No. 1004 (Forest Law of Lands and Waters)

**Date:** 30 December 1965

**Brief description:** Governs the conservation, promotion, and rational use of natural resources specified within the law. The definition of a national park and general criteria for designating protection areas are given.

**Administrative authority:** Ministerio de Agricultura y Cría (Ministry of Agriculture and Livestock) is responsible for natural resource administration, including formulating management plans for national parks and protection areas, and implementing regulations for forest use.

**Designations:**

**Parque Nacional (National Park)** Areas remarkable for their natural scenic beauty or with flora and fauna of national importance.

Public recreation and education, tourism and scientific research are the only activities allowed.

It is prohibited to hunt, shoot, kill or capture wildlife and to destroy or collect flora samples, except when undertaken by park authorities or duly-authorized persons.

**Protection Area (Area de Protección)** All areas around springs or the source of any stream for a radius of 200m. -an area at least 300m wide on both sides parallel to chains of mountains and along the slopes of plateaux. An area at least 50m wide along both banks of navigable rivers and an area at least 25m wide along non-navigable seasonal water courses. Areas around lakes and lagoons whose limits are to be laid down in regulations pertaining to this law: land in river and water basins which require protection owing to their situation or geographical condition; areas needed as windbreaks areas and other areas in the vicinity of human settlements which act as factors in regulating the climate or environment. It is prohibited to carry out agricultural work or destroy vegetation within protection areas. Public use of protection areas is provided for by regulations to this law. -Protection areas are declared by Law or Executive Order.

**Source:** FAO (1966)

**Title:** Ley Orgánica para la Ordenación del Territorio (Organic Law of Territorial Planning), Gaceta Oficial No. 3238

**Date:** 11 August 1983

**Brief description:** Defines categories of protected area that collectively comprise the system Areas Under Special Administrative Rule (Areas Bajo Régimen de Administración Especial) (ABRAE). These areas are declared by the National Executive to have productive, protective and recreation functions, and contribute to the socio-economic development of the country.

**Administrative authority:** The institutes responsible for each area are to be assigned by Presidential Decree (Decreto Presidencial) in the Council of Ministers (Consejo de Ministros).

**Designations:**

**Parque Nacional (National Park)** Natural area whose ecosystems have not been altered by human



exploitation or occupation, and where flora, fauna and geomorphological characteristics are of national importance. Recreation, educational activities and scientific research are allowed. The only exploitation permitted is that of water resources, subject to severe restrictions.

**Monumento Natural (Natural Monument)**

Area of national interest for historic or scientific reasons. Recreational activities are allowed and restricted exploitation of water resources.

**Reserva de Fauna Silvestre (Wildlife Reserve)**

Area required for managing wild animals to ensure the continued production of certain species. Hunting is allowed, but subject to restrictions.

**Refugio de Fauna Silvestre (Wildlife Refuge)**

Areas which are necessary for the protection, conservation and propagation of wild animals, particularly those in danger of extinction. No exploitation is permitted.

**Santuario de Fauna Silvestre (Wildlife Sanctuary)**

No definition given in the extract from the original legislation.

**Parque Litoral (Littoral Park)** Coastal area for the protection and preservation of natural resources of scientific and educational value. No exploitation is permitted.

**Zona Protectora (Protection Zone)** Area recognised as important for regulating climate and water sources. Rational resource use, hydroelectric and forest exploitation are permitted.

**Reserva de Biósfera (Biosphere Reserve)** Those areas in which are found the combination of natural ecosystems requiring protection, and local populations whose traditional lifestyle is in harmony with the environment.

Source: Anon. (n.d.); extract from original legislation

**Title: Reglamento parcial de la Ley Orgánica para la Ordenación de Territorio sobre Administración y Manejo de Parques Nacionales y Monumentos Naturales (Partial regulation of the Organic Law of Territorial Planning regarding the Administration and Management of National Parks and Natural Monuments), Decree No.276**

Date: 9 June 1989

**Brief description:** Establishes the basic regulations for administering national parks and natural monuments, and details the procedures by which new areas are established. To improve administrative efficiency, these two categories of protected area are divided into different management

zones according to the fragility of the natural resources found within them, and the degree of use that can be supported by each zone. Definitions of the zones are given, and the zonification system is to be included in the management plans for national parks and natural monuments, which are obligatory. Any number of these zones may be applied to a protected area as suitable

**Administrative authority:** Instituto Nacional de Parques (National Institute of Parks), (INPARQUES), within the Ministerio del Ambiente y de los recursos Naturales Renovables (Ministry of the Environment and Renewable Natural Resources) (MARNR)

**Designations:**

**Zona de Protección Integral (Integral Protection Zone)** A fragile ecosystem that requires total protection to maintain it in its natural state. No form of modification is permitted and public access is denied. Only scientific research with prior authorisation and regulation, and routine park guard duties are permitted.

**Zona Primitiva o Silvestre (Primitive or Wilderness Zone)** An environment that is in its natural state and has not been modified by man, but can tolerate limited use such as scientific investigation, environmental education or recreation subject to regulation. Some sport fishing is allowed with prior authorisation. No motor vehicles or activities that disturb the natural state of the area are permitted.

**Zona de Ambiente Natural Manejado (Managed Natural Environment Zone)** An area that contains examples of the most significant natural features of the national park or natural monument, and that can support educational and recreational activities. The environment is to be maintained in its natural state with minimum human impact, while allowing public access. Motor vehicles are permitted only on specifically marked routes, and construction is permitted only to provide a basic and rustic infrastructure of visitor facilities.

**Zona de Recuperación Natural (Natural Recuperation Zone)** An area that has been significantly altered by human activity and requires protection to prevent further degradation and allow the recuperation of its natural condition. Once the area has been restored it will form part of a managed natural environment zone.

**Zona de Recreación (Recreation Zone)** An area that, owing to its specific characteristics, is suitable for recreational activities and can support the maximum number of visitors permitted entry into the national park or natural monument. Facilities may be constructed but are subject to strict regulation in order to maintain the environment. **Zona de Servicios (Services Zone)** An area that, owing to its location

and natural characteristics, is suitable for the construction of public service installations such as hotels, restaurants and camp sites. These are to be built and maintained with minimum environmental impact.

***Zona de Interés Histórico Cultural o Paleontológico (Zone of Historic Cultural or Paleontological Interest)*** An area that contains representative examples of historical, paleontological, archaeological or cultural importance, and requires protection in order to allow rational use while maintaining its natural state.

***Zona de Amortiguación (Buffer Zone)*** A peripheral zone in which the regulation of human activities and natural resource use may reduce potential environmental threats to the national park or natural monument, and increase the overall protection of the area. Installations for public service may be constructed. When a national park or natural monument does not contain an area within it suitable for use as a buffer zone, MARNR is obliged to investigate the possibility of extending the protected area or creating another conservation unit adjacent to it, with appropriate management regulations.

Source: Original legislation

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## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Aguaro-Guariquito	II	585,750	1974
2	Archipiélago Los Roques	II	221,120	1972
3	Canaima	II	3,000,000	1962
4	Cerro El Copey	II	7,130	1974
5	Cerro Saroche	II	32,294	1989
6	Chorro El Indio	II	10,800	1989
7	Ciénagas del Catatumbo	II	250,000	1991
8	Cinaruco-Capanaparo	II	584,368	1988
9	Cueva de la Quebrada El Toro	II	4,885	1969
10	Dinira	II	42,000	1988
11	Duida Marahuaca	II	210,000	1978
12	El Avila	II	81,800	1958
13	El Guácharo	II	62,700	1975
14	El Tamá	II	139,000	1978
15	Guaramacal	II	21,000	1988
16	Guatopo	II	122,464	1958
17	Henri Pittier	II	107,000	1937
18	Jaua Sarisariñama	II	330,000	1978
19	Laguna de Tacarigua	II	39,100	1974
20	Laguna de la Restinga	II	18,862	1974
21	Macarao	II	15,000	1973
22	Mariusa	II	331,000	1991
23	Médanos de Coro	II	91,280	1974
24	Mochima	II	94,935	1973
25	Morrocoy	II	32,090	1974
26	Páramos del Batallón y La Negra	II	95,200	1989
27	Parima-Tapirapecó	II	3,420,000	1991
28	Península de Paria	II	37,500	1978
29	Perijá	II	295,288	1978
30	San Esteban	II	43,500	1987
31	Serranía de la Neblina	II	1,360,000	1978
32	Sierra Nevada	II	276,446	1952
33	Sierra de San Luis	II	20,000	1987
34	Sierra de la Culata	II	200,400	1989
35	Terepaima	II	18,650	1976
36	Turuépano	II	70,000	1991
37	Yacambú	II	14,580	1962
38	Yapacana	II	320,000	1978
39	Yurubí	II	23,670	1960
<i>Biosphere Reserves (National)</i>				
40	Alto Orinoco-Casiquiare	VII	8,400,000	1991
41	Delta del Orinoco	VII	876,500	1991
<i>Faunal Reserves</i>				
42	Ciénagas de Juan Manuel, Aguas Blancas y Negras	VIII	71,500	1975
43	Sabanas de Anaro	VIII	16,331	1982
<i>Faunal Refuges</i>				
44	Caño Guaritico	IV	9,300	1989
45	Cuare	IV	11,825	1972
46	De la Tortuga Arrau	IV	17,431	1989
47	Estero de Chiriguare	IV	32,169	1974
48	Los Olivitos	IV	25,723	1986

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Natural Monuments</i>			
49	Cerro Platillón	III	8,000	1987
50	Cerro Santa Ana	III	1,900	1972
51	Cerros Matasiete y Guayamurí	III	1,672	1974
52	Formaciones de Tepuyes	III	1,069,820	1990
53	Laguna de las Marites	III	3,674	1974
54	Las Tetas de María Guevara	III	1,670	1974
55	Loma de León	III	7,275	1989
56	María Lionza	III	11,712	1960
57	Morros de San Juan	III	2,755	1949
58	Pico Codazzi	III	11,850	1991
	<i>Protective Zones</i>			
59	Area Metropolitana de Caracas	V	84,300	1972
60	Barquisimeto	V	46,273	1987
61	Cabos, Puntas y Lagunas de Isla de Margarita	V	1,549	1988
62	Cuenca Alta de los Ríos Maticora y Cocuiza	V	241,500	1974
63	Cuenca Alta del Río Cojedes	V	276,000	1974
64	Cuenca Alta del Río Tocuyo	V	141,600	1974
65	Cuenca Alta y Media del Río Machango	V	113,000	1990
66	Cuenca Altas y medias del Río Pao	V	68,000	1974
67	Cuenca del Río Guárico	V	40,207	1974
68	De la Ciudad de Coro	V	19,720	1987
69	El Cigarrón	V	45,230	1989
70	Escalante Onia Mucujepe	V	101,125	1975
71	La Marichí	V	2,000	1973
72	La Mariposa	V	2,810	1988
73	La Tortuga Arrau	V	9,856	1989
74	Laguna de la Danta	V	2,203	1974
75	Las González	V	11,220	1980
76	Litoral Central	V	35,723	1974
77	Macizo Montañoso del Turimiquire	V	540,000	1974
78	Maracaibo	V	20,800	1986
79	Margen Izquierdo del Río Masparro	V	5,000	1974
80	Mucujún	V	19,450	1985
81	Piedemonte Norte de la Cordillera Andina	V	431,727	1974
82	Region Lago de Maracaibo	V	244,125	1974
83	Río Albarregas	V	11,233	1973
84	Río Capaz	V	45,700	1989
85	Río Chuspita	V	5,642	1976
86	Río Torbes y sus Alrededores	V	12,000	1974
87	Río Yacambú	V	46,900	1974
88	Ríos Guanare, Bocono, Tucupido, La Yuca y Masparro	V	400,000	1991
89	Rubio	V	23,760	1978
90	San Antonio - Ureña	V	6,223	1982
91	San Cristóbal	V	10,000	1978
92	San Rafael de Guasare	V	302,000	1973
93	Serranía de San Luis	V	86,000	1987
94	Sierra Nirgua	V	146,590	1974
95	Sierra de Aroa	V	113,000	1991
96	Sierra de Bobare	V	140,000	1974
97	Sur del Edo Bolívar	V	7,262,358	1974
98	Sureste del Lago de Maracaibo Sto. Domingo	V	406,662	1974
99	Sureste del Lago de Maracaibo Uribante-Caparo	V	446,000	1974
	<i>Hydrological Reserves</i>			
100	Burro Negro	V	75,000	1974
101	Distrito Páez del Estado Apure	V	66,100	1981



<b>Map ref.</b>	<b>National/international designations Name of area</b>	<b>IUCN management category</b>	<b>Area (ha)</b>	<b>Year notified</b>
102	Distritos Maturín, Cedeño, Acosta, Piar	V	190,000	1976
103	Piedemonte Andino	V	491,280	1974
104	Region Valle de Quibor	V	72,000	1974
105	Río Cupravera	V	3,203	1978
106	Río Pedregal	V	195,900	1976
107	Río Sanchón	V	8,100	1976
108	Zona Sur de Lago de Maracaibo	V	618,000	1974
<hr/>				
	<i>Ramsar Wetland</i> Cuare	R	9,968	1988



Protected Areas of Venezuela



# ARUBA (NETHERLANDS)

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**Area** 193 sq. km

**Population** 62,000 (1988 estimate) (Hunter, 1991)  
Natural increase: no information

## **Economic Indicators**

GDP: No information  
GNP: No information

**Policy and Legislation** Aruba obtained the status of an autonomous country within the Kingdom of the Netherlands on 1 January 1986. Existing Antillean laws and regulations remain in force, but since this date Aruba has been responsible for its own legislation. Some laws to protect the environment are currently being introduced and, since April 1992 government officials have been working on a general policy plan for the conservation of nature (Department of Foreign Affairs, pers. comm., 1992).

The collection of corals and of different species of conch (*Strombus* spp) and the catching of sea turtles is banned. However, the degree of enforcement is uncertain and permits for collection are available (UNEP/IUCN, 1988).

**International Activities** The Kingdom of the Netherlands, on behalf of the Netherland Antilles and Aruba, is party to the Caribbean Conservation Association, and ratified the Convention for the Protection and Development of the Wider Caribbean Region (Cartagena Convention) on 24 March 1983 and the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region on 16 April 1984. The Netherlands also acceded to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) on 23 May 1980; a single site within Aruba has been designated under the Convention. The Netherlands also participates in the Unesco Man and the Biosphere Programme, although no biosphere reserves have been established within Aruba.

**Administration and Management** Since 1963 administration and management of protected areas has been the responsibility of a non-governmental organisation (NGO), the Netherlands Antilles National Parks Foundation (Stichting Nationale Parken Nederlandse Antillean STINAPA). Since 1983 Aruba has had an independent STINAPA, now officially known as FANAPA (Aruban Foundation for Nature and Parks). The aim of the organisation is to promote nature conservation through acquisition of land, establishment of parks and by education. Recently a much more extreme environmental and conservationist association, STIMARUBA, has been established (Department of Foreign Affairs, pers. comm., 1992).

**Systems Reviews** Aruba lies on the continental shelf of South America, less than 50km from the Peninsula de Paraguand on the Venezuelan mainland. It is a small island, less than 32km in length. Most of the island is relatively hilly, with the steepest slopes being on the north coast and the highest elevation reaching some 188m. The long southwest coast has a partly emerged reef, with tiny islands along its length, which is separated from the main island by a long narrow lagoon. Although corals are extensive in distribution, reefs are not highly developed, except in a small area on the southeast point (ECNAMP, 1980; UNEP/IUCN, 1988). Much of the vegetation has been modified by man, especially in the southwestern half of the island. Davis *et al.* (1986) describe the vegetation as xerophytic, consisting of thorny scrub and cacti.

The reef islands off the south-west coast have some important mangrove communities, and represent an important area for breeding tern populations (Scott and Carbonell, 1986).

## **Addresses**

Aruban Foundation for Nature and Parks, PO Box 4014,  
Aruba  
STIMARUBA, c/o Spaanslagoenweg 33b, Aruba

## **References**

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## ANGUILLA (UNITED KINGDOM)

**Area** 91 sq. km

**Population** 7,700 (1981)

Natural increase: No information

### **Economic Indicators**

GDP: US\$ 4,875 per capita (1987)

GNP: No information

**Policy and Legislation** First settled by the British in the 17th century, from 1825 it was ultimately incorporated into the colony of St Kitts-Nevis-Anguilla. Anguilla ended its association with St Kitts-Nevis in 1980, and while the latter islands are now independent, Anguilla remains a dependent territory of the United Kingdom. Anguilla's constitution was adopted in 1982, and a consolidated amendment was approved in May 1990.

It is government policy to protect natural scenic areas, such as beaches, historic sites and marine life, from further damage through proper use of those resources (Richardson, 1984). The Marine Parks Ordinance, 1982 empowers the Governor "by Order or Regulations published in the Gazette" to "designate any portion of the marine areas of Anguilla as a marine park" and allows him to make regulations covering a wide range of measures. The entry into force of this Ordinance is to be secured through Regulations which have not yet been enacted. The Beach Protection Ordinance No. 10, 1988 provides for the Governor to declare protected beaches from which the extraction of sand and gravel is forbidden. Seventeen such beaches have been designated. The Anguilla National Trust Ordinance No 7, 1988 provides enabling legislation for the establishment of the Anguilla National Trust.

**International Activities** Anguilla is included in the UK's ratification of the following international agreements; the Convention concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). Anguilla's decision to join the UK's ratification of Ramsar in 1990 followed an independent review of policy and legislation relevant to wetland protection on the island (Pritchard, 1990). The UK government ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) on 23 February 1986, and has signed the Protocol on Specially Protected Areas and Wildlife in 1991. Anguilla is not, however, included in the UK's ratification of the Cartagena Convention. The government of Anguilla has been a member of the Caribbean Conservation Association (CCA) since 1983.

**Administration and Management** Until 1990, environmental matters were the responsibility of the

Department of Agriculture and Fisheries, under the Ministry of Tourism and Natural Resources. Now the portfolio is held by the Office of the Chief Minister. A departmental structure on the environment side has not yet been developed and the budget comes under the Department of Public Health and the Environment (Pritchard, 1990).

The recently established Department of Fisheries and Marine Resources has responsibility for the setting up and control of marine parks. It is anticipated that the proposed Anguilla National Trust will ultimately be responsible for marine and terrestrial park management (Pritchard, 1990). The Anguilla Archaeological and Historical Society, a non-governmental organisation (NGO), has been involved in the creation of the National Trust.

The Department of Lands and Survey is responsible for administration of all Crown lands.

In February 1987 the government established the Fountain National Park Development Committee, comprising the President of the Anguilla Archaeological and Historical Society (as Chairman), two other members of the Society, the Principal Assistant Secretary, the Chief Engineer of the Public Works Department and the Director of Lands and Survey. At present the park is not functioning as a public amenity with managed access.

**Systems Reviews** Anguilla is a low coralline island, formed from limestone and marls developed on old volcanic rocks. It shares a common submarine shelf with St Martin/St Maarten to the south. The coastline has sandy bays in the south and cliffs in the north. There are extensive reefs off the north coast and fringing reefs along most of the south coast. The 17km-long reef along the southeast coast is considered to be one of the most important largely unbroken reefs in the eastern Caribbean (Putney, 1982).

The vegetation consists of degraded evergreen woodland, with scattered areas of grassland, and low scrub. The only areas classed as 'wildlands' (ECNAMP, 1980) are the south-west peninsula, the north-east peninsula, two areas mid-way along the north-west coast, and Prickly Pear Cays. All vegetation is subject to uncontrolled grazing by livestock.

Anguilla has small areas of mangroves and about 15 saline ponds of considerable importance for resident and migratory waterfowl. Offshore islands hold significant breeding seabird colonies. Detailed ecological surveys of the former and counts of the latter are required (Pritchard, 1990).

The need to conserve marine resources effectively is recognised by the government. Establishment and

management of marine protected areas was addressed, for example, in 1980, when the government requested the assistance of ECNAMP in formulating a management plan for critical marine resources. A major recommendation of that study (Jackson, 1981) was the creation of a system of marine parks to protect areas of high ecological value from human activity. The study also recommended the establishment of a multiple-use reserve covering an area of sea to the north of Anguilla.

In 1989 the government put forward a proposal to funding agencies for a comprehensive marine parks programme. The objectives of this are: to develop and implement an effective organisational approach for managing coastal resources; to provide site-specific information and technical guidelines for development and management of coastal resources; to establish marine parks at Shoal Bay, Sandy Island, Prickly Pear Cay (including Seal Island), Dog Island, Little Bay and Sombrero Island; to improve public awareness and understanding of coastal resources as a means of providing a base of popular support for protection and sustainable development of these resources; to provide immediate attention to, and amelioration of, known problems of beach erosion and visitor-caused damage to critical marine habitats at proposed park sites and elsewhere. Elements of the marine parks programme have been carried out or are in progress. Inventory and analysis of marine resources has been funded by the UK Overseas Development Administration's British Development Division in the Caribbean (BDDC), and provision of public information by the US National Parks Service and WWF-UK. Work on the establishment of marine parks is being funded by WWF-UK.

The only existing protected area is an important Anguillan archaeological site, Fountain National Park, acquired using government funds in 1985. Acquisition of the 4.75 acre site involved investigation of an extremely complex landowning pattern and negotiations with the owners by the Archaeological and Historical Society (Pritchard, 1990).

The main pressures on natural resources come from the fishing industry and development of the island's tourist industry. The home fishing industry employs 20% of the population, and territorial waters are fished by foreign trawlers (Richardson, 1984). Fishing and tourism both pose problems of damage to coral habitats by anchor and spearfishing. The development of tourism is increasingly important to the economy, but it also exerts pressure on natural resources. The development of tourism, together with house-building, is contributing to the current "building boom", causing environmental problems such as the extraction of sand leading to beach erosion.

**Other Relevant Information** Tourism has developed rapidly during the 1980s. At the beginning of the decade, Anguilla had only a few thousand visitors annually. The figure reached an estimated 70-80,000 in 1990.

#### Addresses

Ministry of Tourism (Permanent Secretary), Agriculture and Fisheries, The Valley  
Anguilla Archaeological and Historical Society, PO Box 252, The Valley

#### References

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# ANTIGUA AND BARBUDA

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Area 440 sq. km

Population 78,726 (1988) (CCA, 1991)

Natural increase: 0.93% (1988)

## Economic Indicators

GDP: Not available

GNP: Not available

**Policy and Legislation** The National Parks Act No. 11, 1984, as amended (No. 3, 1986), gives general powers to the relevant Minister to declare any area of land or water to be a national park, subject to affirmative resolution of the legislature, and provides for the creation of a statutory corporation called the National Parks Authority. The Act does not provide a definition of the term "national park" and does not make provision for the establishment of other categories of protected area. Only one site, Nelson's Dockyard National Park, has been created under the Act (CCA, 1991). It has been recommended that the existing law be amended to make provision for additional categories of protected area to be established, particularly those that allow a more flexible approach to resource conservation and exploitation (CCA, 1991).

Two areas were proclaimed under the provisions of the Public Parks Ordinance No 4, 1965. The first of these has been incorporated subsequently into Nelson's Dockyard National Park, whilst the latter is not protected in practice. Neither is referred to in the National Parks Act (CCA, 1991).

The Marine Areas (Preservation and Enhancement) Act No. 5, 1972 gives the Minister of Agriculture, Land and Fisheries the authority to declare restricted marine areas in order to preserve and protect marine flora and fauna, natural beauty or to promote recreation. Two such areas have been declared under the Act (SRO No. 47, 1973), one in the reefs off Antigua and the other off Barbuda. Regulations made under the Act (SRO No. 25, 1973) prohibit certain activities within such areas.

The Fisheries Act No. 14, 1983, which is consistent with the unified fisheries draft prepared by FAO for the Eastern Caribbean Commonwealth States, also provides for the declaration of areas of water and adjacent land as marine reserves, to protect natural beauty, flora, fauna and habitats, to restore degraded areas, or to promote scientific study (see Annex). No marine reserves have been created under this Act (CCA, 1991).

The Forestry Ordinance Cap. 99, 1941, and the Forestry Regulations (SRO No. 13, 1941, SRO No. 42, 1952) provide for the protection of lands forested at the time of enactment, prevention of deforestation and for reforestation where deemed necessary by the government (see Annex). However, the legislation appears not to be in force (Miller *et al.*, 1989).

Deficiencies in existing forestry and wildlife policy, legislation and regulations are recognised as deterrents to proper management of forest resources. With the assistance of FAO, a draft national forestry and wildlife policy (McHenry and Gane, 1988) and draft forestry and wildlife acts are being prepared. The institutional framework for the management of protected areas is also flawed, primarily because laws have been passed without sufficient consideration of staffing and budgetary requirements. Administrative responsibilities are also not clearly defined in the case of Barbuda (CCA, 1991).

**International Activities** Antigua and Barbuda is party to the Caribbean Conservation Association, and ratified the Convention for the Protection and Development of the Wider Caribbean Region and the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region (Cartagena Convention) on 11 September 1986. The Convention Concerning the World Cultural and Natural Heritage (World Heritage Convention) was accepted on 1 November 1983, although, to date, no sites have been inscribed on the World Heritage List.

The National Parks Authority received assistance from the Canadian International Development Agency to establish Nelson's Dockyard National Park, particularly with respect to strengthening the institutional capability of the Authority. During Phase II of the development activities, CIDA is due to fund the upgrading of the park's infrastructure (CCA, 1991).

**Administration and Management** A Development Control Authority was established by the Land and Development Control Act (1977). The Authority has responsibility for granting or refusing permission to develop land, and is involved in the envisioned preparation of a national development plan for the country, a component of which will be measures for the improvement of the environment (Miller *et al.*, 1989).

Two different offices are involved with the protected areas system, the National Parks Authority, which reports to the Ministry of External Affairs, Economic Development, Tourism and Energy, and the Fisheries Division of the Ministry of Agriculture, Fisheries and Lands. The latter ministry is responsible for lands, forests, soil conservation, and marine areas. The Fisheries Division is responsible for implementation of both the Marine Areas and Fisheries acts, but lacks the staff and resources to manage effectively the protected areas for which it is responsible (CCA, 1991). The National Parks Authority is responsible for the implementation of the National Parks Act, and for all matters associated with park management, including planning and management of funds generated by park activities (or donated for use in the parks). The



Authority's overall function is to preserve, protect, manage and develop the natural, physical and ecological resources, and the historical and cultural heritage of Antigua and Barbuda. The Authority has a Board of Directors with seven members, and approximately 35 staff, headed by a Parks Commissioner. An Advisory Committee of eight individuals is intended to facilitate community involvement in the affairs of the Authority. There is a weakness in the planning and research capabilities of the Authority, with those functions being taken up by CIDA consultants.

Local councils on Barbuda and Antigua have legal responsibility for forest reserves on the islands, while the Forestry Unit in Antigua provides a range of services in connection with forestry. Although short-staffed and lacking adequate funds, this unit has produced a slope and soils map, which, taken together with an ownership map, provides information on priority government forest lands needing total protection, increased control over use, and rehabilitation (OECS, 1986).

The Historical, Conservation and Environmental Commission was effectively established in 1989, as an advisory body to provide input and guidance for the management of the nation's natural and historical resources. There are no statutory provisions for the Commission, and its terms of reference have yet to be promulgated or approved by Cabinet. However, it was actively involved in a recent environmental profile (CCA, 1991). Until recently, only one NGO has had an environmental agenda, namely the Historical and Archaeological Society of Antigua and Barbuda. Subsequently, the Environmental Awareness Group (EAG) was established in 1988 as an off-shoot with a stronger focus on environmental issues. One of the goals of EAG is to promote, by dialogue and example, appropriate sustainable life styles (IRF, 1991). The Antigua and Barbuda Fisherman's Association is concerned with the destruction of mangroves and other areas important as fisheries habitats and nurseries.

The Caribbean Natural Resources Institute, formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), is a non-profit organisation whose goal is to strengthen local capacity to manage living natural resources critical to development in the Caribbean region. Themes for the 1990s include: parks and protected areas; coastal zone management; community-based management; education and training; and sustainable resource utilisation (Putney and Renard, n.d.).

Currently, only one protected area, Nelson's Dockyard National Park is actively managed. However, management is focused on regulating and supporting business activities within the park, and the park's biological, historical, cultural and historical components are not properly protected, preserved or managed. Two marine parks have been established under existing legislation, but activities are not controlled or regulated

in any way (CCA, 1991). The Parks Authority has little scientific expertise in natural resources management, and there is lack of coordination between protected area organisations (OECS, 1986). Further, no firm policy decision has been made on the ultimate responsibility for managing protected areas in Barbuda. For example, it is not clear if the Barbuda Council would have legal responsibility in the event that proposed areas were established (CCA, 1991). In addition, there is currently no adequate coastal zone management regime, and no agency has clear cut responsibility for wetlands (Jackson, 1990).

**Systems Reviews** Antigua is a hilly coral limestone island, attaining 402m in the south-west, with a deeply indented coastline, fringed by reefs and shoals (UNEP/IUCN, 1988). The reefs are often formed on submerged limestone terraces or platforms. Mangrove vegetation has developed in sheltered bays and inlets behind barriers of sand or coral debris. Due to habitat alteration and human disturbance, much of Antigua's remaining wildlife is limited to coastal areas and offshore islets and cays.

Barbuda is a low limestone island (38m maximum elevation) with a markedly uniform coastline. It is one of the driest West Indian islands, with a mean annual rainfall of only 984mm. To the north and west lies an area of lagoons and creeks separated by beach ridges and mangrove swamps. Codrington Lagoon is the largest such area, and extends southward for practically the entire length of the island. The lagoon is an important nursery ground for fish and lobster, and constitutes one of the largest remaining stands of relatively unspoiled mangroves in the Lesser Antilles (Scott and Carbonell, 1986). In contrast to Antigua, Barbuda is largely forested and in a more natural state, having extensive tracts of native dry forests. The low topography and minimal rainfall has led to soils that are poorly developed, and, as a result, only minor agricultural activities and settlements have developed.

The islands' original forest formations comprised mangroves, littoral woodland, cactus scrub, thorn woodland, deciduous woodland, semi-evergreen woodland, semi-evergreen seasonal forest and evergreen seasonal forest, corresponding to progressively higher elevations and greater rainfall. A study undertaken for the Organisation of American States in 1983 best described the vegetation of Antigua and Barbuda at that time. The recurrent planting of sugar cane over several centuries, and the extensive area under cane production are considered to have destroyed, for all practical purposes, the evidence of natural vegetation. The introduction and rapid naturalisation of many plant species, which now dominate areas previously used for agriculture, have created pioneer ecosystems that are maintained by current land practices. The principal vegetation types found today comprise forest, scrubland, savanna and grassland (Morello, 1983). Current estimates of forest cover vary substantially over time, and according to the methods used. According to one

study in 1983, 5,600ha were considered to be under woodland cover and 10,000ha under scrub vegetation, while another more recent estimate indicated some 9,600ha under woodland (Wirtshafter *et al.*, 1987). A full description of the range of native habitats and species on both islands is provided by Miller *et al.* (1989) and CCA (1991).

As early as 1979, a UNDP-supported project sought to identify and develop a national park system for Antigua and Barbuda (Robinson, 1979). Despite the recommendations of this project, the present protected area system does not provide adequate coverage of species, habitats and other environmental features. Four life zones are identified in Antigua according to ECNAMP (1980a); namely, mangrove, cactus scrub, dry woodland and moist forest. Much of the dry woodland that existed in the English Harbour/Falmouth area prior to 1960 has been reduced to cactus scrub, but sufficient remains that both of these zones are fairly well covered in Nelson's Dockyard National Park. Moist forests are also well represented within the park. ECNAMP (1980a) also highlighted the important marine and coastal habitats, but neither these nor the wildlife they support are adequately represented within protected areas. The north-east coastline of Antigua and adjacent off-shore cays are particularly important for their concentration of wetlands, mangrove habitats, coral reefs, seagrass beds and seabird nesting sites, yet these have not yet been afforded protected status. Similarly, there is no legal basis for protecting the biological diversity of Barbuda.

ECNAMP (1980a) has recommended areas for "special treatment" in both Antigua and Barbuda. The areas selected (ECNAMP 1980a, 1980b) indicate that for Antigua the volcanic south-west and southern sections and their nearshore and northern coastal and marine areas are vital for representation of ecosystems, species, and areas of outstanding recreational, historical and archaeological value. The Highlands of Barbuda and the extended marine habitats of its western and southern side are similarly important. A much better representation of the natural and historical resources of both islands in a system of parks and protected areas is warranted. A number of proposals for additional protected areas are presented in CCA (1991).

During the past five years, a number of events have increased awareness of the need for strengthened and more environmentally-sensitive planning and development policies. These include the on-going destruction of mangroves for large-scale hotel, marine recreation facilities and waste disposal; clearing of hillside and scrub for road construction; and uncontrolled and illegal beach sand mining and sewage disposal (CCA, 1991).

#### Addresses

Parks Commissioner, Antigua and Barbuda National Parks Authority, PO Box 1283, ENGLISH

HARBOUR, Antigua (Tel: 809 460 1053; FAX: 809 460 1516)

Fisheries Department, Ministry of Agriculture, Fisheries and Lands, Government Headquarters, ST JOHN'S, Antigua

Antigua-Barbuda Historical and Archaeological Society, Antigua-Barbuda Museum, PO Box 103, Long Street, ST JOHN'S, Antigua (Tel: 809 462 1469).

Environmental Awareness Group, Antigua-Barbuda Museum, PO Box 103, Long Street, ST JOHN'S, Antigua (Tel: 809 462 1469)

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title: Forestry Ordinance (Cap. 99)**

**Date:** 1941

**Administrative authority:** Local Council

**Designations:**

*Forest reserve* Cutting, or felling any tree, clearing for cultivation, or burning wood or charcoal shall be prohibited except with a permit.

**Source:** OECS (1986)

**Title: Fisheries Act No. 14**

**Date:** 1983

**Administrative authority:** Fisheries Department

**Designations:**

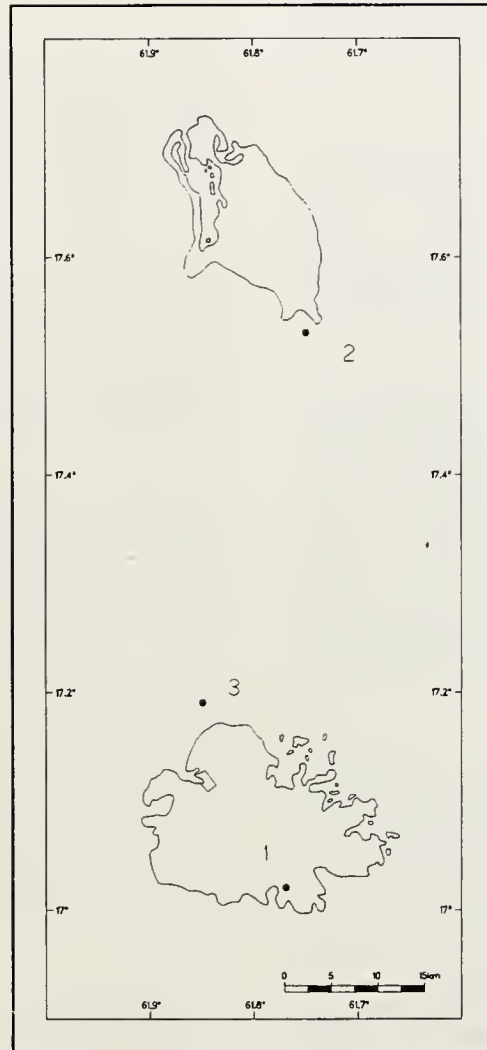
*Marine reserve* All flora and fauna, including fish, are protected and taking, pollution, or construction without a permission is prohibited.

**Source:** Original legislation

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## SUMMARY OF PROTECTED AREAS

Map ref.	<i>National/international designations</i> Name of area	IUCN management category	Area (ha)	Year notified
1	<i>National Parks</i> Nelson's Dockyard	II	4,128	1984
	<i>Marine National Parks</i>			
2	Palaster Reef	II	500	1973
3	Salt Fish Tail Reef (Diamond Reef)	II	2,000	1973



Protected Areas of Antigua and Barbuda





# BAHAMAS

Area 11,406 sq. km

Population 250,000 (1990) (80% on the island of New Providence)

Natural increase: No information

## Economic indicators

GDP: US\$ 9,000 per capita

GNP: No information

**Policy and legislation** The Bahamas National Trust Act, 1959 empowers the Bahamas National Trust to hold and manage lands, waters and places of natural beauty or historic interest for purposes of conservation and preservation. Bye-laws for the management of such sites are made under this Act.

New bye-laws for all land-and-sea parks, drawn up by the Trust under Section 24 of the Act, came into force on 13 February 1986. The bye-laws prohibit the removal or destruction of wildlife, and other named activities that would degrade the areas. (Originally designated for recreational purposes, but now also recognised as 'marine replenishment areas and nurseries').

The Wild Birds Protection Act, 1905 was revised in 1965 and again in 1972. Section 4 makes provision for the designation of areas protected from hunting through the passing of Wild Bird Protection (Reserves) Orders. Between 1951 and 1965, 11 orders were passed designating 25 areas as wild bird reserves.

A recent *Policy Statement for National Parks* has been produced by the National Trust (Anon., 1991a). This document covers a number of headings ranging from system management and system expansion, to research, interpretation and education, and visitor use. It states, among other things, that each park will have, written, a general management plan, to be approved by council every three years. The Trust also produces a more general document concerning *Aims, Objectives and Priorities*, which is reviewed biennially (Anon., 1991b).

**International Activities** The Bahamas does not participate in any conventions or programmes, international or regional, that are of specific relevance to protected areas.

**Administration and Management** The Bahamas National Trust is responsible for the protected areas system, although it has no absolute authority within wild bird reserves. The Bahamas National Trust, a non-governmental self-funded organisation, is managed by a Council which consists of 21 members headed by the Trust President and including government representatives, external conservation bodies and Trust members. The Council appoints an Executive Committee, which convenes at least once a month, to coordinate and oversee the work of the various

sub-committees. Staff includes four in central headquarters and three park wardens overseen by an Executive Director.

The government department responsible for environmental conservation is the Ministry of Agriculture, Fisheries and Land Government, although the Department of Environmental Health Services is also involved with environmental issues.

**Systems Reviews** The islands and cays are low-lying, with an average elevation of only 10m. Many of them have low hills which may reach 30-60m in height. The dominant vegetation is low, dense and thorny. Almost every island contains some wetland habitat, the great majority comprising shallow brackish to saline lagoons, mangrove swamps, coastal flats and intertidal mudflats (Scott and Carbonell, 1986).

In 1983, The Bahamas National Trust submitted to the government a proposal entitled "The Development of a National Park System for the Commonwealth of the Bahamas" identifying 52 additional sites throughout the islands which it felt should be given some protection, and defined three categories of protection: national park, national reserve and protected area. This was followed in 1984 by a national conservation strategy which also recommends the development of a representative system of protected areas (Bahamas National Trust, 1984). This was subsequently represented during June 1990, identifying 12 sites of the highest priority.

A *Bahamas Country Study on Biodiversity* report was produced (Anon., 1992) in January 1992 based on the 1991 UNEP guidelines. This includes lists of current and proposed protected areas: the former consists of 10 sites covering 751,262ha (not all are of sufficient size to be incorporated in the list below), while there are 53 proposed areas comprising 4 national parks, 16 national reserves and 33 unspecified. Also listed are a series of objectives for the conservation and rational utilisation of biodiversity: these include measures for cataloguing biodiversity; establishing protective measures including expansion of the protected areas network; and establishing sustainable practises for activities in all terrestrial and marine environments. A detailed cost assessment is provided for these and all other objectives.

## Addresses

Ministry of Agriculture, Fisheries and Local Government, PO Box N3028, NASSAU, New Providence  
Bahamas National Trust, PO Box N4105, NASSAU, New Providence

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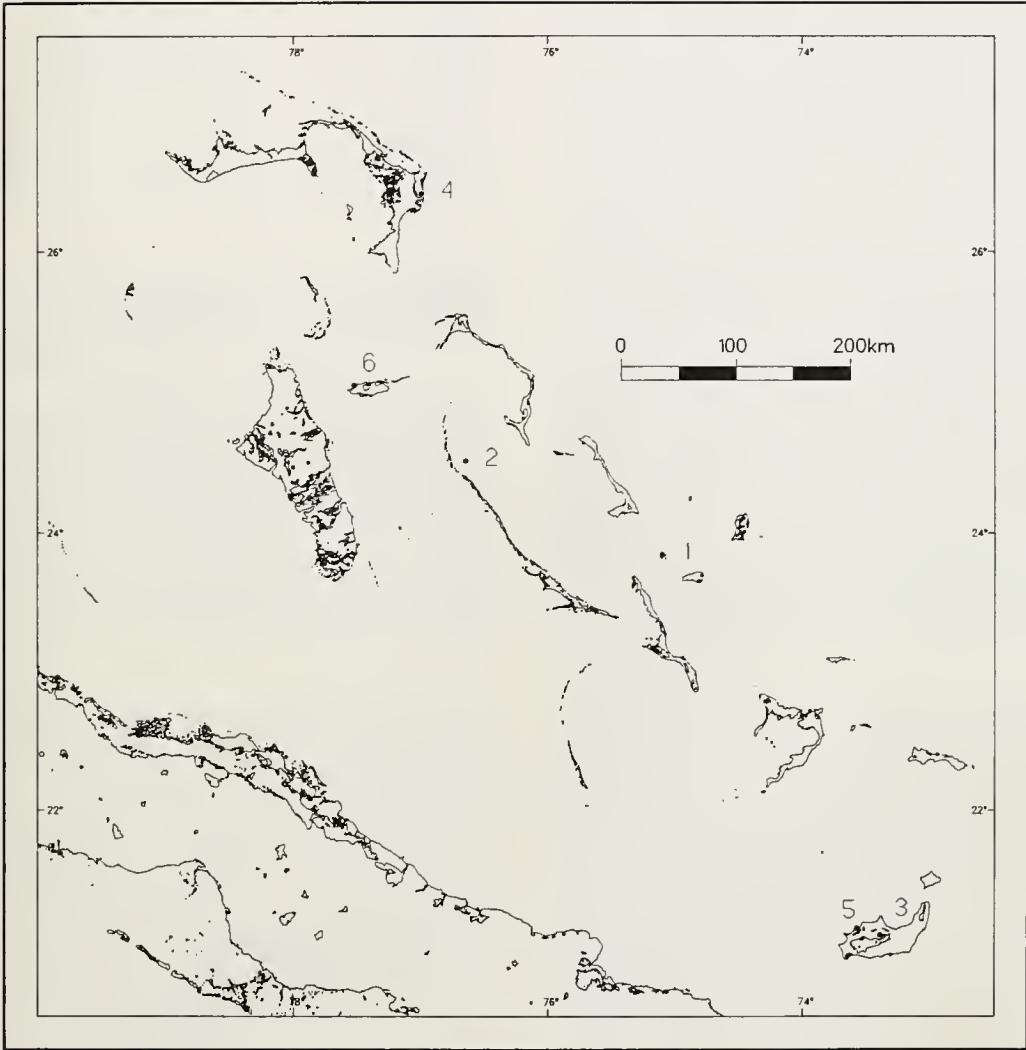
ANNEX

Definitions of protected area designations, as legislated, together with authorities responsible for their administration

<p><b>Title:</b> The Wild Birds Protection (Reserves) Order</p> <p><b>Date:</b> 27 January 1951 (Commencement); subsequent Orders: 1954 (twice), 1955, 1956 (twice), 1958 (twice), 1961, 1962 and 1965</p> <p><b>Brief description:</b> Makes provision for the establishment of wild bird reserves</p>	<p><b>Administrative authority:</b> Ministry of Agriculture</p> <p><b>Designation:</b> Wild bird reserve</p>
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SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Conception Island	II	809	1973
2	Exuma Cays Land and Sea Park	II	45,584	1958
3	Inagua	II	74,333	1965
4	Pelican Cays Land and Sea Park	II	850	1981
	<i>Managed Nature Reserve</i>			
5	Union Creek (within Inagua NP)	IV	1,813	1965
	<i>Wild Bird Reserves</i>			
6	Lightbourn Creek (Waterloo)	IV	200	



**Protected Areas of the Bahamas**





# BARBADOS

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Area 430 sq. km

Population 257,000 (1990)

Natural increase: 0.1% per annum

## Economic Indicators

GDP: No information

GNP: No information

**Policy and Legislation** In the National Development Plan 1983, the Physical Development Plan 1983, amended 1986, and a recent Barbados report to UNCED (1992), the government has articulated a commitment to environmental conservation, including plans for a system of parks and protected areas throughout the island, incorporating both terrestrial and marine systems (Y. St Hill, pers. comm., 1992).

The Marine Areas (Preservation and Enhancement) Act of 1 March 1976 provides for the preservation and protection of coastal and marine areas, while permitting recreational and scientific activities. There is also a Wild Birds' Protection Act, 1907, revised in 1979.

Two pieces of legislation establishing Barbados Marine Reserve were gazetted on 16 February 1981. The Designation of Restricted Areas Order, 1981 established the boundaries of the underwater park, while the Marine Areas (Preservation and Enhancement) (Barbados Marine Reserve) Regulation, 1981 created four zones within the park (scientific zone, two water sports zones and a recreational zone). A second site, Harrison's Cave, is also protected by legislation (Y. St Hill, pers. comm., 1992).

**International Activities** Barbados is a member of the Caribbean Conservation Association, and ratified the Convention for the Protection and Development of the Wider Caribbean Region and the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region (Cartagena Convention) on 25 May 1985. Barbados is not party to the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), or the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), nor does it participate in the Unesco Man and the Biosphere (MAB) Programme.

**Administration and Management** The National Conservation Commission is the statutory body responsible for management of the natural environment, and functions range from conservation of natural and cultural features to management of public recreation areas, including advice to the Minister on these issues. The Commission was created in 1982 through an amalgamation of the Parks and Beaches Commission (which had been established in 1970) with the Caves Authority (set up in 1977). Overall responsibility for

administering Barbados Marine Reserve, all public recreation areas, beaches and caves rests with the Commission, with day-to-day running of the marine reserve being the responsibility of the Park Naturalist and his staff.

An Environmental Unit has been established within the Ministry of Labour, Consumer Affairs and the Environment to coordinate environmental planning, research, education and policy. The unit is also the focal point for environmental matters between Barbados and regional and international agencies. The Environmental Unit is currently developing a national conservation strategy with assistance from IUCN and the Caribbean Conservation Association (CCA) (Y. St Hill, pers. comm., 1992).

Private organisations with an interest in the environment include the Barbados National Trust, created in 1961. Although much of the Trust's efforts are directed toward preserving sites of historical and architectural interest, it also supports the preservation of the natural environment and was instrumental in revision of the Schedule to the Wild Birds' Protection Act in 1979. The Trust owns and manages Welchman Hall Gully, a halfmile cleft in the limestone cap which supports both pre-colonisation and introduced flora. Other organisations include the Barbados Environmental Association, established in 1987, which aims to stimulate interest in environmental issues, create an awareness of the need for conservation and natural resource management, conducts research, and is engaged in other environmental activities which benefit the public.

The CCA has its headquarters in St Michael, Barbados. This international organisation, which has 19 member states in the wider Caribbean, was created in 1967 to ascertain the conservation needs of the Caribbean area and to coordinate conservation activities within the region. The Caribbean Natural Resources Institute, formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), is a nonprofit organisation whose goal is to strengthen local capacity to manage living natural resources critical to development in the Caribbean region (Putney and Renard, n.d.). Collaborative ventures between the CCA and the Institute include an ICOD (Canadian International Centre for Ocean Development) supported marine parks programme, and the Caribbean Heritage Programme for institutional development in support of the region's natural heritage at national and regional levels (Anon., 1989).

**Systems Reviews** Barbados is a small, relatively flat island, with a maximum elevation of 330m, although a ridge runs in a north-south direction slightly below this altitude for several kilometres. The island is located in the North Equatorial current 475km north of South

America, within the AtlanticAntillean subprovince (Cotter, 1982).

The natural vegetation over most of the island originally comprised drought-tolerant forest and shrubs, developing into tropical forest in the moister, sheltered regions. However, native vegetation is now more or less confined to a few small patches in the hills, and along the exposed east coast which has remained relatively undeveloped (Scott and Carbonell, 1986). Much of the island is under cultivation, sugar cane being an important crop, and a well-developed road system means that few areas are inaccessible. Major problems with the management of natural resources are discussed by Wilson (1984) and include beach erosion, threat of oil spillage and land development.

For several years discussion has continued on the establishment of a national park on the north and east coast of the island and encompassing Scotland District. A comprehensive review of the area, including its physical features, outstanding scenic viewpoints, and ecological characteristics, was conducted during 1981 on behalf of the National Trust. Subsequent work on planning, institutional framework and policy development (Pennington, 1983) led to a range of detailed recommendations on the establishment and management of the proposed park. The boundaries of the park, as proposed by Pennington, have recently been accepted with the passage of the Physical Development Plan (1986). The government has also reactivated proceedings towards the official designation and development of the national park, as a pilot project under the National Conservation Strategy, being formulated and executed by the Environmental Unit and IUCN. The next major step will be the development of a detailed sector plan for the area, to be completed by mid 1992 (J.R.A. Wilson, pers, comm., 1992).

In 1981, the government stated in its policy that a new park would be created at Graeme Hall Swamp, an important bird habitat. However, the project has been delayed on economic grounds (UNEP/IUCN, 1988; Wilson, 1984). Scott and Carbonell (1986) note that this is the only wetland of its type in Barbados, and that, as a relatively unspoilt wetland ecosystem in a heavily populated island, the swamp has great potential for educational purposes. The swamp also contains the only mangrove stand on Barbados.

## Addresses

- The Environmental Unit, Ministry of Labour, Consumer Affairs and the Environment, Marine House, Hastings, ST MICHAEL 29 (Fax: 809 426 8959)  
National Conservation Commission, Codrington House, ST MICHAEL  
Barbados National Trust, Ronald Tree house, 10th Avenue, Belleville, ST MICHAEL (Tel: 809 426 2421)  
Barbados Environmental Association, PO Box 132, BRIDGETOWN

## References

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**ANNEX**  
**Definitions of protected area designations,**  
**as legislated, together with authorities responsible for their administration**

**Title:** The Marine Areas (Preservation and Enhancement) Act

**Date:** 1 March 1976

**Brief description:** Provides for the preservation and protection of coastal and marine areas, while permitting recreational and scientific activities.

**Administrative authority:** National Conservation Commission

**Designation:**

*Marine reserve* Prohibited activities include destroying or disturbing any plant or animal or aspect of the physical environment; injuring any bottom growth formation; discharging any waste materials into the water; using spearguns, hooks, lines, traps, explosives or other devices to catch fish; using speedboats, sail boats or jet skis, except in designated areas; carrying sand away from the beach; capturing turtles or their eggs on the shore; and depositing refuse or any offensive matter on the beach or in the sea.

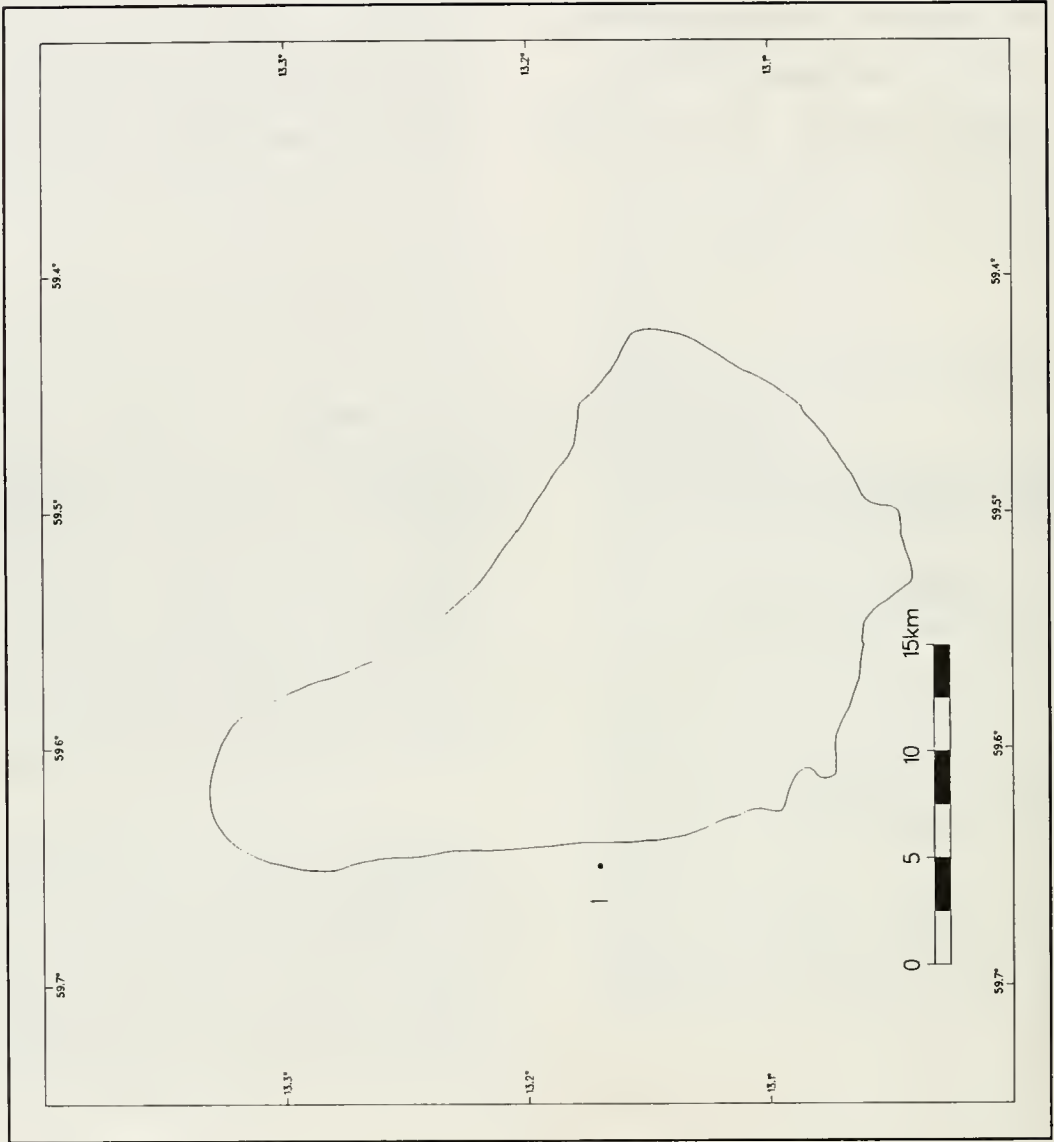
**Source:** Y. St Hill, 1985

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**SUMMARY OF PROTECTED AREAS**

Map ref.	<i>National/international designations</i> Name of area	IUCN management category	Area (ha)	Year notified
1	<i>Marine Reserve</i> Barbados	II	250	1980





Protected Areas of Barbados

## BERMUDA (UNITED KINGDOM)

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**Area** 55 sq. km

**Population** 54,893 (1980); estimate (1989) 59,066  
Natural increase: No information

### **Economic Indicators**

DP: US\$ 21,845 per capita (1987)  
GNP: No information

**Policy and Legislation** Bermuda is a dependent territory of the United Kingdom. The island's constitution dates from 1968.

The Bermuda National Parks Act 1986, makes provision for protected areas on both public and private land under two schedules. All areas declared on public land under the first schedule are either nature reserves or parks, while areas under private ownership may be declared under the second schedule as agreement protected areas. The Coral Reef Reserve Act, 1966 provides legislation under which identified coral reef areas are protected, while Section 4 of the Fisheries Act, 1972 gives the Minister of Works and Agriculture authority to declare any area of the waters within the exclusive fishing zone to be a protected area.

Section 5 of the Protection of Birds Act, 1975 makes provision for the establishment of nature reserves for bird preservation. A number of sites have been declared by Statutory Instrument under this Act: The Nature Reserves (Tern Nesting Areas) Order, 1976, The Nature Reserves (Spittal Pond) Order, 1979, The Nature Reserves (Castle Harbour) Order, 1979, and The Nature Reserves (Evans Bay) Order, 1981.

The Bermuda National Trust Act, 1969 (amended 1970) establishes the Trust and specifies its administration and objectives. It can purchase or receive land for management as nature reserves to be managed according to the Bermuda National Trust (Open Spaces and Property) Regulations.

The Development and Planning Act (1974) was also instrumental in conservation of specified areas. This Act was effectively replaced by the Bermuda Development Plan, 1983 and the Bermuda Development Plan, 1983: Planning Statement (1986) and amended in 1989. These deal broadly with planning for the entire country. Section IV covers Zoning Regulations and divides Bermuda into: broad development areas (First Schedule); environmental protection areas (Second Schedule); environmental overlay areas (Third Schedule); and special study areas. The environmental protection areas listed in this legislation include: open space areas, recreation areas, nature reserve areas, woodland reserve areas and arable reserve areas (Anon., 1989).

**International Activities** Bermuda is included in the UK's ratification of the following international

agreements with provisions for protected areas; the Convention concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). Eight sites are being considered for listing under the Ramsar Convention.

**Administration and Management** The Conservation Division within the Ministry of Agriculture and Fisheries was established in 1966 and a conservation officer and field staff appointed to "conduct research and wardening activities as necessary to save ... endangered flora and fauna".

The National Parks Act established the position of Director of the Conservation Division as the person responsible for the administration and management of protected areas created under the Act. It is also the Director's responsibility to maintain a national parks plan for the system of protected areas, and to prepare management plans for each scheduled site. The management plans are intended to maintain the features upon which the site was first selected, and are required to describe the long-term goals of the protected area, boundaries of the area (and any zones), the management that will be needed to accomplish the goals, and the regulations that apply within the area.

The National Parks Act also created the National Park Commission, with the function of advising the Minister on matters affecting the long-term conservation and management of the system. In addition to this general aim, the Commission is required to review and advise on the national parks plan and the management plans of individual protected areas, both before and during their implementation. The Commission consists of 12 members, of whom the Director and the Parks Administrator are *ex-officio* members. The other ten members are appointed by the Minister and include one member each of the Bermuda National Trust, Audubon Society, Maritime Museum Association, and Zoological Society, two members with "environmental expertise" and two "interested" members of the general public.

The Fisheries Division of the Ministry of Agriculture and Fisheries is responsible for marine habitats, and for the implementation of both the Coral Reef Reserve Act and the Fisheries Act.

The Bermuda National Trust is a nongovernmental organisation (NGO) established by law under the Bermuda National Trust Act, 1969. Its objectives include promoting the permanent preservation of lands and buildings; to maintain these when they have been acquired by the Trust and to promote access to these sites and places. To this end, the Trust has been granted special powers of purchase. It is run by a President along

with a Council of twelve other members (Anon., 1969). Nature reserves acquired and owned by the Bermuda National Trust are managed by the Open Spaces Committee with the advice and assistance of the government Conservation Division. Reserves owned by the Bermuda Audubon Society are managed by the Society's Executive Committee with advice from the Conservation Division. The main NGOs are the Bermuda National Trust and the Bermuda Audubon Society. It is estimated that 10% of the population are members of a conservation organisation (Oldfield, 1987). The Bermuda Biological Station for Research Inc (BBS) aims to provide a year-round facility for research and education into a wide range of maritime studies, particularly those concerned with deep ocean and global implications.

**Systems Reviews** Bermuda is a small, densely populated island, and only small areas of natural vegetation survive (for example at Paget and Devonshire marsh, and the upland hills of Castle Harbour and Walsingham). However, the living standard of the population is high (primarily based on tourism and international business, and virtually all food and fibre is imported).

Bermuda is the most northerly site of mangrove distribution in the world, and small scattered areas of mangrove swamp amounted to a total of 16.7ha in 1980. Inland peat marshes cover about 48ha and are of great botanical interest (Oldfield, 1987).

The first schedule of the National Parks Act lists ten nature reserves and 59 parks, while no agreement protected areas have been declared under the second schedule. The nature reserves listed include a number of those already declared under statutory instruments arising from the Protection of Birds Act. Currently there are 12 nature reserves covering some 48ha, and 63 parks covering some 241ha none of these sites is of sufficient size to be listed in the current publication (they range in size from 0.04ha to 38ha). In addition, 10 sites (c. 15ha) are managed by the Bermuda Audubon Society, 15 sites (c. 40ha) by the Bermuda National Trust, and there are two other private protected areas (25ha) (Department of Agriculture, Fisheries and Parks, pers. comm., 1991).

Bermuda has a number of endemic plants and animals. Most of the natural vegetation however, has been severely modified or destroyed, and populations of plants and animals have been further reduced by introduced species: for example, Bermuda cedar *Juniperus bermudiana* was originally the dominant tree

species, but 96% of its population was destroyed by an introduced species of scale insect (Davis *et al.*, 1985). Despite the small areas of remaining natural habitat, the natural vegetation appears to recover fairly quickly, and various experiments in environmental restoration have been carried out (Pollard, 1985; Wingate, 1985).

#### Addresses

Conservation Division, Ministry of Agriculture and Fisheries, P O Box 145, Flatts 3  
Bermuda National Trust, PO Box 61, HAMILTON 5  
Bermuda Audubon Society, PO Box 1328, HAMILTON 5

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## ANNEX

## Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title: The Bermuda National Parks Act**

Date: 1986

**Brief description:** Enabling legislation for the designation of national parks and reserves

**Administrative authority:** Conservation Division

**Designations:**

The Act makes provision for protected areas on both public and private land under two schedules. All areas declared on public land under the first schedule are either nature reserves or parks, while areas under private ownership may be declared under the second schedule as agreement protected areas. Areas designated under either schedule have one or more of four defined objectives covering protection of natural resources and features, provision for the use of areas to be kept in their natural state, provision of open space, and protection of cultural features.

A management plan must be prepared for each scheduled area (within guidelines identified by the Act) and be in effect within five years of declaration. Activities within the area must be consistent with the provisions of the plan. Where necessary the Minister may pass regulations to ensure that the provision is complied with. The 1986 Act states in detail the powers that authorised officers have to enforce its regulations and specifies certain penalties.

The act divides first schedule protected areas into two classes:

**Class A Protected Areas – Nature Reserves** To be managed to protect special or fragile natural features and provide limited public access.

**Class B Protected Areas – Parks** To be managed to encourage conservation and enjoyment of natural and historic features with the minimum of commercial activity.

**Source:** Original legislation

**Title: Coral Reef Reserve Act**

Date: 1966

**Brief description:** Enabling legislation for the designation of coral reef reserve areas

**Administrative authority:** Fisheries Division

**Designations:**

**Coral Reef Preserve or Reserve:** Two coral reef areas, North Shore Coral Reef Preserve and South Shore Coral Reef Preserve, are protected.

**Source:** UNEP/IUCN, 1988

**Title: Fisheries Act**

Date: 1972

**Brief description:** Enabling legislation for the designation of exclusive fishing zones

**Administrative authority:** Fisheries Division

**Designations:**

**Exclusive Fishing Zones** Section 4 gives the Minister of Works and Agriculture authority to declare any area of the waters within the exclusive fishing zone to be a protected area, prohibiting or restricting the taking of fish (although this does not affect use of boats within designated areas).

**Source:** Original legislation

**Title: Protection of Birds Act**

Date: 1975

**Brief description:** Enabling legislation for the designation of coral reef reserve areas

**Administrative authority:** No information

**Designations:**

**Nature Reserve** May be declared, by Statutory Instrument, on any land which is considered to be especially suited for the feeding and nesting of protected birds, or on land otherwise important as a habitat for their preservation. May not be declared on private land without the consent of the owner. Public access is limited unless otherwise stated by the Minister. under this Act. A number of the reserves thus designated are also listed as nature reserves under the Bermuda National Parks Act, 1986.

**Source:** Original legislation



**Title:** Bermuda National Trust Act

**Date:** 1969 (amended 1970)

**Brief description:** Establishes the Bermuda National Trust and specifies its administration and objectives. Enabling legislation for the designation of nature reserves by the Trust

**Administrative authority:** Bermuda National Trust

**Designations:**

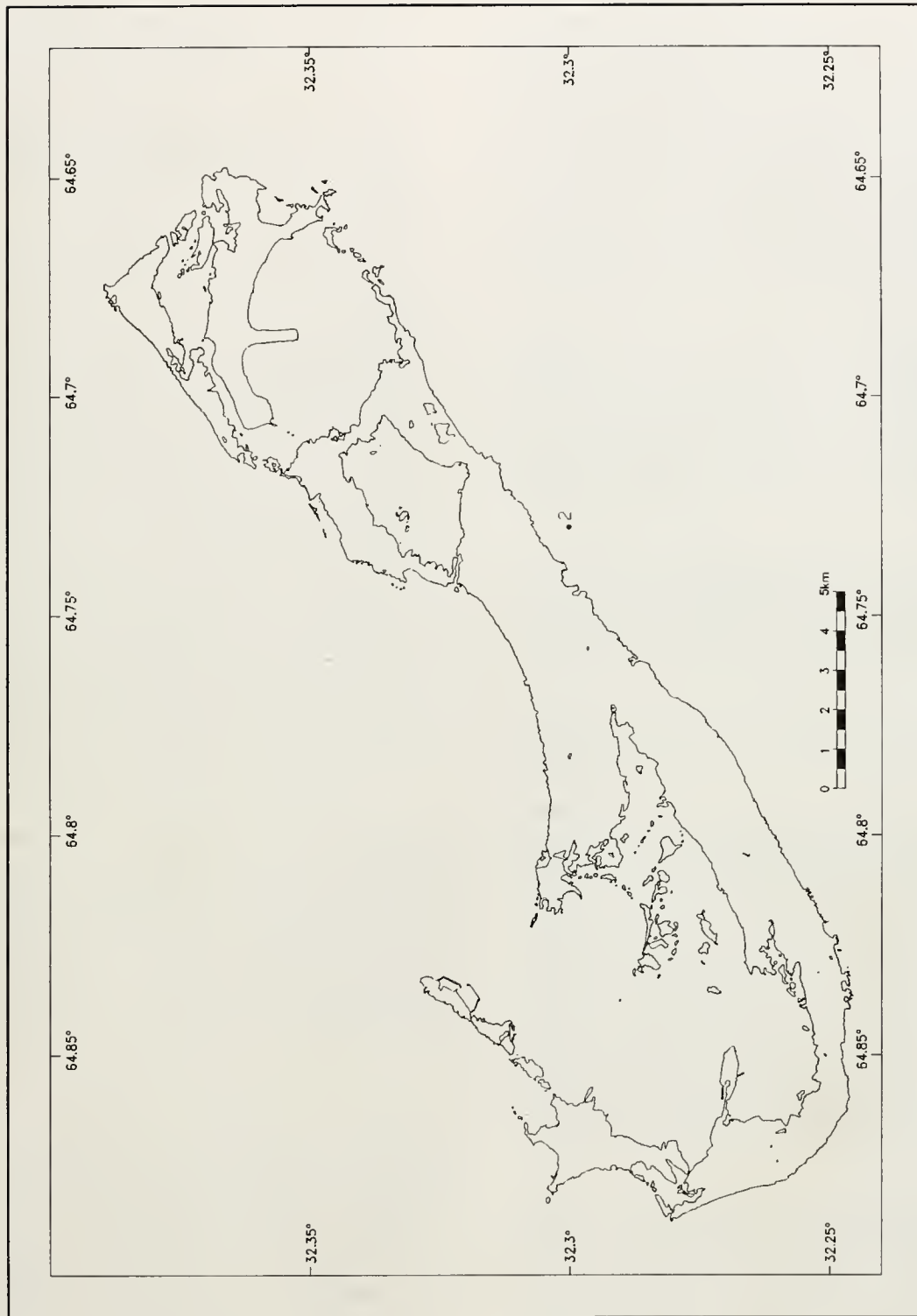
**Nature Reserve** The Trust can purchase or receive land for management as nature reserves to be managed according to the Bermuda National Trust (Open Spaces and Property) Regulations.

**Source:** Original legislation

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**SUMMARY OF PROTECTED AREAS**

<b>Map ref.</b>	<b>National/international designations Name of area</b>	<b>IUCN management category</b>	<b>Area (ha)</b>	<b>Year notified</b>
	<i>Preserves</i>			
1	North Shore Coral Reef	IV	12,000	1966
2	South Shore Coral Reef	IV	530	



Protected Areas of Bermuda



# BRITISH VIRGIN ISLANDS (UNITED KINGDOM)

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**Area** 153 sq. km

**Population** 14,786 (1990)

Natural increase: No information

## **Economic Indicators**

GDP: US\$ 112,440,000 (1989 change of base year)

GNP: US\$ 8,143 per capita (1987)

**Policy and Legislation** The constitution dates from 1967 when the Islands became a self-governing dependent territory of the United Kingdom.

The National Parks Ordinance No. 29, 1961, as amended No. 3, 1978, established the National Parks Trust, and provided for the creation of protected areas in the form of national parks to be managed by the Trust. The Marine Parks and Protected Areas Ordinance No. 8, 1979 provides for the creation of a range of categories of protected area, including multiple-use management area or marine parks and protected area. The Protection of Trees and Conservation of Soil Ordinance (Cap. 86) provides for protected forestry and water areas, and the Trust currently manages Sage Mountain Protected Forest created under this Act. The Wild Birds Protection Ordinance (Cap. 98, 1959), as amended (1980), authorises the Governor to declare protected areas specifically as bird sanctuaries. The provisions of this ordinance also apply to birds in any marine park or protected area designated under the Marine Parks and Protected Areas Ordinance. More recently all bird sanctuaries in the country were subsumed under a new law which declared the entire British Virgin Islands as a bird sanctuary (Potter, pers. comm., 1992).

Other relevant legislation includes the Fisheries Ordinance No. 18, 1979, the Beach Protection Ordinance, 1985, and the Bird Sanctuary (Flamingo Pond, Anegada) Order, 1977. The Fisheries Ordinance authorises the Minister of Natural Resources to declare any water area within the exclusive fishing zone (200 miles) to be a protected area. All fishermen must obtain licences, and fisheries officers are empowered to confiscate fishing equipment and impose fines. In May 1990, Horseshoe Reef was declared a protected area under the Fisheries Ordinance.

Several laws deal with protected areas, and this was one of a number of reasons which led to the government requesting technical assistance from the Organization of Eastern Caribbean States in strengthening and updating its existing environmental legislation. A report was subsequently prepared on the existing legislation (Lausche, 1986). Since then, two new pieces of environmental legislation have been drafted: a new Protected Areas and Wildlife Act, 1987, and a Coastal Conservation and Management Act, 1991. Once enacted, this comprehensive legislation is expected to make a major contribution to improving the territory's

capacity for sound environmental planning and management (BVINPT/ECNAMP, 1988).

The Protection of Trees and Conservation of Soil Ordinance (Cap. 86) lacks regulations, but contains stronger provisions on offences, enforcement, and legal proceedings than does the National Parks Ordinance. While bye-laws or regulations may be enacted for the management of national parks and the control of public activities under either Act, Lausche (1986) describes the present lack of regulations as a major deficiency. Regulations were passed in 1991 prescribing permitted activities in marine parks, and a schedule for fees.

**International Activities** British Virgin Islands is included in the UK's ratification of the following international agreements with provisions for protected areas; the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).

The UK government ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) on 23 February 1986, and has signed the Protocol on Specially Protected Areas and Wildlife in 1991. The UK's ratification includes the British Virgin Islands.

The government of the British Virgin Islands has been a member of the Caribbean Conservation Association (CCA) since 1974.

**Administration and Management** The agency with responsibility for conservation management is the Department of Conservation and Fisheries, which comes under the portfolio of the Ministry of Natural Resources and Labour. The Ministry of Natural Resources is also responsible for agriculture, fisheries, forestry and mining. The National Parks Trust, which takes its authority from the National Parks Ordinance, is responsible for the development and management of all potential and designated areas, and for the Botanic Gardens. The Department of Conservation and Fisheries and the National Parks Trust work closely in areas such as environmental monitoring and resource management. The development of a single conservation agency has been proposed (Cambers, 1991).

Since 1980 the development of marine parks and protected areas has been the subject of collaboration between the government and the Eastern Caribbean Natural Areas Management Programme. An initial survey resulted in eight marine areas being identified as warranting protection (Jackson, 1981). Following endorsement of these areas by the government, the project was extended into a second phase of research, planning and implementation. Two particular concerns



were to integrate marine and terrestrial components of the protected area system, and to provide recreational areas for the local population. A further five areas were recommended (Jackson, 1982). The second phase of the project also aimed to achieve five objectives by the end of 1988: to improve fundraising capability; to produce management plans for four existing areas; to consider studies submitted on seven proposed areas (Wreck of the Rhone Marine Park had already been declared) and make recommendations to the government; to improve conservation awareness among the public; and to improve relations with natural resource users, by involving interested parties in the management process. In 1987, it was reported that the collaborative project had gone some considerable way in strengthening and supporting the National Parks Trust. The funding basis had been made more secure, a Trust had been established and a director appointed (in 1985), and efforts were being made to involve Trust members more actively in the work of the Trust. As part of this project, *A parks and protected areas system plan for the British Virgin Islands*, which identifies the goals, objectives and management requirements of the national parks and protected areas system, was prepared (BVINPT/ECNAMP, 1986). The system plan was accepted by the government in 1987.

Other agencies involved in conservation include the BVI Dive Operators Association. Members of the Association have been involved, for example, in the management of Wreck of the Rhone Marine Park, providing surveillance, monitoring the wreck and reefs, and explaining park regulations to visitors. They have also installed and maintained moorings at the dive site with support and collaboration from the National Parks Trust and government (Geoghegan *et al.*, 1991).

**Systems Reviews** The British Virgin Islands comprise just over 40 islands, small cays and rocks, the marine area of the territory being well over five times the size of the land mass. The four largest islands are Tortola, Virgin Gorda, Anegada and Jost Van Dyke. Geologically, the islands belong to the Greater Antilles, and, with the United States Virgin Islands, rise from the Puerto Rican shelf, here lying about 65m below sea-level. Most of the islands (with the exception of Anegada) were uplifted from submerged volcanoes and are formed from volcanic debris and metamorphosed sediments. The islands are dominated by steep-sloping hills fringed by narrow valleys and sparse mangroves. Most of the soils are light, and have limited water-holding capacity, which, combined with erratic rainfall patterns and insufficient forest cover to retard steep slope erosion, deters high agricultural production. The dominant natural vegetation is cactus scrub and dry woodland, although much of this has been modified. Coral reefs surround many of the islands (UNEP/IUCN, 1988; Walters, 1984).

The main economic activity is now tourism, which has expanded considerably in recent years (during the period 1978-1982 income from tourism nearly tripled).

Development of the tourist industry has had an impact on natural habitats, putting particular pressure on coastal wetlands and mangrove communities (Scott and Carbonell, 1986). As the tourism industry is based on the marine environment, this was a significant factor leading to the development of protected areas in the islands.

At present, terrestrial parks cover 2.1% of the land area. The system plan sought to define a system of parks and protected areas which would incorporate the existing parks into a larger system of comprehensive ecological units, to preserve the most important areas of the natural and cultural heritage. Twelve additional parks were proposed, but none of these has yet been declared. This is partly due to the approach adopted in BVI of preparing management plans and strengthening institutions in advance of park declaration. Significant progress has been made in the development of three of the proposed protected areas: Southwestern Virgin Gorda, Anegada and Horseshoe Reef, and North Sound, Virgin Gorda (Cambers, 1991). Anegada has been identified as an internationally important wildlife site, with endemic and endangered plant and animal species and important wetland habitats. It has the largest reef complex in the Lesser Antilles, with Horseshoe Reef forming an extension of the fringing reef surrounding the island. Horseshoe Reef is now protected and managed for conservation; several proposals are being considered for the development of a terrestrial park for Anegada. Mapping of all of British Virgin Island's wetlands and mangroves has been carried out by the Department of Conservation and Fisheries within their Mangrove Management Programme.

#### Addresses

- National Parks Trust, PO Box 860, Road Town, TORTOLA (Tel: 809 494 3904)  
BVI Dive Operators Association, PO Box 108, TORTOLA  
Conservation and Fisheries Department, Road Town, TORTOLA (Tel: 809 494 5651N2; FAX: 809 494 4435)  
Town and Country Planning Department, PO Box 834, Road Town, TORTOLA (Tel: 809 494 344433; FAX: 809 494 5794)

#### References

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**ANNEX**  
**Definitions of protected area designations, as legislated,**  
**together with authorities responsible for their administration**

**Title: National Parks Ordinance No. 29, 1961,**  
**as amended No. 3, 1978**

**Date:** 1961 (amended 1978)

**Brief description:** Provides for the designation of national parks

**Administrative authority:** National Park Trust

**Designations:**

**National park** The Ordinance does not provide substantive details relating to management or other provisions.

**Title: The Marine Parks and Protected Areas Ordinance No. 8, 1979**

**Date:** 1979

**Brief description:** Enabling legislation for the designation of multiple use management areas as marine parks or protected areas

**Administrative authority:** National Parks Trust

**Designations:**

**Marine park or protected area (Multiple use management area)** Provides for the creation of a range of categories of protected area, including multiple-use management areas. The Act also prohibits spear fishing, and damage or removal of flora or fauna within a marine park or protected area. While bye-laws or regulations may be enacted for the management of parks and the control of public activities under either Act.

**Title: The Protection of Trees and Conservation of Soil Ordinance (Cap. 86)**

**Date:** 1954

**Brief description:** Enabling legislation for the designation of protected forests

**Administrative authority:** Department of Agriculture and National Parks Trust

**Designations:** No information

**Protected forest** Provides for protected forestry and water areas, and the Trust currently manages Sage Mountain Protected Forest created under this Act. The Act lacks regulations, but contains stronger provisions on offences, enforcement, and legal proceedings than does the National Parks Ordinance.

**Title: Wild Birds Protection Ordinance (Cap. 98, 1959)**

**Date:** 1959 amended 1980

**Brief description:** Enabling legislation for the designation of protected forests

**Administrative authority:** No information

**Designations:**

**Bird sanctuary** The Governor is authorised to declare protected areas specifically as bird sanctuaries. The provisions of this ordinance also apply to birds in any marine park or protected area designated under the Marine Parks and Protected Areas Ordinance.

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Bird Sanctuaries</i>			
1	Cooper Island	IV	138	1959
2	Flamingo Pond	IV	449	1977
3	Ginger Island	IV	105	1959
4	Peter Island	IV	430	1959
	<i>Natural Monument</i>			
5	Wreck of the Rhone	III	324	1980
	<i>Forest Park</i>			
6	Virgin Gorda Peak	II	107	1974





Protected Areas of the British Virgin Islands

# CAYMAN ISLANDS (UNITED KINGDOM)

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**Area** 259 sq. km

**Population** 25,355 (1990)

Natural increase: No information

## **Economic Indicators**

GDP: No information

GNP: US\$ 18,000 per capita (1990)

**Policy and Legislation** The Cayman Islands are a dependent territory of the United Kingdom. The present constitution dates from 1972.

Marine protected areas have been designated around Grand Cayman under the Marine Conservation (Marine Parks) Regulations, 1986, and protected areas on Cayman Brac and Little Cayman under the Marine Conservation (Marine Parks) (Amendment) Regulations, 1986. This legislation defines three categories of marine parks: environmental zone, replenishment zone and marine park zone (see Annex). Animal sanctuaries have been declared on Grand Cayman under the Animals Law No. 8, 1976, on Cayman Brac under the Animals (Sanctuaries) Regulations, 1980, and on Little Cayman under and Animals (Sanctuaries) Regulations, 1982. All areas established under this legislation are wetlands and of importance for bird species.

The National Trust for the Cayman Islands Law, 1987 established the National Trust to preserve the historic, natural and maritime heritage of the islands. The Trust maintains several areas of land for wildlife conservation.

**International Activities** Cayman Islands is included in the UK's ratification of the following international agreements with provisions for protected areas; the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). The Cayman Island authorities produced a leaflet on Ramsar designation in 1987. Five sites have been proposed for Ramsar listing, and it is expected that one of these will be declared.

The UK government ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) on 23 February 1986, and has signed the Protocol on Specially Protected Areas and Wildlife in 1991. The UK's ratification includes the Cayman Islands.

The government of the Cayman Islands is not a member of the Caribbean Conservation Association (CCA) but representatives participate in regional activities of CCA.

**Administration and Management** During 1990, responsibility for all environmental matters, including marine conservation, marine parks, animal sanctuaries

etc., was placed in the Portfolio for Education, Environment, Recreation and Culture. This Portfolio is still responsible for museums, the turtle farm, the National Trust and activities related to international agreements.

The Natural Resources Unit, a Department of the Portfolio for Education, Environment, Recreation and Culture, is responsible for the day-to-day management of the natural environment. The Planning Department falls under the jurisdiction of the Portfolio of Communication, Works and Agriculture. A revision of the current development plan is scheduled for 1992.

Enforcement of conservation legislation is the responsibility of the police, and, in cases of marine issues, of the marine enforcement officers who are employed by the Natural Resources Unit and have full constabulary powers. At present there are two marine enforcement officers on Grand Cayman and one on Little Cayman and Cayman Brac. A number of volunteer fisheries officers also assist with the enforcement of marine conservation legislation (G. Ebanks-Petrie, pers. comm., 1992).

The National Trust for the Cayman Islands, a statutory, non-governmental organisation, is involved in land acquisition and management for conservation purposes.

**Systems Reviews** The three Cayman Islands are flat, low-lying limestone islands with extensive reef systems. The populations of the three islands differ considerably, with fewer than 100 on Little Cayman and less than 2,000 on Cayman Brac. This is reflected in the varying degrees to which the islands' environments have been adapted. Little Cayman is the least disturbed of the group, with settlement mainly in the vicinity of the south and west coast. In 1980 almost all of the island's interior was untouched (Diamond, 1980).

In contrast, the rapid development of Grand Cayman has resulted in degradation of various fragile habitats. Mangrove swamps in Grand Cayman have been particularly vulnerable to development with destruction to form marinas and estate developments. Natural woodland and thicket is also being cleared increasingly for roads, housing, tourism and agriculture. Three wetland sites have recently been declared animal sanctuaries (Meagre Bay and Colliers Pond on Grand Cayman and the Rookery on Little Cayman), these are landbased (G. Ebanks-Petrie, pers. comm., 1992). In 1989 the government gave 257ha of land to the National Trust. This area is known as the Salina Reserve. The Trust is also joint proprietor of 24ha acres on Grand Cayman being developed as a botanical gardens, with woodlands preserved in their natural state. In December 1991 ownership of a 40ha woodland site on Cayman Brac, important as a nesting area for *Amazona leucocephala hesterna*, was transferred to the National

Trust by The Nature Conservancy and is now titled Brac Parrot Reserve. The site will form the basis for a larger reserve on Cayman Brac (G. Ebanks-Petrie, pers. comm., 1992).

**Addresses**

The Cayman Islands Government Office, 197 Knightsbridge, LONDON SW7 1RB  
Natural Resources Unit, PO Box 486, GEORGE TOWN, Grand Cayman (Tel: 809 949 8277; FAX: 809 949 8469; Tlx: 4260 CP)  
National Trust for the Cayman Islands, PO Box 10, GEORGE TOWN (Tel: 809 949 0121; FAX: 809 949 7494)

**References**

Bradley, P. (1986). In: Scott, D.A. and Carbonell, M., *A directory of Neotropical wetlands*. IUCN, Cambridge and IWRB, Slimbridge, UK. 684 pp. Diamond, A.W. (1980). Ecology and species turnover of the birds of Little Cayman. *Atoll Research Bulletin* 241. Pp. 141-164.  
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**ANNEX**

**Definitions of protected area designations, as legislated, together with authorities responsible for their administration**

**Title:** Marine Conservation (Marine Parks) Regulations; Marine Conservation (Marine Parks) (Amendment) Regulations

**Date:** 1986

**Brief description:** Enabling legislation for the designation of marine protected areas. Marine protected areas have been designated around Grand Cayman under the Marine Conservation (Marine Parks) Regulations, 1986, and protected areas on Cayman Brac and Little Cayman under the Marine Conservation (Marine Parks) (Amendment) Regulations, 1986.

**Administrative authority:** Natural Resources Unit

**Designations:**

**Marine Park** This legislation defines three categories of marine parks:

**Environmental zone** In which prohibited activities include the removal of any form of marine life, the use of anchors, entry into the water and exceeding a speed of five knots.

**Replenishment zone** Where the removal of conch and lobster is prohibited and fishing methods restricted.

**Marine park zone** In which marine life is protected and anchoring forbidden, except in certain circumstances.

**Title:** Animals Law No. 8, 1976 (Grand Cayman); Animals (Sanctuaries) Regulations, 1980 (Cayman Brac); Animals (Sanctuaries) Regulations, 1982 (Little Cayman).

**Date:** 1976; 1980; 1982

**Brief description:** Enabling legislation for the designation of animal sanctuaries

**Administrative authority:**

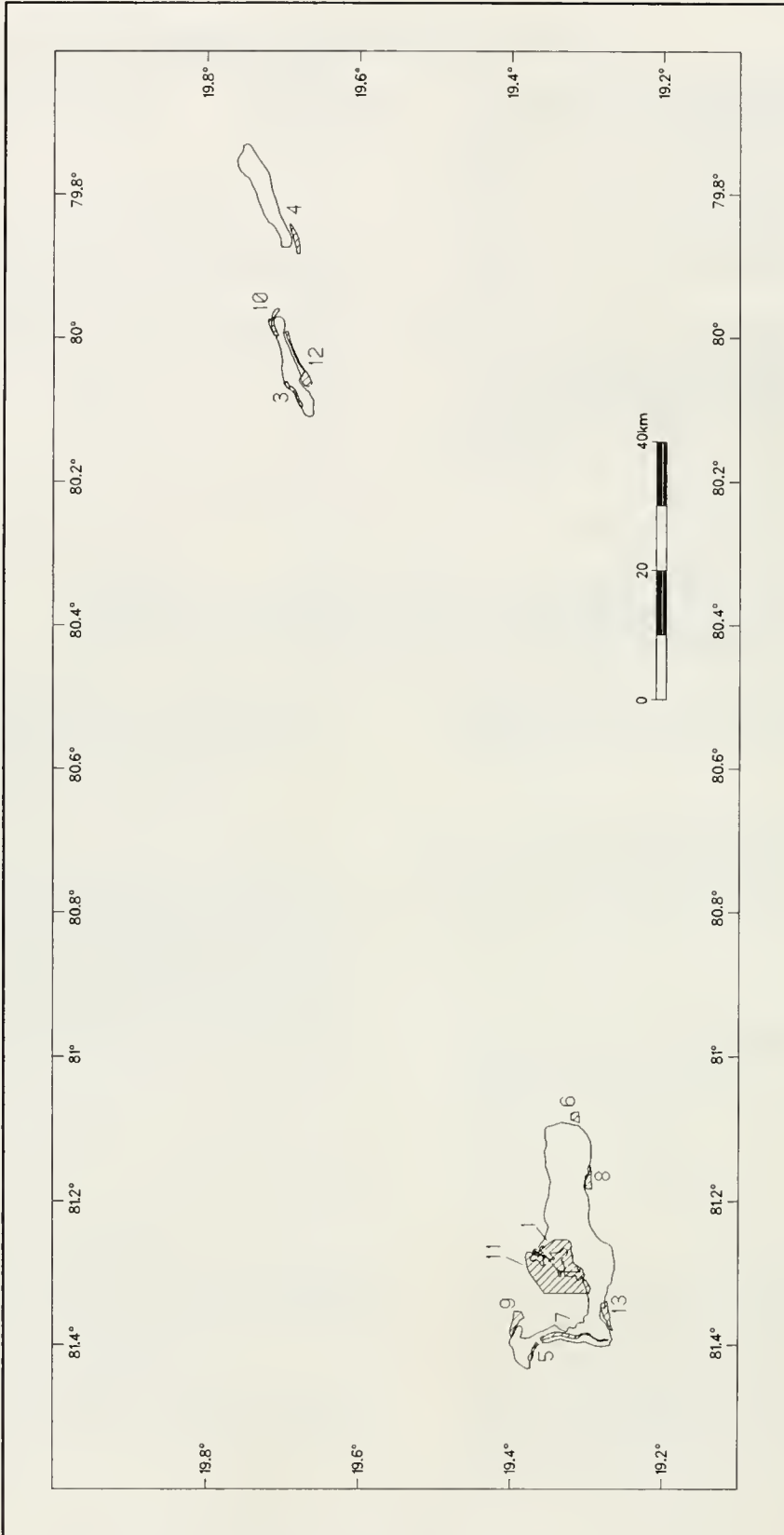
**Designations:** No information

**Animal Sanctuary** Animal sanctuaries have been declared on Grand Cayman under the Animals Law No. 8, 1976, on Cayman Brac under the Animals (Sanctuaries) Regulations, 1980, and on Little Cayman under and Animals (Sanctuaries) Regulations, 1982. All areas established under this legislation are wetlands and of importance for bird species. "The disturbance of any natural feature or any vegetable or animal life" is prohibited.

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Ecological Zone</i>			
1	Little Sound (Grand Cayman)	I	1,731	1986
	<i>Reserves</i>			
2	Salina (Grand Cayman)	IV	257	1989
	<i>Marine Parks</i>			
3	Bloody Bay-Jackson Point	II	161	1986
4	Dick Sessingers Bay-Beach Point	II	143	1986
5	North West Point-West Bay Cemetery	II	155	1986
6	Radio Mast-Sand Bluff	IV	177	1986
7	Victoria House-Sand Cay Apartments	II	801	1986
	<i>Replenishment Zones</i>			
8	Frank Sound (Grand Cayman)	IV	224	1986
9	Head of Barkers - Flats	IV	365	1986
10	Mary's Bay - East Point	IV	180	1986
11	North Sound (Grand Cayman)	IV	3,310	1986
12	South Hole Sound (Little Cayman)	IV	316	1986
13	South Sound (Grand Cayman)	IV	317	1986





Protected Areas of the Cayman Islands

# THE REPUBLIC OF CUBA

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Area 114,524 sq. km

Population 10,606,000 (1990)

Natural increase: 0.89% per annum

## Economic Indicators

GDP: US\$ 1,514 per capita (1987)

GNP: No information

**Policy and Legislation** The 1959 Constitution declares that the state protects national monuments and areas of outstanding natural beauty, historic or aesthetic value, for the benefit of the population. The first legal provision for environmental protection was the Reforestation Plan of the Revolutionary Army (Plan de Repoblación Forestal del Ejército Rebelde), Law 239 of April 1959, which proposed the creation of nine national parks and encouraged tourism. Prior to this, no governmental policies for environmental protection or rational resource use existed, and Cuba had undergone largescale environmental degradation (Perera and Rosabal, 1986).

In 1968, the Protection of Nature in Cuba project (La Protección de la Naturaleza en Cuba) was implemented by the government, detailing policies on environmental and natural resource protection. The project recommends the creation of a number of protected areas, in the form of a cooperative system, and marks the beginning of a concerted effort to establish national parks and other protected areas (Perera and Rosabal, 1986).

Cuba participates in the FAO Tropical Forest Action Plan (TFAP), an international strategy to promote the development of forestry sectors in participating countries, allowing greater contribution to national economy while maintaining conservation principles. The Forestry Action Plan for Cuba (Plan de Acción Forestal para Cuba) was initiated in 1989 by the Ministry of Agriculture (Ministerio de Agricultura) (MINAG) and other organisations with interest in the forestry sector, to interpret the global designs of the TFAP into specific national needs (MINAG, 1991). The plan comprises several projects, including sustainable management of forest ecosystems such as mangroves, supporting conservation programmes, and improving the management capacity of the forest institutes (MINAG, 1991). Information on the extent of implementation of this plan is not currently available.

In an effort to resolve environmental problems, the National Commission of the Academy of Sciences (Comisión Nacional de la Academia de Ciencias) recommended, in Resolution No. 412, 1963, that the National Institute of Agrarian Reform (Instituto Nacional de Reforma Agraria) establish natural reservations (reservaciones naturales) for scientific research in forested areas that constitute the National

Forest Heritage (Patrimonio Nacional Forestal). Scientific knowledge of natural areas is declared essential to formulate guidelines for rational resource use. Four natural reservations are delimited in the resolution, and prohibited activities given (see Annex). Responsibility for their management is transferred to the National Commission of the Academy of Sciences.

Act No. 1204, 1967 provides for the creation of the National Institute for Forest Development (Instituto Nacional de Desarrollo y Aprovechamiento Forestal) (INDAF). The responsibilities of INDAF include formulating forest policies, implementing conservation regulations regarding natural resource protection, and proposing management strategies for wildlife in collaboration with the National Commission of the Academy of Science. Those reserves under the administration of the National Commission shall remain so.

Law No. 27, 1980 provides for the creation of a large protected area comprising several other areas with management category designations from inviolable protection to multiple use, called Sierra Maestra Great National Park (Gran Parque Nacional Sierra Maestra). Nine management categories are defined in the area, which is extensive and contains a high diversity of ecosystems and natural resources. Law No. 27 provides for the creation of a Governing Commission (Comisión Rector) specifically to manage the Great National Park.

The Protection of the Environment and Rational Use of Natural Resources (Protección del Medio Ambiente y del Uso Racional de los Recursos Naturales), Law No. 33, 1981 is the principal legislative act currently in effect, providing the basis for protection and improvement of the environment. National conservation objectives are stated and include prohibiting deforestation, encouraging an increase in forest cover, and preventing pollution and degradation of natural resources. Provision is made for the creation of the National Network of Protected Areas (Red Nacional de Areas Protegidas) for the protection of flora and fauna, particularly endemic species. Four categories of protected area comprise the National Network: national park (parque nacional); nature reserve (reserva natural); national monument (monumento nacional); faunal refuge (refugio de fauna), and "other categories" (otras categorías) (see Annex). Clear definitions of the management categories are not given, but management regulations and demarcation of boundaries must be detailed in the individual legislative acts providing for the establishment of each area.

The 1981 Law also makes provision for the creation of the National System for Environmental Protection and Rational Use of Natural Resources (Sistema Nacional de Protección del Medio Ambiente y del Uso Racional de

los Recursos Naturales), unifying policies on natural resource protection into a comprehensive system. It is composed of subsystems for the protection of specific resources, including the Subsystem for the Protection of Terrestrial Flora and Fauna (Sistema de Protección a la Flora y la Fauna Terrestres), which comprises a large part of the National Network of Protected Areas. The institutes responsible for managing each subsystem are assigned by the Council of Ministers (Consejo de Ministros), a high level body of ministers from various governmental sectors. Cooperation between the institutes is encouraged.

Further details of the structure and function of the National System for Environmental Protection and Rational Use of Natural Resources are given in Decree-law No. 118, 1990. The governmental institutes and ministries responsible for each subsystem are stated, together with the principal objectives of each. Provision is made for the creation of an organisation with ultimate responsibility for the entire National System, the National Commission of Environmental Protection and Rational Use of Natural Resources (Comisión Nacional de Protección del Medio Ambiente y del Uso Racional de los Recursos Naturales (COMARNA), and details of its structure are given.

**International Activities** Cuba signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940. Cuba ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (the Cartagena Convention), and its Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region on 15 September 1988. A second Protocol, the Protocol Concerning Specially Protected Areas and Wildlife (SPAW), was signed by Cuba on 11 June 1991.

Cuba ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 24 March 1981, but no sites have been inscribed to date. Cuba participates in the Unesco Man and the Biosphere Programme and has four sites accepted as biosphere reserves.

Cuba participates in the FAO Latin American Network programme (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, otras Áreas Protegidas, Flora y Fauna Silvestres) (Perera, 1986; Perera and Rosabal, 1986).

**Administration and Management** National conservation policies are formulated and implemented by COMARNA, which is vested with overall responsibility for the National System for Environmental Protection and Rational Use of Natural Resources. COMARNA coordinates the activities of

15 ministries and a number of institutions that are responsible for each subsystem within the National

System, and ensures compliance with current environmental legislation so that national conservation objectives may be attained. In 1990, COMARNA joined the Council of Ministers, giving it greater administrative influence (Santana, 1991).

COMARNA comprises a President elected by the Council of Ministers, and representatives from each ministry and institute responsible for managing the subsystems. At the local level, provincial environmental commissions (comisiones provinciales de medio ambiente), which are dependent on COMARNA, assess ecological problems and promote protected area establishment and conservation programmes. The commissions are important in coordinating protected area management across the country (Perera and Rosabal, 1986; Santana, 1991).

The National Network of Protected Areas comprises conservation units from different subsystems for the protection of specific natural resources, particularly the Subsystem for the Protection of Terrestrial Flora and Fauna. The MINAG is vested with the responsibility for this subsystem which includes forested land, and for other subsystems such as soils, fisheries, and agriculture. The MINAG, therefore, manages a large part of the country's natural resources. Responsibility for managing the national network is assigned to the various institutes, as follows: national parks, faunal and floral refuges and unassigned areas to the MINAG; natural reserves to the Academy of Sciences; national monuments to the Ministry of Culture (Ministerio de Cultura), and natural tourist areas to the National Institute of Tourism (Instituto Nacional de Turismo). COMARNA proposes guidelines for the creation of protected areas, and each institute is responsible for formulating and implementing management plans for their respective protected areas. A body of forest guards (cuerpo de guardabosques), under the MINAG, patrols protected areas and ensures compliance with environmental legislation (Perera and Rosabal, 1986).

Policies for forest resource use are formulated by the National Institute for Forest Development (INDAF). Forested land is administered by the Forest Administration (Administración Forestal) within the MINAG. The Forest Administration is headed by a viceminister and comprises three departments, one for each of its functions: silviculture; protection of forests and fauna; and industrial forestry. A separate unit carries out forest inventories. In each province there is a forest department within the provincial offices of the Ministry of Agriculture (MINAG, 1991).

Sierra Maestra Great National Park is managed by the Governing Commission (Comisión Rectora), specifically established for this purpose. The Governing Commission comprises a president, a



vicepresident, a secretary, and representatives from other organisations including the Academy of Sciences, the MINAG and the INDAF.

Further details of the effectiveness of administration are currently not available, neither are details of nongovernmental organisations working in environmental conservation issues.

**Systems Reviews** Topographically, Cuba may be divided into three zones: the plains (llanuras) occupying around two-thirds of the total land area; foothills; and the highland region, comprising isolated groups of mountains separated by plains, the highest of which is the Sierra Maestra (MINAG, 1991). The climate is tropical with annual rainfall around 1380mm. Cyclones are frequent, particularly in October and September. Cuba is drained by many rivers and periods of extreme drought may occur during the dry season (MINAG, 1991).

Cuba has the highest species diversity in the West Indies (Woods, 1989), and the highest degree of endemism with over 50% of the flora and 32% of the vertebrate fauna unique to the islands (Santana, 1991). By 1988, around 73% of the population lived in urban areas, an increase of 10% from 1975 (MINAG, 1991). Around 4.4 million ha are used for arable farming, and 2.4 million ha for permanent pasture (MINAG, 1991). Further details of land use are currently not available.

In the late 1800s, forests covered 56% of the island, but by 1959, only 14% remained (Santana, 1991). When the revolutionary government took power in 1959, the Reforestation Plan was implemented to reduce the deforestation rate and encourage plantations. As a result, forest cover has increased to 18% of the total area and Cuba has the lowest annual deforestation rate in Latin America, at only 0.1% (MINAG, 1991; Santana, 1991). Further developments in the forestry sector include the creation of a System of Forest Protection (Sistema de Protección Forestal), with a body of more than 2,000 forest guards (MINAG, 1991). Although forest cover has increased, only around 20% of total land area remains in its natural state (Perera and Rosabal, 1986).

The first national park was created in 1930, and by 1959 only five more protected areas had been established (Santana, 1991). In 1959 alone a further five parks were created and by 1991 the National Network of Protected Areas comprised over 200 conservation units, covering 12% of total land area (Santana, 1991). Of the forested land, 5.1% is covered by national parks, and a further 59.5% is under protection by other designations (Santana, 1991). A further 1.6 million ha are protected as protection forests (bosques protectores) which are set aside to conserve natural areas and fauna, protect water and soil resources or prevent coastal erosion (MINAG, 1991). A problem with forest conservation is that almost all forested land has suffered some degree of degradation, and many areas are in urgent need of restoration (MINAG, 1991).

Cuba has a coherent national system of protected areas, following the definition given by the FAO Latin American Network programme (Ormazábal, 1988). The National Network of Protected Areas in Cuba was established in 1981, and implements the principles of the programme to attain national objectives (Perera, 1986; Perera and Rosabal, 1986).

Almost all ecosystems are included in the national network, with only 2% not represented at all (Perera, 1988; Perera and Rosabal, 1986). However, although the protected area system covers 12% of the total land area, only 12% of the total land is afforded strict protection, and many reserves are too small (Santana, 1991). Despite protection, many wild floral and faunal species and ecosystems are threatened by over-exploitation and habitat modification (Santana, 1991).

A large-scale environmental education project has been implemented in Sierra Maestra Great National Park. It covers both government and privately-owned land, and is effectively managed as a multiple-use reserve, comprising a protected rural zone (zona rural protegida) and three other national parks. In total, nine management categories are employed within its boundaries, from inviolable reserve to development and economic exploitation area. Around 200,000 people live in Sierra Maestra Great National Park, and the project provides incentives for local populations to farm in a sustainable way, reduce environmental degradation and deforestation (Santana, 1991).

Compliance with resource regulations, through the body of forest guards, affords efficient protection to natural areas. However, cooperation between the administrations of the areas that comprise the National Network of Protected Areas must be achieved through the establishment of legal regulations (Perera and Rosabal, 1986). Clear definitions of the existing management categories and creation of new ones is required. The present designations are primarily suitable for terrestrial ecosystems and modifications are needed to protect marine and coastal habitats (Perera, 1988).

#### **Addresses**

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Comisión Rectora del Gran Parque Nacional Sierra Maestra, Ave. 42, No. 514 esq. A 7a., Miramar, Playa, CIUDAD DE LA HABANA (Tel: 222526/27/28/29; Tlx: 0511156)

Academia de Ciencias de la República de Cuba, Calle 11, No. 514 esq. D y E, Vedado, CIUDAD DE LA HABANA (Tel: 329786/322035\ 321108)



Instituto Nacional de Desarrollo y Aprovechamiento Forestales (INDAF), Virtudes 680 y Belascoain, CIUDAD DE LA HABANA

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## ANNEX

**Definition of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title:** Resolución No. 412 (Resolution No. 412)

**Date:** 10 July 1963

**Brief description:** Delimits four natural reserves, giving details of their conservation objectives and activities prohibited within them. The importance of natural resource conservation is stated.

**Administrative authority:** Reserves are established by the Instituto Nacional de Reforma Agraria (National Institute of Agrarian Reform), on the recommendation of the Comisión Nacional de la Academia de Ciencias de la República de Cuba (National Commission of the Academy of Sciences of the Republic of Cuba). The latter is responsible for administering the reserves.

**Designations:**

*Reservación Natural (Natural Reserve)*

A natural area that has not been altered by human activity, or has been altered in such a way that recuperation of its natural state is possible, that is set aside for the purpose of scientific research on the conservation and regeneration of its natural resources. The area is part of the Patrimonio Forestal Nacional (National Forest Heritage). Contains representative examples of national vegetation formations or important natural ecosystems. Humans, domestic animals and vehicles are not permitted to enter delimited area without authorisation. Prohibited activities include hunting, fishing and anything that disturbs the natural state of the area.

**Source:** Original legislation

**Title:** Protección del Medio Ambiente y del uso Racional de los Recursos Naturales (Protection of the Environment and Rational use of Natural Resources) Law No. 33

**Date:** 10 January 1981

**Brief description:** National conservation objectives are given as protecting and regenerating natural resources; encouraging development while maintaining conservation principles; promoting scientific research; and establishing methods of rational resource use. It is the obligation of every individual and the state to protect the environment. Each natural resource is dealt with separately and

guidelines given for its rational use. Provision is made for the creation of the Red Nacional de Areas Protegidas (National Network of Protected Areas) for the protection of flora and fauna, and for the creation of the Sistema Nacional de Protección del Medio Ambiente y del Uso Racional de los Recursos Naturales (National System for Environmental Protection and Rational Use of Natural Resources) to coordinate and standardise environmental policies. It comprises subsystems, including the Subsistemas de Protección a la Flora y la Fauna Terrestres (Subsystem for the Protection of Terrestrial Flora and Fauna), which makes up a large part of the National Network of Protected Areas.

**Administrative authority:** The National System for Environmental Protection and Rational Use of Natural Resources is administered by Administración Central del Estado (Central Administration of the State) and each subsystem has its own organisation of Central Administration. The Subsystem for the Protection of Terrestrial Flora and Fauna is managed by the Ministerio de Agricultura (Ministry of Agriculture) (MINAG). Protected areas comprising the National Network are declared by the Consejo de Ministros (Council of Ministers), which assigns responsibility for their administration to respective organisations.

**Designations:**

The National Network of Protected Areas comprises the following management categories:

*Parque Nacional (National Park)*

*Reserva Natural (Natural Reserve)*

*Monumento Nacional (National Monument)*

*Refugio de Fauna (Faunal Refuge) and Otras Categorías (Other Categories)*

Precise delimitation and regulations regarding resource use, must be given for each area. The regulations are to enable the area to attain the conservation objectives for which it was established, as determined by its designation. Commercial and sport hunting, fishing or capture of wildlife is prohibited. Deforestation is prohibited, although the Council of Ministers may authorise controlled socioeconomic development of forest resources. Further details of management categories are not given.

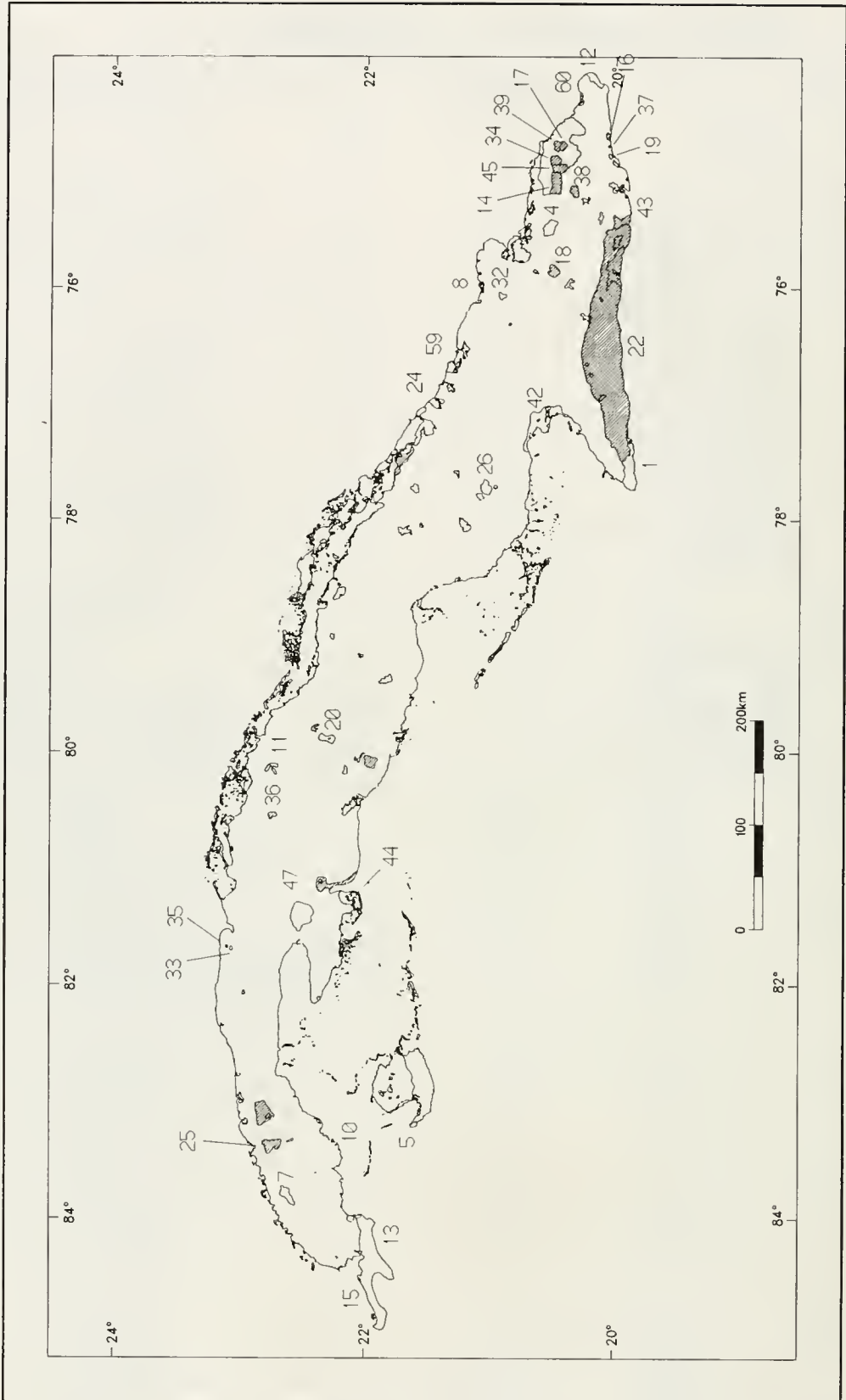
**Source:** Original legislation

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Desembarco del Granma	II	25,764	1980
2	Gran Piedra	II	3,354	1980
3	La Bayamesa	II	16,500	1980
4	Pico Cristal	II	15,000	1930
5	Punta Francés - Punta Pederales	II	17,424	1985
6	Turquino	II	17,464	1959
7	Viñales	II	13,436	
	<i>Marine National Parks</i>			
8	Bahía del Naranjo	II	6,800	
9	Cayo Caguama	II	1,200	
	<i>Ecological Reserves</i>			
10	Los Indios	IV	3,250	
11	Mogotes de Jumagua	IV	400	1986
12	Punta Negra - Punta Quemados	IV	3,972	
	<i>Natural Reserves</i>			
13	Cabo Corrientes	I	1,578	1963
14	Cupeyal del Norte	I	10,260	1980
15	El Veral	I	7,535	1963
16	Imías	I	2,600	
17	Jaguaní	I	4,932	1963
18	Loma de la Mensura	I	2,400	
19	Tacre	I	1,200	
	<i>Integrated Management Areas</i>			
20	Cubanacán	VIII	7,164	1986
21	Escambray	VIII	187,000	1986
22	Gran Parque Sierra Maestra	VIII	527,000	1980
23	Guanaroca	V	2,690	
24	La Isleta - Nuevas Grandes	V	13,000	
25	Mil Cumbres	VIII	16,634	1986
26	Sierra del Chorrillo	VIII	4,560	1986
27	Subarchipiélago de Jardines de la Reina	V	30,580	
28	Subarchipiélago de Sabana - Camaguey	V	178,908	
29	Subarchipiélago de los Canarreos	V	33,110	
	<i>Managed Flora Reserves</i>			
30	Arenas Blancas	IV	1,500	
31	Cayo Caguanes/Cayos de Piedra	IV	1,500	1966
32	Cerro Galano	IV	2,770	
33	Cuabal Tres Ceibas	IV	370	
34	El Toldo	IV	5,638	1987
35	Lomas de Galindo	IV	623	
36	Monte Ramonal	IV	2,572	
37	Pan de Azúcar	IV	260	
38	Parnaso - Los Montes	IV	9,500	
	<i>Faunal Refuges</i>			
39	Alto de Iberia	I	5,673	1987
40	Cayo Cantiles	I	3,800	1986
41	Cayos de Ana María	IV	6,900	
42	Delta del Cauto	IV	60,000	
43	Hatibonico	IV	5,220	1980
44	Las Salinas	IV	31,800	1936

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
45	Ojito de Agua	IV	3,739	1987
46	Río Máximo	IV	10,000	
47	Santo Tomás	IV	14,800	1936
	<i>Natural Parks</i>			
48	Cayo Romano	V	92,000	1986
49	Sur Isla de la Juventud	V	80,000	1992
50	Topes de Collantes	V	12,260	
	<i>Touristic Natural Areas</i>			
51	Cayo Algodón Grande	V	3,600	
52	Cayo Coco/Cayo Guillermo	V	32,000	1986
53	Cayo Gruz	V	1,400	
54	Cayo Guajaba	V	9,168	
55	Cayo Largo - Cayo Rosario	V	18,610	1986
56	Cayo Paredón Grande	V	3,500	
57	Cayo Sabinal	V	33,500	
58	Cayo Santa María	V	6,250	
59	Covarrubias	V	10,200	
60	Playa Cajuajo - Boca del Yumurí	V	5,500	
61	Playa Santa Lucía	V	1,100	
62	Punta del Este	V	5,300	
	<i>Biosphere Reserves</i>			
	Baconao	IX	84,600	1987
	Cuchillas del Toa	IX	127,000	1987
	Península de Guanahacabibes	IX	101,500	1987
	Sierra del Rosario	IX	10,000	1984





Protected Areas of Cuba

# DOMINICA

Area 790 sq. km

Population 71,183 (1991 Dominica Population Census)  
Natural increase: 1.5% per annum

## Economic Indicators

GDP: US\$ 2,068 per capita (1991)

GNP: US\$ 2,515 per capita (1991)

**Policy and Legislation** The forest policy includes amongst its aims the introduction and protection of game animals, birds and fish, and the preservation of localities of natural scenic or scientific interest. A further goal is to encourage the management of forest reserves and protected forests in the interests of soil and water conservation, and in a sustainable manner. Other objectives include the development of a national parks system, the protection and development of wildlife and wildlife preserves, the enactment of appropriate research, and improvement to the infrastructure of the protected areas administration.

The National Parks and Protected Areas Act No. 16, 1975 provides the main legislation for the protected areas system (see Annex). This Act authorises the Minister of Agriculture, by order, to set aside state lands for protected areas in the form of national parks, historic sites, and recreational areas, and specifies regulations the Minister may make for such areas. The Act also outlines the powers and responsibilities of the Director of National Parks and support staff, and provides for a National Parks Advisory Council, although this had not been established by 1986 (OECS, 1986). Also, while the enactment of the 1975 Act was prompt, park regulations have yet to be enacted (Wright, 1985). The Forestry and Wildlife Act No. 12, 1976, and the Forestry and Wildlife (Amendment) Act (No. 35), 1982 focuses on the protection of wildlife within forests and provides for the creation of wildlife reserves (see Annex).

The Forest Ordinance Cap. 80, 1959 covers the designation of forest reserves, including the designation of private lands as protected forest for water or soil conservation or other public purposes (see Annex). Under this ordinance, one water catchment area on private land was declared a protected forest under the Stuart Hall Catchment Rules No. 11, 1975 (see Annex). The Forest Rules (SRO 17, 1972), made under the Ordinance, specify prohibited activities in forest reserves, give details on the issuing of licences and permits for harvesting forest produce, and outline the powers and responsibilities of the Chief Forest Officer. While national parks are managed primarily for the preservation of natural ecological conditions, controlled harvest of timber is permitted in forest reserves.

In 1987, Dominica adopted the harmonised fisheries legislation (Fisheries Act No. 11) accepted by other East Caribbean islands, allowing for the establishment of

marine protected areas. The Act also provides for the establishment of local fisheries management areas, and authorises fisheries research, prohibits the use of explosives or chemicals for fishing, and provides for the promulgation of regulations (see Annex). The Act is supported by the Fisheries Regulations, 1989. The Beach Control Ordinance (No. 21), 1966 prohibits the use of beaches for public or commercial purposes, except with a licence.

The Crown Lands Ordinance, 1960 and the Crown Lands Regulations, 1961 govern the sale and release of government land. There is a tendency to transfer to private ownership unallocated government land not included within national parks or forest reserves, including land that was not well suited to agriculture (Miller *et al.*, 1988; D. Williams, pers. comm., 1992). This has since been improved through a coordinated approach by the Forestry and Wildlife Division and Lands and Surveys Division (CCA, 1991).

Amendments required to national parks legislation include clarification that both land and water (fresh and marine) elements may be included in the national park system, and regulations to address questions of prohibited and permitted activities within the parks. It has been suggested that camping, carrying of firearms, sand mining, and quarrying all need to be controlled or prohibited in such areas (OECS, 1986). Two aspects of current forestry legislation, which are considered weak, are that penalties for forest offences are too low for deterrence, and there is no mechanism for ongoing co-ordination of decision-making between forestry and other sectors concerning land-use planning and development control (OECS, 1986). Forestry legislation needs to be consolidated and strengthened, and a legal framework for the management and development of the interconnected coastal resources is required. Currently, historical and archaeological resources are without protection, unless they fall within the boundaries of the legislated national parks.

**International Activities** Dominica is not party to the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), or the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), and does not participate in the Unesco Man and the Biosphere (MAB) Programme.

At the regional level, Dominica is not party to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region, or the Protocol Concerning Specially Protected Areas and Wildlife (Cartagena Convention).

**Administration and Management** The Forestry and Wildlife Division, in the Ministry of Agriculture, is responsible for all matters pertaining to forestry and wildlife management, and all protected areas in the country are under the management control of this Division. The most important legislation pertaining to the creation and responsibilities of the Division is the Forestry and Wildlife Act, 1976. The Division is headed by the Director of Forestry and Wildlife, and includes a Superintendent of National Parks. As of 1991, there were two forest officers, five assistant forest officers, two forest technicians, five forest rangers, and eleven forest guards, as well as 75 labourers.

The National Parks and Protected Areas Act, 1975 is administered by the Parks Section, a separate unit within the Forestry and Wildlife Division. The Parks Section has the responsibility of preparing park management plans for the approval of the Minister. For example, a ten-year management plan has been compiled for Morne Trois Pitons National Park (Scheele, 1989).

Actual government capital expenditure on parks and protected areas for the financial year 1991-1992 amounted to EC\$ 926,300 (US\$ 349,547), and forestry division recurrent expenditure during the same period amounted to EC\$ 1,266,730 (US\$ 478,011).

The Fisheries Development Division (FDD), within the Ministry of Agriculture, is responsible for overseeing the optimal utilisation of marine resources, and includes managing programmes of public awareness on endangered species, marine reserve establishment and conservation, and coastal zone management. The Division is relatively small, with eight core staff positions (CCA, 1991).

The principal non-governmental organisation (NGO) concerned with environmental issues is the Dominica Conservation Association (DCA), established in 1981, which seeks judicious management of the country's natural and cultural resources through appropriate measures. Projects which DCA are involved in include development of agroforestry and long-term development planning for the Cabrits National Park (IRF, 1991).

At the regional level, Dominica is a member of the Caribbean Conservation Association, a non-governmental, non-profit organisation established in 1967, dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources. In collaboration with CANARI (Caribbean Natural Resources Institute, formerly the Eastern Caribbean Natural Area Management Program – ECNAMP, established in 1981), the CCA is responsible for implementing the Caribbean Heritage Program, which seeks to provide institutional support to organisations in order to improve their capacity to preserve important natural areas (IRF, 1991). These two organisations, together with the Canadian International Centre for Ocean Development (ICOD), have been working on a Marine Parks Programme for the

Caribbean region (ECNAMP, 1988). CANARI, whose goal is to strengthen local capacity to manage living natural resources critical to development, is also working to establish a parks and protected areas network for the Lesser Antilles, and is involved in the development of Cabrits National Park and a National Parks and Forest System Plan for Dominica (Putney and Renard, n.d.).

The CCA has also collaborated with the Island Resources Foundation (IRF), established in 1971, in administering the Country Environmental Profile Project for the Eastern Caribbean. Under this project, environmental profiles were prepared for six countries including Dominica. IRF is a technical and research assistance organisation, whose mandate emphasises workable development strategies appropriate for small island resource utilisation. The Island Resources Foundation (based in the US Virgin Islands) launched a two-year project in November 1986, in partnership with WWF-US and the Rockefeller Brothers Fund, aimed at strengthening private sector natural resource management programmes in the Eastern Caribbean. Dominica was one of the target islands of this programme, which focused largely on encouraging improved programme planning, proposal writing, project management, communication, fund raising and administration.

The CCA and IUCN are currently collaborating in the Natural Resources Management Program for Sustainable Development, which is focusing on the development of national conservation strategies and environmental impact assessment support services (IRF, 1991).

One weakness of protected areas management is lack of coordination between the various agencies involved (OECS, 1986). For example, there is scope for collaboration between the Fisheries Development Division and the Forestry and Wildlife Division in the management of marine areas in Cabrits National Park (CCA, 1991).

**Systems Reviews** Dominica, initially settled by Arawak and then Carib Indians, was first sighted by Christopher Columbus in 1493. In 1783, the British obtained possession, and in 1898, Crown Colony rule was introduced, thereby placing government control for the next 70 years in London. In 1967, Dominica became a State in Association with Great Britain, and achieved full independence on 3 November 1978 (Honychurch, 1984).

Dominica is a volcanic island rising to a maximum height of 1,447m, and is part of the Windward group in the Lesser Antilles, 500km north of Venezuela and 2,200km south-east of Florida (Thorsell, 1978). The country has a coastline of 153km, and has limited seagrass, mangrove and coral reef habitats due to the steep topography and rugged terrain characteristic of the coast (CCA, 1991). Urban and agricultural activities are limited to the coast, and generally spread no more than



three miles inland. The west coast of the island supports dry woodland, and the east coast supports littoral vegetation, while the highlands support rain and cloud forest. The protection of areas of highland serves both to conserve the watershed from degradation, and to protect the native fauna and flora.

Historically, a very high proportion of Dominica has been covered with rain and montane forest. In pre-Arawak times this was approximately 90% of the land area, and in 1945 forest still covered approximately 80% of the island (Evans, 1988). Only in the last 30 years has widespread forest clearance taken place, mainly for agriculture, and in particular during the last ten years. Half the population is subsistence farmers, clearing land for agriculture (Wright, 1985). Today, some 52,000ha, or 68% of total land area, comprise natural forest, woodland and bush (CCA, 1991).

Steep topography, high relief, and considerable microclimatic variability have a strong influence on the distribution of vegetation types. Littoral woodlands occur within the immediate coastal zone of the windswept east side of the island. Scrub and savanna vegetation are found along the leeward coast which comprises the driest part of the country. Mature forest, montane thicket, and elfin woodlands occur only in the high rainfall interior, while rain forests, both mature and secondary, are found in well-drained areas of intermediate elevation and moderate rainfall. Freshwater swamps and mangroves are rare. The former occur mainly along stream outlets in the northeast and northwest, while small stands of mangrove are present along the northwest and northeast coasts. In addition, fumarole vegetation can be found in selected areas, primarily in the Valley of Desolation just south of Boiling Lake in the south central part of the island (CCA, 1991). Although there is at present no definitive estimate of the extent of natural vegetation, the following figures are indicative: mature rain forest (24,490ha), montane rain forest (3,640ha), montane thicket (800ha), elfin woodland (170ha), littoral woodland 140ha), scrub woodland 6,240ha), secondary rain forest (9,090ha), semi-evergreen rain forest (7,170ha) and swamp (30ha) (McKenzie, 1987). A high percentage of this forest is protected in four conservation areas, Morne Trois Pitons National Park, Cabrits National Park, Northern Forest Reserve and Central Forest Reserve.

The development of protected areas legislation and the first national park are described in detail by Wright (1985). In 1961, Dominica had no parks, no enabling legislation, no management capacity, and little public awareness or political support for parks or conservation in general. Proposals for a national park were first made shortly thereafter, and then again in 1969 by the American Conservation Foundation. In 1973-74 the Canadian International Development Agency (CIDA) continued this work by providing financial assistance through the Canadian Nature Foundation for development of legislation and the establishment of a park. This included support for two lawyers who

developed the legislation, and an in-country advisor to the Dominica Forestry Department. Morne Trois Pitons National Park was officially established in 1975 (Scott and Carbonell, 1986).

The north-west of Morne Trois Pitons National Park (biologically the richest) was part of Middleham Estate and was later named the Archbold Reserve, the title to which was held by The Nature Conservancy (a US NGO). Management rights to the area were leased to the Dominican government from 1974 to 1982, when the land was formally transferred to the government. Development of the park was assisted by grants from CIDA, USAID, and the EEC, technical expertise from the OAS, while the Canadian Nature Federation was active both in the establishment of the park and in the development of the infrastructure for its effective management (Thorsell, 1984; D. Williams, pers. comm., 1992). A second national park, Cabrits, was legally established in 1986, and development plans for this area are laid out in the document "Cabrits 2000". Further work is continuing on the management plan for the proposed Morne Diablotin National Park, and an expanded parks system is likely to include areas with cultural or historical significance, and marine elements. An objective of the National Parks Section is to establish an internationally recognised national parks systems, comprising the following categories of protected areas: natural areas, historical, archaeological areas, recreational areas, in addition to activities related to environmental health, research and training.

Northern Forest Reserve in the north central portion of the island includes large tracts of habitat for the island's two endangered parrots, imperial parrot *Amazona imperialis* and red-necked parrot *A. arausiaca*, and is the largest tract of protected, relatively undisturbed forest in the Caribbean. The Division of Forestry and Parks has received support from WWF-US and other organisations for the study and protection of these species, and part of the reserve is being developed as the proposed Morne Diablotin National park (F. Grégoire, pers. comm., 1991).

As early as 1979, it was proposed that at least 13 park system units (natural monuments, marine parks, recreation areas, natural areas, national parks) and 21 forest reserves be created from land already in government ownership (Shanks and Putney, 1979). Today, about 20% of the country is included within legally defined forest reserves or national parks. This is considered an inadequate basis for resource management purposes, for example for the protection of watersheds, 60% of which are unprotected, or wildlife habitat. An ongoing FAO-funded forest management project will, however, make recommendations for more specific conservation and management measures within the forestry sector in the near future (F. Grégoire, pers. comm., 1991).

Impacts ranging from construction and agricultural (pesticide use) activities to tourism developments and



pollution of one kind or another are threatening coastal resources in the country (CCA, 1991). Further, deforestation is considered to be one of the most important environmental issues, driven by agricultural expansion and timber harvesting, and the area under cultivation (26,390ha) is already greater than that envisaged by the government for the year 2001 (23,700ha). Estimates of encroachment in forest reserves and national parks range from 20ha to nearly 2,000ha. The proposed development of hydropower within Morne Trois Pitons National Park is legal under the ministerial authority provided for within the 1975 National Parks and Protected Areas Act, although it may be considered a non-conforming use (CCA, 1991). Perhaps the most fundamental problem facing the managers of Dominica's forests is the rapidly expanding pressure on this resource as a source of timber, fuelwood and charcoal, and as an area increasingly utilised for crop cultivation. Much of this pressure could be reduced, however, as most of the country's requirements for forest resources or land could be met either by exploitation of land that has already been cleared or disturbed, or through more efficient use of existing resources. To this end, it has been recommended that those areas that are appropriate for wildlife conservation, watershed protection, recreation, nature tourism and biological diversity be protected. The specific recommendations of Shanks and Putney (1979) for the allocation of state lands and some private lands for protected areas status could be reviewed by forest and park staff in this regard (CCA, 1991).

#### Addresses

- Forestry and Wildlife Division (Director), Botanical Gardens, ROSEAU (Tel: 809 448 82401 ext. 417; FAX: 809 448 7999)
- Dominica Conservation Association (President), PO Box 310, 59 King George Vth Street, ROSEAU (Tel: 809 448 4098)
- Caribbean Conservation Association (Executive Director), Savannah Lodge, The Garrison, ST MICHAEL, Barbados (Tel: 809 426 5373/9635)
- Caribbean Natural Resources Institute (Director), 1104 Strand Street, Suite 206, CHRISTIANSTED, St Croix, US Virgin Islands 00802 (Tel: 809 773 9854) and Clarke Street, VIEUX FORT, St Lucia (Tel: 809 454 6878/6060)
- Island Resources Foundation (President), Red Hook Center, Box 33, St Thomas, US Virgin Islands 00802 (Tel: 809 775 6225)

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration.**

**Title: National Parks and Protected Areas Act  
(No. 16)**

**Date:** 1975

**Brief description:** Concerning the creation of national parks and protected areas. Establishes a National Parks Advisory Council

**Administrative authority:** National Parks Section, Forestry and Wildlife Division

**Designations:**

**NATIONAL PARKS SYSTEM** All land in the parks and all lands set aside as protected areas shall constitute the national parks system and are hereby vested in the Crown and dedicated to the people of Dominica for their benefit, education and enjoyment.

Compatible activities on such lands include outdoor recreation, education and scientific study, while prohibited activities include agriculture, logging, settlement, and hunting.

The Act also empowers the Director of National Parks to prepare park management plans to guide all activities and operations in each park.

**National park** Comprises those lands defined in the schedule to the Act.

**Protected area** The Minister may by order set apart any state lands as a protected area for the purpose of preserving the natural beauty of such an area, including flora and fauna thereof; creating a recreational area; commemorating a historical event of national importance; or preserving any historic landmark or any area or object of historic, prehistoric, archaeological or scientific importance.

**Source:** Original legislation; OECS (1986); Shanks and Putney (1979)

**Title: Forestry and Wildlife Act (No. 12)**

**Date:** 1976

**Brief description:** To provide for the protection, conservation and management of wild mammals, freshwater fishes, amphibians, crustaceans and reptiles, and for purposes connected therewith. Establishes a Division of Forestry and Wildlife within the Ministry of Agriculture, Lands and Fisheries.

**Administrative authority:** Forestry and Wildlife Division

**Designations:**

**Wildlife reserve** Upon the recommendation of the Director (of the Forestry and Wildlife Division) and the Permanent Secretary, the Minister may declare any area, any stream, impoundment or portion thereof to be a wildlife reserve in which hunting, fishing or taking of one or more species shall be prohibited.

**Source:** Original legislation.

**Title: Forestry and Wildlife Act  
(Amendment Act)**

**Date:** 1982

**Brief description:** No information.

**Administrative authority:** Forestry and Wildlife Division.

**Designations:** No information.

**Source:** Lausche (1986)

**Title: Forest Ordinance**

**Date:** 1959

**Brief description:** Provides for the designation of forest reserves and control over forest produce; provides for designation of private land as protected forest for water and soil conservation and other public purposes (e.g. Stewart Hall Water Catchment Rules No. 11, 1975).

**Administrative authority:** Forestry and Wildlife Division

**Designations:**

**Forest reserve** Any area declared by the Administrator in Council by notice in the Gazette to be a forest reserve.

**Protected forest** Any area of private land declared by the Administrator in Council by notice in the *Gazette* to be a protected forest. Such areas are created to prevent soil erosion, flooding, to maintain water supplies, and for securing the proper management of timber lands. The Administrator in Council may make rules to regulate or prohibit: the felling, cutting, burning, or injuring of any trees or timber; the clearing of lands for cultivation; the pasturing of livestock; and the setting of fires.

**Prohibited area** Any area within a forest reserve, Crown land, or protected forest into which entry is forbidden when this is necessary for any purposes of the Ordinance.

Source: Original legislation

**Title: Forests Rules (No. 17)**

Date: 1972

**Brief description:** Rules pertaining to the use and management of forest resources within forest reserves

**Administrative authority:** Forestry and Wildlife Division

**Designations:**

*Forest reserve* Prohibited activities in such areas include: the felling, cutting, burning, injuring or removing of any forest produce; squatting, residing, or building any living place or livestock enclosure, or constructing or reopening any saw pit or road; setting fire to any grass or undergrowth; grazing livestock; clearing, cultivating, or breaking up land for cultivation; and the hunting, killing or capturing of any wildlife, unless in possession of a licence or permit.

Source: Original legislation

**Title: Stewart Hall Water Catchment Rules**

Date: 1975

**Brief description:** Rules which specify authorised activities within this area

**Administrative authority:** Forestry and Wildlife Division

**Designations:**

*Stewart Hall Water Catchment Protected Forest* Prohibited activities include: the felling, cutting, burning, injuring or removing of any forest produce; squatting, residing, building, constructing any structure or reopening any saw pit or road; setting fire to any grass or undergrowth; grazing livestock; hunting, killing or capturing any wildlife unless in possession of a licence or permit to do so; storing or applying pesticides; and carrying out any planting other than reforestation on slopes of over 20 degrees.

Regulations also apply to the location, design and operation of sanitary facilities for existing dwelling houses.

Source: Original legislation

**Title: Fisheries Act (No. 11)**

Date: 1987

**Brief description:** An Act allowing for the establishment of local Fisheries Management Areas and Marine Reserves, and for regulations guiding their management.

**Administrative authority:** Fisheries Development Division

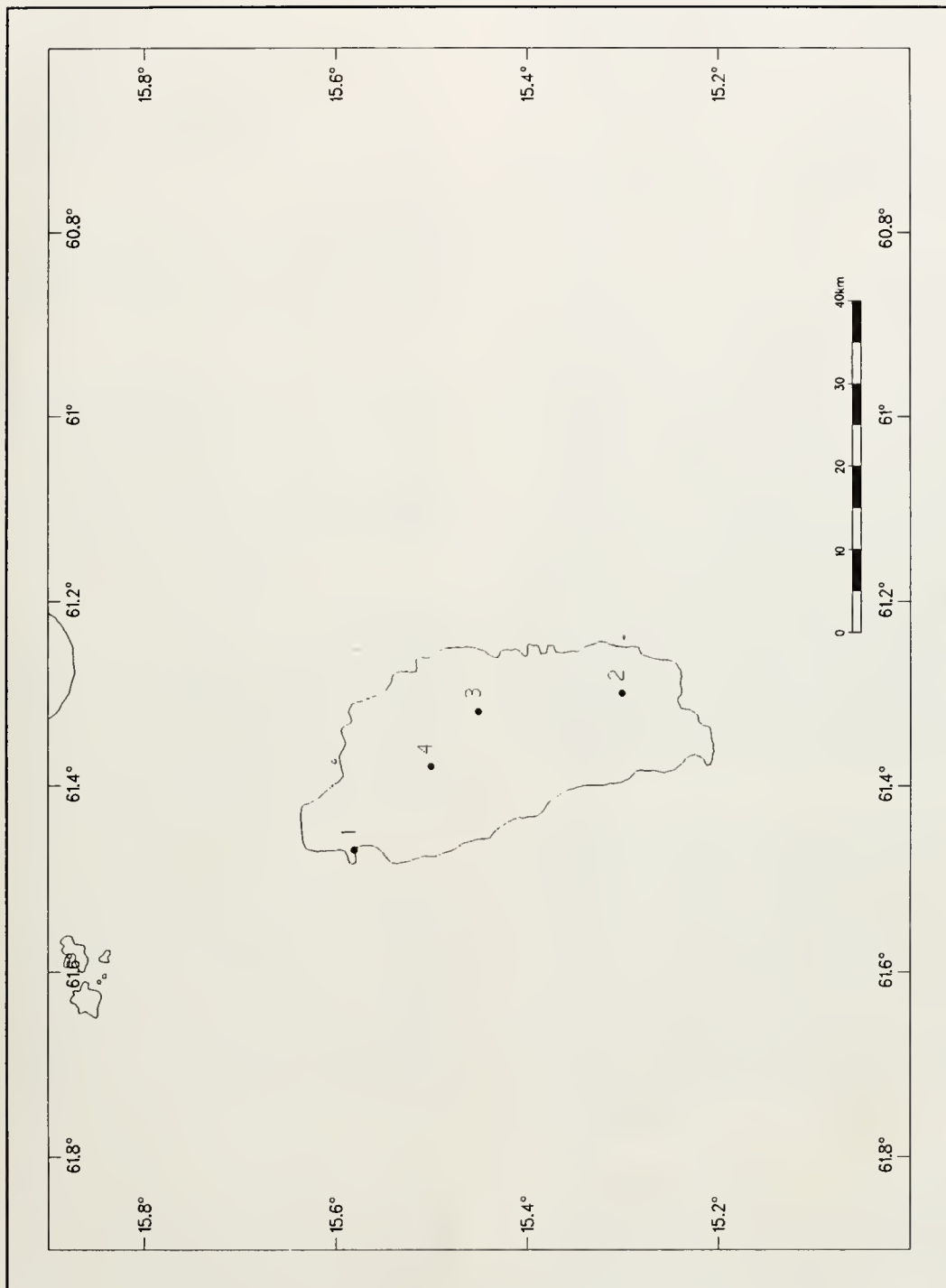
**Designations:**

*Marine reserve Fisheries management area*

Source: CCA (1991)

**SUMMARY OF PROTECTED AREAS**

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Cabrits	II	531	1986
2	Morne Trois Pitons	II	6,872	1975
	<i>Forest Reserves</i>			
3	Central	VIII	410	1952
4	Northern	VIII	8,814	1977
	<i>Protected Forest</i>			
5	Stewart Hall Water Catchment	VIII	318	1975



Protected Areas of Dominica





# DOMINICAN REPUBLIC

Area 48,442 sq. km

Population 7,170,000 (1990)

Natural increase: 1.98% per annum

## Economic Indicators

GDP: US\$ 851 per capita (1987)

GNP: US\$ 790 per capita (1989)

**Policy and Legislation** No reference to natural resource protection is made in the 1844 constitution, nor in the 1966 revision currently in effect, and no national conservation policies or objectives are stated in legislation. As a result, no national conservation strategy has been formulated (SEA/DVS 1990).

The first legislation providing for the protection of natural resources was Decree No. 2295, 1844, which prohibited deforestation around river sources. Law No. 4794, 1907 provided for the creation of a body of rural guards (*guardacampestres*) to protect the countryside. In 1928, Law No. 944 prohibited deforestation and cultivation on mountain summits, for 20m either side of a river and around lakes, and for a radius of 150m around river sources.

Law No. 5856, 1962 provided for the creation of the General Directorate of Forestry (*Dirección General Forestal*) (DGF) to manage and restore forest areas. The National Forest Commission (*Comisión Nacional Forestal*) (CONATEF) was established under provision of Law No. 705, 1982 as a high level organisation to regulate the activities of the DGF. Wildlife resources are first referred to in Law No. 85, 1931, but this is predominantly concerned with hunting and has little application to wildlife management.

In 1965, the State Secretariat of Agriculture (*Secretaría de Estado de Agricultura*) (SEA) was restructured through Law No. 8, and specific environmental functions assigned to a state Subsecretariat of Natural Resources (*Subsecretaría de Recursos Naturales*) (SURENA) within it. Based on this Law, Resolution No. 44, 1978 provided for the creation of the Wildlife Department (*Departamento de Vida Silvestre*) (DVS), within SURENA, to inventory and manage national flora and fauna for conservation purposes, and to ensure sustainable exploitation.

Law No. 67 of November 1974 provided for the creation of the National Directorate of Parks (*Dirección Nacional de Parques*) (DNP) as an autonomous agency responsible for the administration, development and care of protected areas. Under this Law, three main types of conservation units are described: recreational area (*área recreativa*); historical area (*área histórica*); and natural and indigenous area (*área natural e indígena*). The management categories that comprise each group are named, but detailed descriptions of the designations are

not given (see Annex). Provision is made for the expropriation of private land to establish protected areas where necessary. The objectives of protected areas are listed and include conserving unique geological features and landscapes of outstanding beauty, cultural remains, refuges for threatened endemic species, examples of ecosystem types, and specific resources such as water, to provide opportunities for scientific research and recreation. Prohibited activities are given and include deforestation, and hunting or capturing wildlife except for authorised, scientific research.

Without constitutional provision for natural resource protection, there are no national guidelines on which to base environmental legislation. As a result, this legislation has often been ambiguous, inconsistent and ineffective. Other governmental sectors can formulate and pass laws that permit activities which may directly contradict conservation laws, such as urban development or mineral exploitation in protected areas (SEA/DVS 1990). The absence of a national conservation strategy results in a lack of coordination between public institutions with interest in natural resources, and conflicts often arise (O. Ramírez, pers. comm., 1992). Since the 1970s, several Projects for Constitutional Reform (*Proyectos de Reforma Constitucional*) have been initiated to revise the present constitution, and include regulations and guidelines for sustainable resource use (SEA/DVS 1990). However, proposals to add a clause relating to nature conservation to the 1966 Constitution, which were put forward in 1974, had not been passed by 1990 (SEA/DVS 1990).

Only eight management categories are provided for by Law No. 67, whereas, in practice, additional management categories not described in legislation are used (SEA/DVS 1990). Individual laws and decrees providing for the creation of individual protected areas often describe the conservation objectives of the area, and state activities prohibited within it, but designations need to be standardised at the national level (SEA/DVS 1990). A thorough revision of the current environmental legislation is required. For example, the 1931 Hunting Law largely contradicts subsequent legislation providing for wildlife protection, but it has not been repealed (SEA/DVS 1990).

## International Activities

The Dominican Republic signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (*Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América*) (Western Hemisphere Convention) in 1940, and it has since been ratified. In 1982 the Dominican Republic joined the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies

and practices which contribute to conservation, protection and wise use of natural and cultural resources.

The Dominican Republic ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 12 February 1985, but no sites have been inscribed. It participates in the Unesco Man and the Biosphere Programme, but no sites have yet been inscribed.

**Administration and Management** There are 12 governmental institutions with responsibility for natural resource administration and management (SEA/DVS 1990). This spreading of responsibility among organisations with frequently conflicting interests in natural resource use reduces the effectiveness of environmental protection (SEA/DVS 1990).

The Subsecretariat of Natural Resources (SURENA) comprised four departments: Land and Water (Tierras y aguas); Fishery Resources (Recursos Pesqueros); Inventory and Organisation of Natural Resources (Inventario y Ordenamiento); and Environmental Education (Educación Ambiental). In 1978, a fifth department, the Wildlife Department (Departamento de Vida Silvestre) (DVS), was established in response to the need for management of wildlife resources (SEA/DVS 1990). The DVS is responsible for conducting scientific research and regulating wildlife use, ensuring compliance with protected area regulations and international wildlife treaties. At the time of its creation, the lack of information available on the biological characteristics of predominant ecosystems precluded the formulation of effective management plans, and the DVS implemented the project Study and Management of Wild Areas (Manejo de Areas Silvestres) to make an inventory of the biological diversity found in the country. As a direct result of this study, nine new protected areas were established in 1983 (SEA/DVS 1990). The DVS is divided into five sections responsible for evaluation and management of wildlands; ornithology; herpetology and mammalogy; hunting control; and administration (A. Schubert, pers. comm., 1992).

The National Directorate of Parks (DNP) was established in 1974 as an autonomous government agency directly under the Presidency, responsible for administering, regulating, maintaining and developing national parks and other protected areas. The internal organisation of the DNP is given in the legislation providing for its creation. At the head are a director and a subdirector, both trained specialists in national parks management, below whom are four divisions whose responsibilities reflect the functions of the DNP itself: legal issues; supplies; accounts; and topography. The Advisory Committee (Comité Asesor) comprises the State Secretary of Education, Fine Arts and Culture (Secretario de Estado de Educación, Bellas Artes y Cultos); the head of the National Directorate of Tourism (Dirección Nacional de Turismo); the governors of the Autonomous University of Santa Domingo, the National

University Pedro Henríquez and the University Madre y Maestra; and a representative of a national private organisation with interests in natural resources and conservation. The Advisory Committee regulates the activities of the DNP and ensures compliance with the legislation.

An administrative office of the DNP is assigned to each protected area, comprising a specialist trained in wildland management, and a body of park guards (guardaparques) to patrol the area and ensure compliance with established regulations (Váldez and Mateo, n.d.). DNP policy is to delegate authority and responsibility to local offices (Hartshorn *et al.*, 1981).

The General Directorate of Forestry (DGF), established in 1962, is responsible for conserving and developing forest resources, ensuring their utilisation is conducted in a sustainable manner (SEA/DVS 1990).

A large number of nongovernmental organisations (NGOs) in the Dominican Republic work on conservation and environmental protection issues. Among the largest and most active groups is the Nature Foundation (Fundación Integral ProNaturaleza) (PRONATURA), founded in 1985, which is concerned with promoting scientific research of natural resources to allow the conservation and rational development of the environment. Most NGOs are unified by the Dominican Federation of Ecological Associations (Federación Dominicana de Asociaciones Ecológicas) (FEDOMASEC), which coordinates the activities of conservation organisations, and formulates guidelines for the environmental protection and education projects of its members (SEA/DVS 1990).

Problems in natural resource and protected area management arise from the large number of public institutions vested with such responsibilities. In many cases, conflicts of interest result, preventing the implementation of a coherent conservation policy. Legislation is urgently required to amalgamate all natural resource responsibilities into a single institution, which would be responsible for planning, implementing and supervising action plans and national policies for resource management (SEA/DVS 1990).

Administrative effectiveness could also be improved by increasing co-ordination between public and private organisations involved with natural resource management. NGOs have only been acknowledged by the government environmental sector since the late 1980s, and only to a limited degree (SEA/DVS 1990). However, during that time, a large number of NGOs have been established whose work has contributed to the protection and management of natural resources (SEA/DVS 1990). Those which work in the declaration and management of protected areas are: Grupo Jaragua, Progressio Foundation (Fundación Progressio), Quita Espuela Foundation (Fundación Quita Espuela), Cibao Ecological Society (Sociedad Ecológica del Cibao) (SOECT), Barahona Ecological Society (Sociedad Ecológica de



Barahona)(SOEBA), and the Centre for the Ecodevelopment of Bahía de Samana and its Environment (Centro para el Ecodesarrollo de la Bahía de Samana y su Entorno)(CEBSE) (A. Schubert, pers. comm., 1992).

**Systems Reviews** The territory of the Dominican Republic comprises two thirds of the island La Española (the other third belonging to Haiti) and six small islands, with a total coastline of 1,576km (SEA/DVS 1990). A characteristic feature is its high elevation; a large part of the country is over 1,000m and the highest mountains in the Caribbean, with altitudes of over 3,000m, are located here.

The great topographical variation within the country, from sea level to 3,087m, results in a range of temperatures and ecosystems, which has promoted a high degree of biodiversity and endemism (SEA/DVS 1990). Around 36% of the floral species found on the island of La Española are endemic (SEA/DVS 1990). The major vegetation zones are: semideciduous forest; evergreen humid forest; pine forest; and seashore and riverine habitats (A. Schubert, pers. comm., 1992). Following the Holdridge classification system, nine ecological life zones are found (SEA/DVS 1990). The largest of these are sub-tropical moist and sub-tropical dry forests.

Four mountain systems are found, oriented east to west and separated by fertile, alluvial plains: Septentrional cordillera in the north; Central cordillera; Sierra de Neiba; and Sierra de Baoruco to the south. Three of these ranges continue into Haiti. Between the first two ranges extends the fertile Cibao or Vega Real valley, where agricultural production is intensive. As a result, around 20% of the population lives here (SEA/DVS 1990). At high altitudes temperatures drop below 0°C, but the average temperature for the whole country is about 26°C. Annual precipitation is highest in the Septentrional cordillera, at 2305mm, and drops to 422mm in the southwest. Cyclones are frequent, with 90% of them occurring on the south coast (SEA/DVS 1990).

The most densely populated regions are the southern coast and the Cibao valley (SEA/DVS 1990). Around 0.62% of total land area is occupied by urban development and roads, and over 50% is used for agriculture. Land ownership is unequal, with a tradition of large estates owned by a few people: 70% of farms are less than 5ha. As a result, peasant farmers work small plots of land and move frequently, particularly to under populated mountainous regions where insufficient knowledge of cultivating the difficult terrain causes severe soil erosion in many areas (SEA/DVS 1990).

Around 90% of total land area has been deforested for agricultural purposes or urban development. Only mountain summits and areas with infertile soil, such as in the southeast, remain in their natural state (SEA/DVS 1990). At the beginning of the 1900s, forest covered around 85% of total land area, but by 1986, only 10.1%

remained forested (SEA/DVS 1990). Since the 1960s, the government has prohibited deforestation in an effort to protect forest resources (SEA/DVS 1990).

The most significant threat to the environment arises from the encroachment of shifting agriculture which contributes to soil erosion (SEA/DVS 1990; Hartshorn *et al.*, 1981). The lack of clear land ownership rights does not permit permanent agriculture, and of the 2.6 million ha of agricultural land, only 860,000ha are permanently cultivated (SEA/DVS 1990). Agricultural pressure is most noticeable in dry forests in the west and humid forests in the northeast (Hartshorn *et al.*, 1981).

The first national park was established in 1956. By 1983, there were only five areas protected under this designation. Following the creation of the DVS in 1978, a nationwide survey and inventory of biological diversity implemented by this institute resulted directly in the establishment of nine new protected areas in 1983 (SEA/DVS 1990).

Eleven management categories are currently in use, only eight of which are described in the 1974 law providing for the protected area system, but not in detail. Three other categories; forest reserve (reserva forestal), wildlife refuge (refugio de vida) and faunal sanctuary (santuario de la fauna) have been introduced in practice, but are not described in legislation. The lack of clear definition and conservation objectives of each designation results in contradictions and inconsistencies among them. In some cases, different categories have been applied to the same area (SEA/DVS 1990). In view of this, and the absence of unifying legislation, protected areas do not form a coherent national system. The existing system needs to be revised, management categories standardised, and areas reclassified where necessary (SEA/DVS, 1990).

The present system of protected areas does not cover all the major ecosystems in the country, with many being under-represented or absent altogether, particularly montane forest. Marine, mangrove and fresh water lake ecosystems are well represented in protected areas (SEA/DVS 1990).

Between 1979 and 1990, a review of biological diversity and protected areas was conducted by the Wildlife Department (DVS), which involved an analysis of literature and a series of field studies. The survey recommended a number of measures to improve protected area effectiveness. These included modifying current legislation and administrative structure, and increasing scientific research, environmental education, training for park personnel, and involvement of NGOs in all environmental issues. Measures to convert migratory agriculture into permanent agriculture would reduce pressure on protected areas. To increase protected area coverage, 15 new sites were



recommended for protection. Further studies will be done in these areas to formulate management plans and determine suitable designations (SEA/DVS 1990).

#### Addresses

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## ANNEX

### Definition of protected area designations, as legislated together with authorities responsible for their administration

**Title:** Ley No. 67 que crea la Dirección Nacional de Parques (Law No. 67 creating the National Directorate of Parks)

**Date:** 20 November 1974

**Brief description:** Provides for the establishment of an autonomous institute responsible for the development, administration and maintenance of a system of protected areas. The management categories that comprise the system are described, but details of the designations are not given in any legislation.

**Administrative authority:** Dirección Nacional de Parques (National Directorate of Parks)

**Designations:** The management categories that make up the system of protected areas are considered to form three main groups.

**Area Recreativa (recreational Area), comprising:**

*Parque Recreativo Nacional (National Recreation Park)*

*Jardín Zoológico Nacional (National Zoological Garden)*

*Acuario (Aquarium) Carretera Panorámica (Scenic Route)*

**Area Histórica (historic Area), comprising:**

*Monumento Nacional (National Monument)*

**Area Natural (natural Area), comprising:**

*Jardín Botánico (Botanical Garden)*

*Parque Nacional (National Park)*

*Reserva Científica Natural (Natural Scientific Reserve)*

To be included in the protected area system, an area must be:

– of national importance owing to its scientific, cultural, scenic, or historic characteristics, or for its recreational potential

– of sufficient size to ensure the conservation of the natural formations, floral and faunal species found within it.

– open to the public for recreational, educational, or scientific purpose. All visitors are obliged to comply with the regulations established by this law.

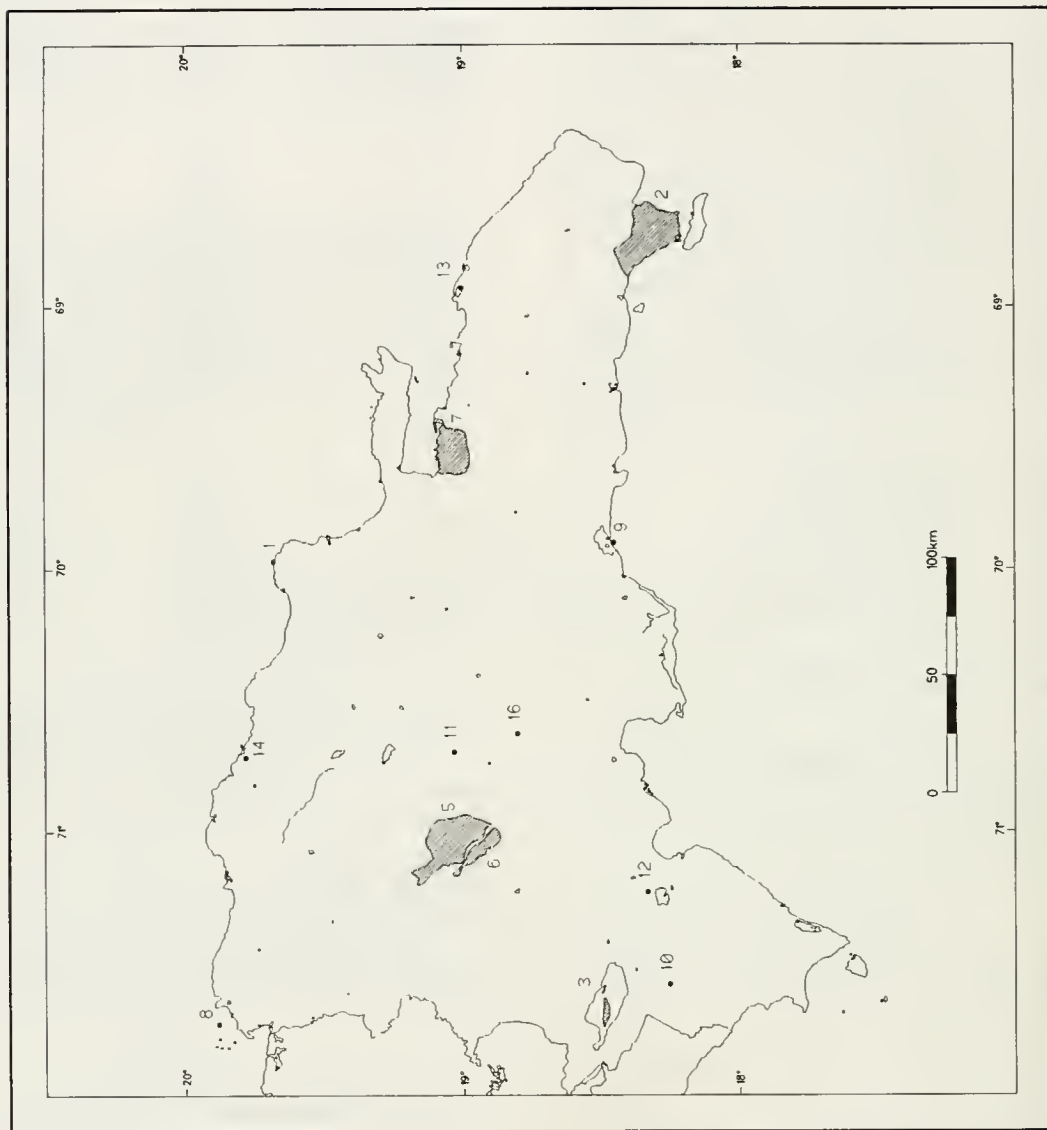
– Deforestation or destruction of the vegetation, hunting or capture of wildlife, collection of the eggs of marine turtles and other animals, and any other

disturbances to the natural condition of the protected area, are all prohibited.

Source: Original legislation

### SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Cabo Francés Viejo	V	125	1974
2	Del Este	II	42,000	1975
3	Isla Cabritos	II	2,400	1974
4	Jaragua	II	137,400	1983
5	José Armando Bermúdez	II	76,600	1956
6	José del Carmen Ramírez	II	73,784	1958
7	Los Haitises	II	20,800	1976
8	Monte Cristi	II	53,000	1983
9	Parque Submarino La Caleta	V	1,010	1986
10	Sierra de Bahoruco	II	80,000	1986
<i>Scientific Reserves</i>				
11	Ebano Verde Natural	IV	2,310	1989
12	Laguna del Rincón	IV	4,780	1983
13	Lagunas Redonda y Limón	IV	10,100	1983
14	Loma Isabel de Torres	V	2,200	1983
15	Loma Quita Espuela	IV	7,250	1992
16	Valle Nuevo	IV	40,900	1983
<i>Cetacean Sanctuary</i>				
17	Banco de la Plata	IV	374,800	1986
<i>Scenic Route</i>				
18	El Aceitillar-Cabo Rojo	V	41,000	1986



Protected Areas of the Dominican Republic

# GRENADA

Area 344 sq. km

Population 110,000 (1989) (Hunter, 1991)

Natural increase: No information

## Economic Indicators

GDP: No information

GNP: US\$ 1,265 (Hunter, 1991)

**Policy and Legislation** Grenada has no substantive national park legislation that provides adequate authority either to establish or to manage national parks and protected areas (National Parks and Wildlife Unit, 1988). Although legislation makes provision for the establishment of both forest and marine reserves, the focus is on protecting timber, water resources and fisheries. Less emphasis is placed on the preservation of habitat and recreational resources.

The Plan and Policy Statement for National Parks and Protected Areas (National Parks and Wildlife Unit, 1988) describes proposed management objectives for the five categories of protected areas it defines. Within national parks, zoning would be used to ensure both strict protection of certain areas and intensive recreational and educational uses in others. The aim within natural and cultural landmarks would be to allow recreational and educational uses of sites without destroying the basic features protected. The objective within protected seascapes would be to ensure the ecological integrity and scenic quality of seascapes, while providing opportunities for recreation, tourism, education and research. Multiple use management areas would aim to ensure the sustained production of water, fibre, other wood products, wildlife, forage and/or marine products, as well as outdoor recreation and education.

The Forest, Soil and Water Conservation (Amendment) Ordinance No. 34, 1984 makes provision for the Chief Forestry Officer to protect areas to provide natural and undisturbed habitat for the flora and fauna of Grenada. Forest reserves may be declared on state-owned land, while protected forests may be established on private land when necessary for certain public purposes (OECS, 1986). According to the original Ordinance (Chapter 129 of 1 August 1949), the Chief Forestry Officer may negotiate for the voluntary protection of private land, or owners of private land may request that the land be supervised by the Chief Forestry Officer. Water catchments are given the protective status as forest reserves, and the 1984 Act gives responsibility for management and conservation of these catchments to the Forestry Department (OECS, 1986).

Private lands needed for inclusion within the proposed national park system could be acquired under the provisions of the Land Settlement Ordinance, 1933 which allows for the acquisition of lands for public purposes.

Grand Etang Reserve Ordinance Cap. 135, 1906 designated the area around Grand Etang Lake as a forest reserve, as well as two areas in Carriacou (see Annex). According to OECS (1986), Grand Etang Forest Reserve is also declared a sanctuary for animals and birds under the Wild Animals and Birds (Sanctuary) Ordinance Cap. 314, 1928. Certain activities are prohibited within the reserve, but the penalties would appear to no longer be adequate.

The Grenada Fisheries Act No. 15, 1986 provides for the promotion and management of fishing and fisheries in Grenadian waters. Section 23 (Marine Reserves and Conservation Measures) makes provision for the Minister to declare any area of the "fishery water" and adjacent lands as marine reserves when necessary for several purposes, including the preservation and enhancement of the area's natural beauty (OECS, 1986) (see Annex).

**International Activities** Grenada ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region (Cartagena Convention) on 30 May 1985. Grenada is not party to the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), nor the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), and does not participate in the Unesco Man and the Biosphere (MAB) Programme.

**Administration and Management** The National Parks and Wildlife Unit, within the Forestry Department, is responsible for all protected areas, terrestrial and marine. Where areas are protected for their value as watersheds, management also involves the Central Water Commission. Under the proposed national parks plan, the Ministry of External Affairs, Agriculture, Lands, Forestry, Tourism and Legal Affairs would be designated as the agency responsible for planning, management and protection of all areas in the system (National Parks and Wildlife Unit, 1988). Currently, many of the existing land-use controls are not enforced, and activities of the National Parks and Wildlife Unit and the Forestry Department are hindered due to budgetary and personnel constraints.

The principal nongovernmental organisation (NGO) concerned with environmental issues is the National Trust and Historical Society, which aims to preserve the country's historical, archaeological, cultural and architectural heritage, and its flora and fauna. The National Trust was established under the provisions of the National Trust Act (1967), but subsequently merged with the Historical Society in 1990. The Carriacou



Committee for Tourism and Conservation was formed in 1991 and has as its major goals and objectives the conservation and management of the reefs and beaches of Carriacou (IRF, 1991).

Grenada is party to the Caribbean Conservation Association, a regional, nongovernmental, nonprofit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources. The Caribbean Natural Resources Institute, formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), has also been involved in Grenada (management alternatives for the proposed Levera National Park). This organisation, whose primary goal is to strengthen local capacity to manage the living natural resources critical to development in the region, is currently collaborating with the Caribbean Conservation Association for a marine parks programme and the "Caribbean Heritage Programme". This latter initiative is providing institutional development in support of the region's natural heritage at the national and regional levels (ECNAMP, 1989; Putney and Renard, n.d.). In 1989, a Memorandum of Understanding was signed by the Caribbean Conservation Association and the Government of Grenada for the purpose of executing a Country Environmental Profile, with the Ministry of External Affairs, Agriculture, Lands, Forestry, Tourism and Legal Affairs the designated government counterpart agency. The Grenada National Trust was designated as the local implementing and coordinating agency (CCA/IRF, 1991).

**Systems Reviews** The state of Grenada, comprising the islands of Grenada, Carriacou, Petite Martinique, as well as a number of small islets, is mainly of volcanic composition (UNEP/IUCN, 1988). The mountainous terrain is deeply dissected, and about 70% of the island has a slope of at least 20° (Hudson and Francis, 1984). The climate is humid and tropical and supports rain and cloud forest in the interior. Areas classified as "wildlands" (ECNAMP, 1980a, 1980b) cover approximately 15% of the island, and broadly coincide with areas considered rich in locally important species. Grand Etang Forest Reserve represents such an area of interest.

The most recent map of the actual vegetation cover was compiled from interpretation of aerial photography taken in 1982, indicating the following coverage: montane rain forest (1,688ha), closed evergreen rain forest (2,278ha), moist deciduous and semideciduous forest (1,752ha), scrub/cactus vegetation (1,226ha), mangrove swamp (190ha) and inland swamp (28ha) (CCA/IRF, 1991). In a separate analysis, FAO (n.d.) indicated that for the year 1989, there were 4,200ha of forests in Grenada, comprising 4,000ha of closed broadleaved, and 200ha of forest plantations.

In order to determine the degree of representation of the country's natural features within the proposed system of parks and protected areas, the following analyses have

been carried out (CCA/IRF, 1991; National Parks and Wildlife Unit, 1988): representation of geological formations with regard to their significance as illustrations of the tectonic history of the island; representation of the main types of natural habitats and ecosystems; distribution of native species of flora and fauna, particularly those threatened with extinction; and protection of watersheds and water courses, and maintenance of high standards of water quality and quantity. The representation of vegetation formations in the proposed system of parks and protected areas can be summarised as follows. The rain forest and lower montane rain forest formations have been greatly reduced by cutting, and disturbed for agriculture. The only relatively intact example is in the vicinity of Seven Sisters Falls in Grand Etang Forest Reserve; representation within the proposed system is not considered adequate. Montane thicket is still common on all mountain peaks above approximately 600m, and representation within the proposed system is considered adequate. Elfin woodland/palm brake is confined to the summit peaks of Grand Etang and Mount St Catherine, and would be well represented within the proposed system. Almost the entire evergreen/semievergreen seasonal forest formation has been converted to agriculture. The formation is very poorly represented in the proposed system; only minute areas are included at Marquis River Natural Landmark. Today, the best remnant of moist forest remaining in the entire country is found at Morne Delice, but this is outside the proposed system. Deciduous seasonal forest is only fairly represented in several small areas, but is also recuperating on some of the peninsulas on the southern coast, and at Levera Hill due to abandonment of agriculture. Such areas could be considered for inclusion within the system. Fairly extensive but damaged stands remain in Carriacou in the forest reserves and in the proposed national park. Swamp and marsh formations, namely the coastal mangroves swamps and the freshwater herbaceous ecosystems at Grand Etang Lake and Lake Antoine, are generally in a healthy state. Mangrove cutting for charcoal has caused a deterioration in Levera and North East Seascape, but management actions to prohibit this activity have been initiated. These formations are adequately represented in the proposed system. Littoral woodland formation is relatively common, but most areas have been damaged through exploitation for charcoal and goat grazing; representation is adequate.

The government made the establishment of a national park and protected areas system a priority in the development plan for 1986, and a review has now been carried out (National Parks and Wildlife Unit, 1988). A total of 27 areas in Grenada and 16 in Carriacou are recommended for inclusion within the system. Of the total, three units are recommended as national parks, eleven as protected seascapes, eleven as natural landmarks, twelve as cultural landmarks, and four as multiple use areas. This represents approximately 4,458ha or about 13% of the land area. In addition,

several marine areas are proposed. However, these proposals do not include the following areas: the habitat of the endemic Grenada dove and Grenada hookbill kite; the Morne Delice remnant moist forest; and the historically and recreationally important wreck of the luxury liner Bianca C., much valued for diving. Additionally, the areas of oldgrowth rain forest in the upper watershed of the Great River in Grand Etang Forest Reserve are still legally eligible for logging, even though they are included in the proposed protected areas system (CCA/IRF, 1991). Individual management plans need to be compiled as part of the general plan (CCA/IRF, 1991; National Parks and Wildlife Unit, 1988).

#### Addresses

National Parks and Wildlife Unit, Forestry Department, Ministry of Agriculture and Tourism, ST GEORGE'S (Tel: 809 440 3083/2934)

Carriacou Committee for Tourism and Conservation, c/o Caribee Inn, Prospect, CARRIACOU (Tel: 809 443 7380)

National Trust and Historical Society, c/o Grenada National Museum, Young Street, ST GEORGE'S (Tel: 809 440 3725)

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ANNEX

Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration

**Title:** Grand Etang Reserve Ordinance  
(Cap. 135)

**Date:** 1906

**Brief description:** Designated the area around Grand Etang Lake, as well as two areas in Carriacou, as forest reserves

**Administrative authority:** Department of Forestry

**Designation:**

*Forest reserve Sanctuary* For the wild animals and birds of the colony, and to make special temporary (1957/1962) provision for the protection of agouti, armadillo and certain snakes. Hunting, trapping and carrying of firearms are prohibited.

**Source:** National Parks and Wildlife Unit (1988)

**Title:** The Forest, Soil and Water Conservation (Amendment) Ordinance No. 34

**Date:** 1984

**Brief description:** Makes provision for the Chief Forestry Officer to protect areas to provide natural and undisturbed habitat for the flora and fauna of Grenada.

**Administrative authority:** Department of Forestry

**Designation:**

*Protected area* Either private or crown land may be declared to safeguard the watershed, to prevent erosion, to conserve resources and to provide recreational opportunity.

**Source:** National Parks and Wildlife Unit (1988)

**Title:** The Grenada Fisheries Act No. 15

**Date:** 1986

**Brief description:** Provides for the promotion and management of fishing and fisheries in Grenadian waters. Section 23 (Marine Reserves and Conservation Measures) makes provision for the Minister to declare any area of the "fishery water" and adjacent lands as marine reserves.

**Administrative authority:** National Parks and Wildlife Unit

**Designation:**

*Marine reserve* Designated where special measures are necessary to protect flora and fauna, allow for natural regeneration of depleted aquatic life, promote scientific study, or preserve and enhance natural beauty. Activities prohibited without permission include taking flora and fauna, extracting minerals, dumping waste, and building.

**Source:** National Parks and Wildlife Unit (1988)

**Title:** National Trust Act

**Date:** 1967

**Brief description:** Establishes The National Trust, with provision for the inalienable protection of natural areas.

**Administrative authority:** National Trust and Historical Society

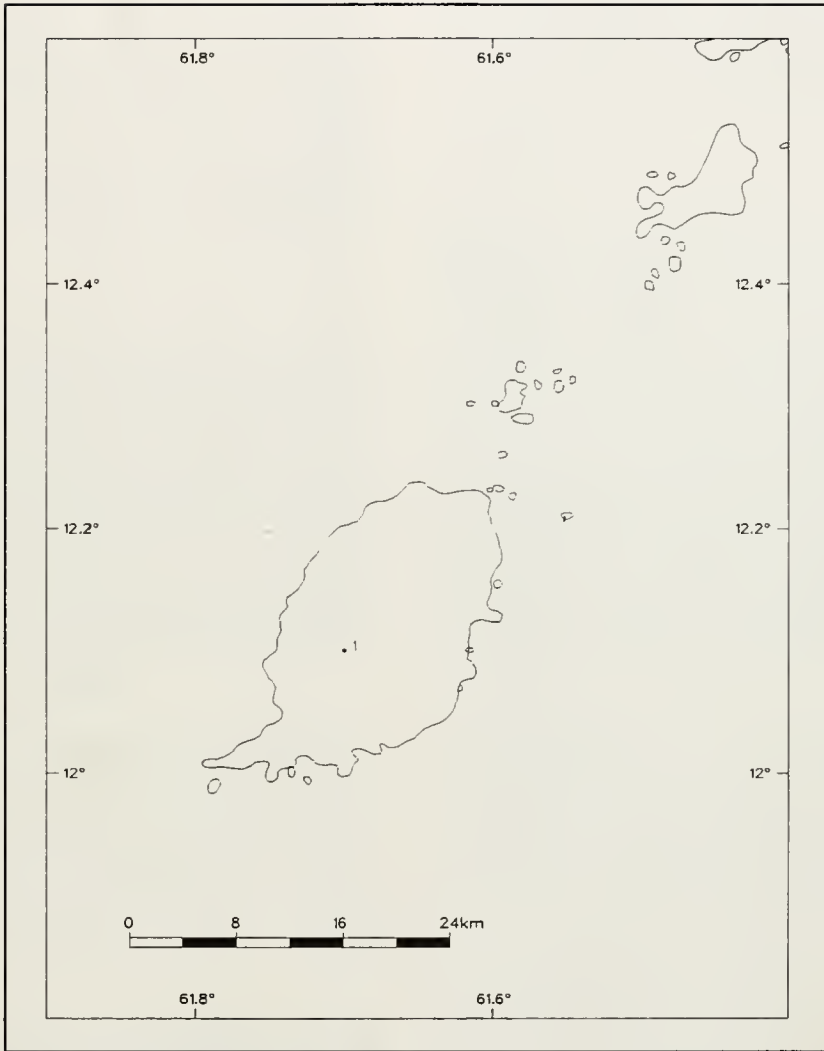
**Designation:**

Not applicable

**Source:** National Parks and Wildlife Unit (1988)

SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	Forest Reserve Grand Etang	VIII	618	1910



**Protected Area of Grenada**





# GADELOUPE (FRANCE)

Area 1,780 sq. km

Population 343,000 (1990)

Natural increase: 0.64% per annum

## Economic Indicators

GDP: US\$ 5,515 (1987)

GNP: No information

**Policy and Legislation** Formerly a French colony, Guadeloupe (including the islands of St Martin and St Barthélemy) has, from 1946, had the status of an overseas department of France. In 1974 it also became an administrative region. The territory is covered by French legislation, some of which is applicable specifically to Guadeloupe. For a complete list of legislation concerning protected areas under French jurisdiction, see the country sheet for France (Volume 2).

The protected areas currently comprise one national park and one nature reserve. Provision for the establishment of national parks is given under Law (Loi) No. 60.708 "relative à la création de parcs nationaux", of 22 July 1960 (see Annex), and related enforcement decree, No. 61.1195, 1961. The creation of a national park is by a decree which lays down regulations and arrangements for development and management, the level of protection, and lists permitted activities. Guadeloupe National Park was established under Decree No. 89-144 of 20 February 1989 "créant le Parc National de la Guadeloupe" (see Annex). This decree also provides for the creation of the statutory body, also called "Parc National de la Guadeloupe".

Provision for the establishment of nature reserves is given in Law No. 76/629 "relative à la protection de la nature" (see Annex), and a decree which relates to the implementation of this Act. Decree No. 87-981 concerning creation of Grand Cul-de-Sac Marin Nature Reserve (Décret portant création de la réserve naturelle du Grand Cul-de-Sac Marin) (see Annex) of 23 November 1987 provides details of activities prohibited within the reserve.

The first (legislative) section of the French Forest Code, given in Law No. 85-1273 of 4 December 1985, contains a clause (Article L. 171-1) which states that certain parts of this law are not applicable to Guadeloupe. Similarly, although most of the second (regulations) part of the forest code is relevant, four clauses (Article R. 562-1 to 562-4) list those parts which do not apply in this department of France. The legislative and regulations sections both provide for the responsibilities of the National Forest Office (Office National des Forêts).

**International Activities** Conventions of which France is a member, which are of relevance to Guadeloupe, include the Convention for the Protection

and Development of the Marine Environment of the Wider Caribbean Region and Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region (both of which were ratified by France on 13 November 1985), and a second Protocol Concerning Specially Protected Areas and Wildlife, signed by France in 1991. Together the convention and associated protocols are known as the Cartagena Convention. France is a member of the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources.

**Administration and Management** The French governmental body responsible for the establishment of parks and reserves (and setting hunting regulations) is the Department of Nature and Countryside (Direction de la Nature et des Paysages), part of the Ministry of the Environment (Ministère de l'Environnement). National parks have a board of directors with the total membership fixed by decree. The board of directors decides, in principle, how the park is to be administered, managed and regulated. The executive director is, however, responsible for day to day administration. The main objectives of management are; the protection of nature, landscape and sites, and to ensure the biological diversity within the territory; keeping the area available for present and future generations; developing respect for nature and contributing to sustainable development. Under French legislation, nature reserves may be managed by diverse organisations.

Within Guadeloupe, management of existing and proposed nature reserves is the responsibility of the "Parc National de la Guadeloupe", a public, national establishment of an administrative character, under the control of the Ministry of the Environment. The Parc National de la Guadeloupe administrative body comprises a management team of approximately 40 people, the budget for 1991 being US\$2.7 million.

The Office National des Forêts (ONF), an industrial and commercial public national establishment, is responsible for management of all state forests. The ONF cooperates with the Parc National de la Guadeloupe administrative body, in co-managing the national park, which is principally forest. The ONF is also responsible for management of all state-owned forests, an area of 38,800ha. One director is responsible for both the ONF and the National Park, all other staff are employed specifically in either the ONF or the National Park (Anon., 1990).

The official policy for management of state forest (given in Anon., 1990) is presented and commented on in a handbook *Guadeloupe domainal forest management*

1979-1990 (Portecop, 1984). The nation's forestry objectives include wood production, biological conservation and recreational activities. Protected evergreen rain forest covers 24,500-25,000ha on the highest land (of which 16,500ha lie within the national park) (D. Chabod, pers. comm. 1991).

Various other public organisations are involved with protected areas and species. The Regional Department for Environment (Délégation Régionale de l'Environnement), within the Ministry for the Environment (Ministère de l'Environnement), and the Regional Department of Maritime Affairs (Direction Départementale des Affaires Maritimes) are involved with administration. Research organisations include the Université des Antilles et de la Guyane (marine and terrestrial ecosystems); the National Institute for Agronomic Research (Institut National de la Recherche Agronomique) (INRA) (forest ecosystems, sylviculture, Guadeloupe herbarium, in cooperation with the National Park); the French Scientific Institute for Development through Cooperation (Institut Français de Recherche Scientifique pour le Développement en Coopération) (ORSTOM) and the Office for Geological and Mining Research (Bureau de Recherches Géologiques et Minières) geological and hydrological research).

**Systems Reviews** Most of Guadeloupe consists of two large islands, joined by a mangrove swamp: Basse-Terre, volcanic and mountainous, and Grande-Terre, limestone and flat. The smaller, associated islands are either volcanic or limestone. The islands of St Martin and St Barthélémy lie 250km to the north-west. Only the northern part of St Martin belongs to Guadeloupe, the southern third being Dutch. Basse-Terre rises to much greater altitude than the other islands, reaching 1467m at La Soufrière volcano. Most land below 400m on Basse-Terre, and almost all but the northern coastal region of Grand-Terre, is cultivated or developed. Vegetation is, therefore, largely modified. The only natural growth on Grand-Terre is man-induced scrub woodland. In 1986, Basse-Terre still had untouched rain forest and lower montane rain forest (Davis *et al.*, 1986). In 1977 it was estimated that woods and forests occupied 70,000ha (Anon., 1979; Portecop, 1984). Much of this comprises the forests at higher altitudes on Basse-Terre, and the large areas of mangrove at the junction of the two islands. Mangrove covers about 7,500ha, 6,000ha of which occurs at Grand Cul-de-Sac Marin, the largest area of mangrove in the Lesser Antilles (Davis *et al.*, 1986; Imbert *et al.*, n.d.). Reefs occur to a greater or lesser extent around all the islands forming the Guadeloupe archipelago (UNEP/IUCN, 1988).

The protected area system comprises Guadeloupe National Park, which was established in 1989, and Grand Cul de Sac Marin Nature Reserve, established in 1987. Guadeloupe National Park covers 17,300ha. It consists largely of practically unexploited forests, and protects a great number of valuable natural landscapes including

the Soufrière volcano. In addition, there are three proposed nature reserves, Pitons du Nord and Beaugendre to the north and south respectively of the national park, and Pigeon, an island to the west of Basse-Terre (Anon., 1991). The creation of a marine nature reserve on St Barthélemy was accepted in principle by the National Council of Protection of Nature on 17 September 1991, and by the Minister of the Environment in March 1992. Official gazettelement of the reserve is due in the near future (N. Aussedat, pers. comm., 1992).

Proposals for conservation action, including establishment of areas proposed for protection, are given by Johnson (1988). Portecop (1984) identifies the three main environmental problems as deforestation, impairment of tourist attractions and loss of wildlife. All coral reefs are under threat from human activities such as: urban development; industrial and agricultural pollution; fishing using traps; collection of corals by tourists; urban and industrial pollution; sedimentation; subsistence fishing (UNEP/IUCN, 1988).

Hurricane Hugo, which swept through the Caribbean on 16 and 17 September 1989, caused devastation in particular to Puerto Rico and Guadeloupe, both of which lay directly within its path. Mangroves were damaged particularly seriously by the hurricane. A report on the hurricane, including its ecological impact, is given by Pagney Bénito-Espinal and Bénito-Espinal (1991).

#### Addresses

Parc National de la Guadeloupe, Habitation Beausoleil Montéran, BP 13-97120, SAINT CLAUDE (Tel: 590 802425; FAX: 590 800546)

Office National des Forêts, Division Gestion des Forêts Publiques, Jardin Botanique, BP 648, 97109 BASSE-TERRE (Tel: 590 811720; FAX: 590 814877)

Ministry of the Environment, Direction de la Protection de la Nature, Service des Parcs et Réserves, 13 boulevard du Général Leclerc, 92521 NEUILLY-SUR-SEINE, France (Tel: 33 14 081 8410; Fax: 33 14 081 9953)

Association des Amis du Parc National de la Guadeloupe et de l'Environnement, BP 286, 97100 BASSE-TERRE

Université des Antilles et de la Guyane, BP 771, 97173 Pointe à Pitre Cedex (Tel: 590 938600; Fax: 590 92 06 57)

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Loi no. 60/708 relative a la création de parcs nationaux (Law no. 60/708 relating to the Creation of National Parks) and Décret no. 61-1195: pris en application de la Loi du 22 juillet 1960 instituant les parcs nationaux (Decree No. 61-1195: for the enforcement of the Law of 22 July 1960 for the establishment of national parks)

**Date:** 22 July 1960; 31 October 1961, amended in 1989 (Decree No. 89-6)

**Brief description:** Provides the general framework for establishing national parks

**Administrative authority:** Ministère de l'Environnement (Ministry of the Environment), Direction de la Nature et des Paysages (Department for Nature and Countryside)

#### Designations:

**Parc national (National park)** For the conservation of flora, fauna, subsoil, climate, water, and natural environment in general, and to prevent natural degradation. Sites are declared by individual decree of the Council of State.

The limits of the territory declared under the decree may include national maritime waters.

The legislation allows for the establishment of a buffer zone around the park itself, where none of the protective constraints applies.

The Decree of 1989 lists the behaviour and activities which are to be restricted, and details of penalties to be imposed for contravention against the law.

Hunting (but not fishing) is in principal banned from all parks, as is interference with the flora and fauna, film-making, professional photography, publicity and the usurpation of the "national park" label. There are generally restrictions on commerce and industry, public and private works, mining, water-use, and, to some extent, public access. In reality for these latter restrictions there is usually a complex system of prohibitions and exemptions based on each individual decree of classification. Forestry and agricultural activities are generally continued although they are closely monitored to ensure that they do not come into conflict with the main purpose of the park.

**Source:** Original legislation in French

**Title:** Loi no. 76/629 relative à la protection de la nature (Nature Conservation Act No. 76 629); and decrees relating to the implementation of this Act (including Nos. 77/1141; 77/1295; 77/1296; 77/1297; 77/1298; 77/1300)

**Date:** 10 July 1976

**Brief description:** A wide ranging Act, covering "the protection of natural areas and the countryside, the preservation of animal and plant species, the maintenance of biological equilibrium through the protection of natural resources against all causes of degradation". This Act includes framework provisions for the definition, designation and establishment of nature reserves (definition given below), voluntary nature reserves and biotope protection orders.



**Administrative authority:** Ministère de l'Environnement (Ministry of the Environment), Direction de la Nature et des Paysages (Department for Nature and Countryside)

**Designations:**

*Réserve naturelle (Nature reserve)* Where the conservation of the fauna, flora, subsoil, water, mineral and fossil deposits and, in general, the natural surroundings is of particular importance or which require the suspension of all artificial intervention that might lead to their degradation.

Classification of sites may include areas of French territorial waters.

Factors taken into consideration include: preservation of species and habitats; conservation of botanical gardens or arboreetums; preservation of biotopes and formations of geological, geomorphological or speleological interest; preservation or creation of stop-over points on major migration routes; scientific or technical studies and sites of particular interest for the study of evolution.

Established with the approval of the Ministry of the Environment under an agreement of a contractual nature. Subject to the owner's consent the decision to establish a reserve is issued in the form of a decree; if the owners object, publication is followed by a survey and the reserve is designated by a Council of State decree, setting out details of permitted activities.

**Source:** Original legislation in French

**Title:** Décret no. 87-981 portant création de la réserve naturelle du Grand Cul-de-Sac Marin (Decree No. 87-981 concerning creation of Grand Cul-de-Sac Marin Nature Reserve)

**Date:** 23 November 1987

**Brief description:** Provides regulations for activities permitted within Grand Cul-de-Sac Marin Nature Reserve

**Administrative authority:** Parc National de la Guadeloupe

**Designations:**

*Réserve naturelle du Grand Cul-de-Sac Marin (Nature reserve)* Prohibited activities include: hunting; introduction of undomesticated animals or plants without appropriate authorisation; apart from fishing, to cause any harm or disturbance to plants or undomesticated animals, nests, eggs, hides etc.

The Préfet of the Republic may take any measures necessary to ensure conservation of animals and plants within the reserve and to control overabundant species.

Fishing is only permitted from boats, subject to regulations; traditional agricultural activities may continue.

Any pollution of the water, air or soil is prohibited, as is any private or public work apart from that which is necessary to maintain the integrity of the site.

**Source:** Original legislation in French

**Title:** No. 89-144 créant le Parc national de la Guadeloupe (Decree No. 89-144 creating Guadeloupe National Park)

**Date:** 20 February 1989

**Brief description:** Provides a definition of Guadeloupe National Park, and peripheral area.

**Administrative authority:** Parc national de la Guadeloupe

**Designations:**

*Parc national de la Guadeloupe (Guadeloupe National Park)* Agricultural, pastoral and forest activities may continue to be practised freely, in their current form providing they conform to regulations. Methods of traditional cultivation in the Grande-Rivière valley are maintained. New agricultural and pastoral methods are only permitted following special authorisation. On land liable to overgrazing, livestock numbers may be fixed by the appropriate authority.

Prohibited activities include all hunting and fishing; introduction of non-domestic animals; damage or disturbance of any sort to eggs, nests animals or plants (with the exception that medicinal plants and certain others may be collected); collection of rocks and fossils; all industrial, mining and commercial activities.

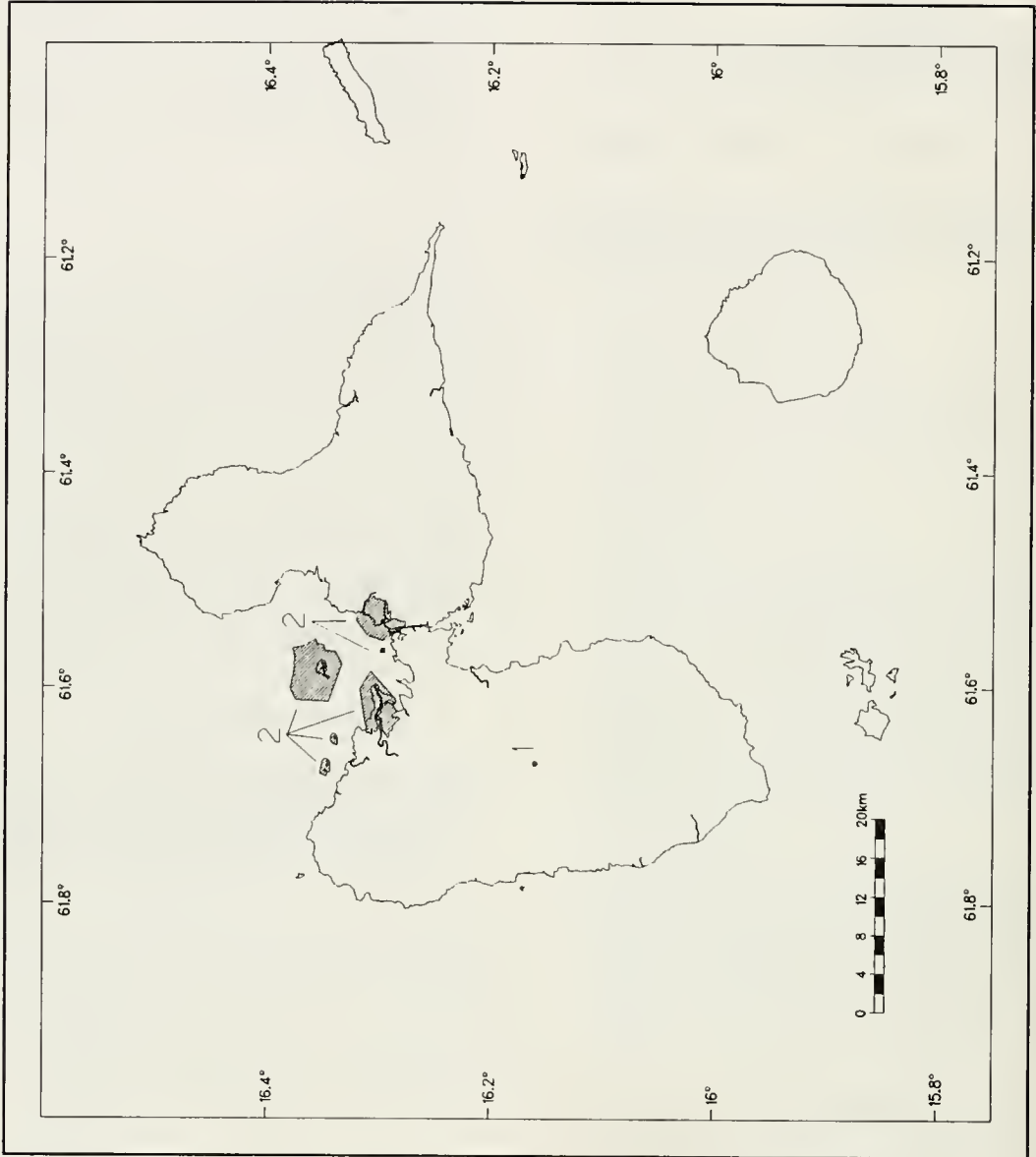
Sports and activities, notably walking and swimming may continue, with competitive sport being subject to prior authorisation.

*Zone périphérique (Peripheral zone)* Area in which tourism is encouraged, traditional activities maintained and new activities developed, but without any specific and newer regulations.

**Source:** Original legislation in French

## SUMMARY OF PROTECTED AREAS

Map ref.	<i>National/international designations</i> Name of area	IUCN management category	Area (ha)	Year notified
1	<i>National Park</i> Guadeloupe	II	17,300	1989
2	<i>Natural Reserve</i> Grand Cul de Sac Marin	I	3,700	1987



Protected Areas of France - Guadeloupe

# HAITI

Area 27,750 sq. km

Population 6,513,000 (1990)

Natural increase: 2.05% per annum

## Economic Indicators

GDP: US\$ 324 (1987)

GNP: No information

**Policy and Legislation** Haiti has had a turbulent political past. Since 1859 it has been a republic, although the country was under United States occupation from 1915 to 1934. A law of 3 February 1926, passed during the occupation, provided for the declaration, by executive decree, of national forest reserves on public land. Following a military coup in 1950, a law of 20 August 1955 was passed, which, in addition to regulating cutting, transport and sale of wood, provided for the establishment of protected zones (zones sous protection) and reserved zones (zones réservées) within the national forest estate. Further protection of forest resources was provided by Law No. 8 of the Rural Code (16 May 1962). The Rural Code of François Duvalier of 28 May 1962 strictly controls forest resources and activities in forest reserves (Woods and Harris, 1986).

A decree of 18 March 1968 declared as public domain certain areas considered to be national parks (parcs nationaux) and nature sites (sites naturels). Eight such sites were identified, all of which were small and of tourist or historic interest. A decree of 23 June 1983 provided for the continued protection of these eight sites as national nature parks (parcs nationaux naturels). The decree also provided for the creation of two, more extensive, sites (La Visite and Pic Macaya) for watershed conservation and the protection of endemic flora and fauna. The major responsibilities of the national parks programme are also listed under the 1983 Decree, under additional responsibilities of the Ministry of Natural Resources and Rural Development (Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural) (Woods and Harris, 1986).

Two pieces of legislation relate to the management of protected areas. A decree of 29 March 1979 appointed a self-governing body, the Institute for the Protection of the National Heritage (ISPAN), and an Order of 30 December 1987 defined the terms of reference of the forest rangers of the Haitian armed forces (Arrêté définissant les attributions des gardes forestiers des forces armées d'Haiti) (Anon., 1989).

A draft national conservation strategy was drawn up in April 1987. Among the recommendations formulated were the following: 1) creation of an independent government agency to be responsible for the planning and execution of conservation policies and programmes; 2) promulgation of more appropriate and adequate

conservation legislation; 3) preservation and protection of natural ecosystems; 4) protection of the endemic gene pool; 5) an increase in scientific research; 6) establishment of a conservation education programme; 7) integration of the national conservation strategy into the national development programme to assure its effective execution and to assure that development projects are environmentally sound; 8) watershed protection; 9) increase of forest reserves; and 10) development of national parks.

Unfortunately, just after the publication of the national conservation strategy, the Ministry of Plan, responsible for its production, was abolished, to be replaced by a Commissariat of Planning. Changes in personnel, priorities and the physical location of the planning organisation stopped any further development or execution of the NCS, which, although incomplete, was a very positive step towards a functional and integrated conservation policy (Paryski *et al.*, 1989).

**International Activities** Haiti signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Convención sobre la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América) (Western Hemisphere Convention) in 1940, and it has since been ratified. Haiti ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 18 January 1980, although to date no sites have been inscribed. The country does not participate in the Unesco Man and Biosphere (MAB) programme, nor has it acceded to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). At a regional level, Haiti is not party to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention), nor is it a member of the Caribbean Conservation Association, the regional organisation dedicated to promoting policies and practices which contribute to conservation, protection and the wise use of natural and cultural resources.

**Administration and Legislation** The government organisation responsible for the protection of forests, watersheds, the environment, coastal resources and natural resources is the Division of Natural Resources (DRN) of the Ministry of Agriculture (Ministère de l'Agriculture) (MARNDR) (Paryski *et al.*, 1989). Until recently, however, the Division has restricted its conservation efforts to regulating hunting and fishing, to small hillside terracing projects, and to very limited reforestation projects. Serious conservation activities have been limited by low budgets, overlapping institutional responsibilities, a lack of trained and motivated personnel, the lack of an agency fully responsible for conservation, and changing and



contradictory government priorities and policies (Paryski *et al.*, 1989).

In 1979 the Institute for the Protection of the National Heritage (Institut de Sauvegarde du Patrimoine National) (ISPAN) was founded to protect Haiti's natural and cultural heritage, and to develop a national parks programme with the assistance of US-AID. Responsibilities of the Institute include the inventory, classification, survey, protection, reclamation and development of sites, both natural and man-made, and archaeological and historical monuments. Funding was obtained from the US-AID mission for the establishment of two parks in the highest mountains in Haiti: La Visite and Pic Macaya (Paryski *et al.*, 1989). Included in this project was a biogeophysical survey of potential national park sites. The results were presented as a series of reports to US-AID in Haiti (Dod and Judd, 1986; Franz and Cordier, 1986; Gali and Schwartz, 1986; Judd, 1986; MacFadden, 1986; Thompson, 1986; Woods, 1986; Woods and Ottenwalder, 1986). Unfortunately, progress in making these parks functional has been slow. Some of the problems include: a) the decree creating the parks failed to assign final responsibility for the administration of the parks to a single government agency, resulting in a confusion between MARNE and ISPAN as to which group has the primary responsibility for national parks; b) lack of political will to address environmental problems and protect Haiti's natural heritage, partly caused by the country's continuing political instability; c) the parks project was taken over from ISPAN by INHACA, a highly political organisation created and supervised by ex-President Jean-Claude Duvalier's wife (after the departure of the Duvaliers, ISPAN regained control of the parks project, and as of April 1988 was the governmental agency responsible for national parks); deforestation of park sites was carried out not only by the peasants living in and around the parks, but by politically connected businessmen; e) ISPAN and MARNE have neither adequate and sufficiently trained staff nor sufficient budgets to effectively develop and protect the parks; f) in spite of this already inadequate funding, the United States government has withdrawn all its US-AID financial support of MARNE and ISPAN (after December 1987) because of political irregularities surrounding the presidential election in Haiti; g) and finally, a fire destroyed a significant part of the main MARNE building at Damien, with the loss of some important papers, maps, and documents that relate to the parks project (Paryski *et al.*, 1989).

In cooperation with ISPAN, DRN has drawn up lists of endangered species of plants and animals and of natural sites in need of protection. It is hoped that at least some of these sites can be made into national parks when adequate funding and personnel become available. US-AID has developed a US\$ 15 million project to assure the protection of the Massif de la Hotte watershed. The project also provides for the protection and appropriate agricultural development of the buffer zone

surrounding the park by working with selected non-governmental organisations such as ORE and UNICOR. It is hoped that Macaya Park and surrounding areas will be managed as a biosphere reserve. Perhaps the most difficult aspect of establishing parks is the complex problem of displacing extremely poor peasants from park sites and limiting their activities in and around the parks. The planting of communal forests next to park sites to provide lumber and fuelwood is being considered. DRN is fully participating in the national parks project by providing personnel, technical assistance, and on site services (Paryski *et al.*, 1989).

Parc Laviste and Parc Macaya are partially protected by park guards who are limited by a lack of legal and logistical support and a lack of adequate and appropriate training (P. Paryski, pers. comm., 1992). The creation of a corps of forest rangers, a specialised branch of the armed forces accountable to the Civil Defence, has been proposed, but not yet established. However the latest *de facto* government is discussing once again the creation of such a corps, which would be responsible for the surveillance of catchment basins, forests, national and communal parks and natural sites. More specifically, their terms of reference would be as follows: to ensure the enforcement of forest, water and park legislation through the recording of infringements and the search of offenders; to prevent unauthorised agricultural and forest exploitation; to seize illegally acquired forest products; to inspect the forests and parks under their charge. They operate in collaboration with the appropriate public authorities, and receive military and technical training (Anon., 1989).

Since 1983, Florida State Museum has worked with US-AID and ISPAN to complete inventories of the two national parks newly established in 1983, and to develop management plans for the areas. They have also made proposals for the development of the national park programme and its implementation. The results of this work are drawn together in the "Stewardship Plan" for Haiti's national parks. Included in this plan are proposals for the creation of a unified programme to administer all units of the national parks, to be known as "Parcs Haiti" (Woods and Harris, 1986).

A University of Florida Extension project, in collaboration with the Haitian government, is currently in operation, to establish a biosphere reserve in Pic Macaya National Park (P. Paryski, pers. comm., 1992). The project has four main activities: planning the management of the park and surrounding land as biosphere reserve; assisting the 1,750 inhabitants to increase agricultural production and their household income using ecologically appropriate means; rehabilitating critical zones; establishing a database on the history, management and fauna and flora of the region. The project is unique in Haiti, integrating biodiversity conservation with economic and community development (P. Paryski, pers. comm., 1992).

The University of Florida project was subject to considerable constraints: the extreme difficulty of access

to the work sites, the social and political disorders and strife, the degradation of rural infrastructures, the increasing decapitalisation of the peasant population, the lack of adequate supplies of goods and services in rural areas, changes in policy and strategies, and finally the major economic and political difficulties that have resulted from the 30 September 1991 coup d'état and its consequences. The project did, however, manage to protect the park which has remained largely intact, and rehabilitate and reforest very critical areas while simultaneously raising the household incomes of the peasants living in the Macaya area. The embargo applied by the OAS, and restrictions under Section 513 of the US Foreign Assistance Act, 1991 have not permitted an extension of US-AID financial assistance to the project (P. Paryski, pers. comm., 1992).

The World Bank has designed a US\$ 40 million environmental project that would provide financial and technical assistance to MARNDR to establish a functioning environmental protection service which would manage both Parc Lavisite and Parc Macaya. This project agreement was scheduled to be signed in October 1991, but did not take place because of the coup d'état; the project is currently suspended pending a resolution of the current political crisis (P. Paryski, pers. comm., 1992).

In July 1992 the *de facto* government announced a US\$ 30 million emergency programme which includes US\$ 3 million for environmental protection measures including the protection of Parc Lavisite and Parc Macaya (P. Paryski, pers. comm., 1992).

US-AID and UNDP have jointly financed a study and pilot project for the creation of a marine park at the "Arcadins", a coral reef system to the north-west of Port-au-Prince. US-AID has now suspended its assistance to the project (P. Paryski, pers. comm., 1992).

The UNDP has initiated a proactive environmental programme and a coordination committee for environmental and conservation programs of the various multi-lateral and bi-lateral donor organisations (P. Paryski, pers. comm., 1992).

The general public is now aware of the disastrous consequences of continuing and progressive environmental degradation, but, in general, this consciousness has yet to be translated into positive action either by private groups or the government. A new conservation lobby group, called the *Fédération des Amis de la Nature*, has been formed and is planning to fight to reforest the country.

In general, management of protected areas has not been effective. Although over the past five decades successive governments have passed legislation to protect the environment, these laws have been neither observed nor enforced generally. This lack of enforcement, the continuing political instability in Haiti and the pressures on the environment caused by the

overwhelming poverty of most of the population, have reduced the effectiveness of conservation activities (Paryski *et al.*, 1989).

**Systems Reviews** Haiti comprises the western one-third of the island of Hispaniola on the northern edge of the Caribbean basin. It is a mountainous country; over 80% of the terrain has slopes in excess of 25%, and a number of peaks are over 2,000m. The topography is extremely rugged, and dominated by three ranges that trend east-west. There is generally no shortage of water, but rivers have uneven flow (Paryski *et al.*, 1989).

Haiti is one of the most biologically significant countries of the West Indies. Hispaniola has an estimated 5,600 plant species, some of which are confined to Haiti. Approximately 36% are endemic to the island (Paryski *et al.*, 1989; SEA/DVS, 1986). No reliable data exist on the extent of the original forest cover. However, the estimated forest cover in the country as a whole was down to 7% in the 1950s, much of it described as a mixture of degraded hardwoods and a few pines. By 1978 the amount of virgin forest cover had declined to 2.4%, and to 1.5% in 1989. Forest exploitation began soon after Amerindians arrived on the island approximately 7,000 BP, but only accelerated in the 1700s following colonisation. Rapid population growth has led to serious land abuse, with extensive clearing of woodland for farming, timber and firewood, such that the country is now almost completely deforested. Remaining vegetation is similar to that of the neighbouring Dominican Republic. Only a few pines survive at higher altitudes and also small areas of mahogany, rosewood and cedar. The impact of charcoal production on mangrove areas has been particularly severe in places, and exploitation of wood resources is now increasing in the south-west (Paryski *et al.*, 1989). Coral reefs occur around the island, but are possibly the least well known in the Caribbean (UNEP/TUCN, 1988).

Kurlansky (1988) estimates that one-third of the land is seriously eroded. It is one of the most environmentally degraded countries in the world, faces serious economic and social problems, and is classified by many as an environmental disaster area. Coastal zones are the only ecosystems that have remained relatively untouched, due to the decline in tourism, and include spectacular coral reefs, extensive mangrove wetlands and large estuaries (Paryski *et al.*, 1989; UNEP/TUCN, 1988).

The protected areas system currently comprises ten national nature parks, which cover 9,795ha or 0.35% of the country. Eight of these areas were established as national parks or "sites naturels" in 1968, and are comparatively small. In 1983 they were redesignated as national nature parks, whilst at the same time two, much larger, national nature parks were gazetted. The impetus to create these two large areas, situated in the remote and still forested areas of the highest mountains, came from an attempt to protect the fragile watershed. Coral reefs



are not included in any of the national parks gazetted so far (UNEP/IUCN, 1988).

Alarmed at the degradation of the natural environment, a working group was established, the result of which was a report (Anon., 1988) stressing the urgent need for environmental action. The report includes recommendations concerning management of protected areas, such as the need for compensation to be paid to all people, both sedentary and nomadic, relocated outside these areas; and for all forms of exploitation of protected areas to be controlled.

The great biological potential of the mouth of the Rivière de l'Artibonite for the establishment of a reserve for manatee *Trichechus manatus* and birds is described by Rathbun *et al.* (1985). However, they do not consider establishment of a wildlife reserve to be feasible, due to the large number of fishermen. Paryski *et al.* (1989) propose several developmental measures to preserve the remaining biological diversity. Those that directly involve protected areas are: 1) establish communal forests to provide a renewable source of energy and animal habitat; 2) enforce existing environmental and conservation laws strictly, so that agricultural activities in certain extremely degraded areas can benefit from the presence of nearby conservation zones without further degrading these zones; 3) establish rural environmental education programmes, especially in areas near conservation zones. They further propose special conservation measures, including: 1) adoption of the IUCN World Conservation Strategy; 2) creation of an independent National Park Service with direct responsibility for the planning, creation and management of all national parks; and 3) management of all fragile areas, especially those surrounding national parks, as biosphere reserves. However, the authors recognise that attempts to improve the conservation situation will only succeed if efforts are coupled with improving the status of peasants living adjacent to the parks.

#### Addresses

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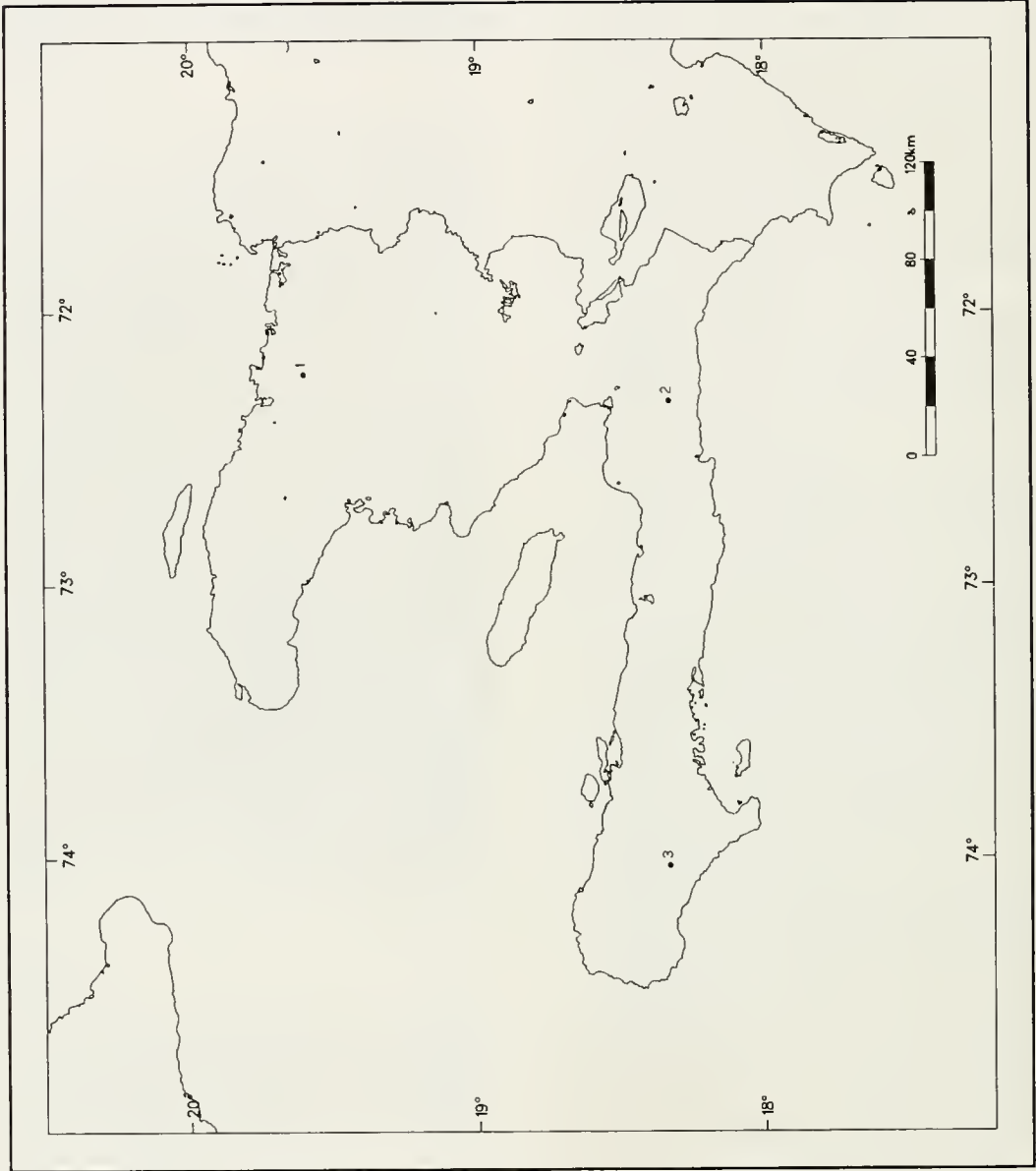
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## SUMMARY OF PROTECTED AREAS

Map ref.	<i>National/international designations</i> Name of area	IUCN management category	Area (ha)	Year notified
	<i>Natural National Parks</i>			
1	La Citadelle, Sans Souci, Ramiers	V	2,200	1968
2	La Visite	II	2,000	1983
3	Pic Macaya	II	5,500	1983





Protected Areas of Haiti

# JAMAICA

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Area 11,400 sq. km

Population 2,456,000 (1990)

Natural increase: 1.17% per annum

## Economic Indicators

GDP: US\$ 960 per capita (1987)

GNP: US\$ 1,186 per capita (1987)

**Policy and Legislation** The possession of Jamaica by England was confirmed in the Treaty of Madrid, 1670; self-government was introduced in 1944 and complete independence achieved within the Commonwealth on 6 August 1962. The Constitution dates from August 1962; the Crown is represented by a Governor-General appointed on the advice of the Prime Minister.

At present, no overall environmental policy is applied, nor is there a coordinated set of policies related to biodiversity conservation or the preservation of ecosystems and ecological processes. The forest policy, issued over 30 years ago, includes provisions for "Protection and development of the Islands' natural forest resources", but there is no policy for the establishment and management of a system of protected areas. In addition, some policies have a potentially negative impact upon forest ecosystems. These include the Idle Lands Declaration (under the Land Development and Utilisation Act), under which private lands, which have been set aside to protect natural vegetation, may be declared "idle"; in such case the owner has to "develop" them or be subject to compulsory acquisition by the government (Anon., 1989).

Interest in natural resource protection was initiated in 1904 with the enactment of the Morant and Pedro Cays Act controlling resource exploitation. This was followed by a series of pieces of legislation, such that by June 1991 there were 11 types of protected areas controlled by 10 acts, involving six agencies, several statutory bodies, and four ministries. This complex situation, with overlapping and conflicting responsibilities of agencies involved, has been one of the major impediments to the development of a workable system of protected areas. Legislation includes the Forest Act, Wildlife Protection Act, Beach Control Act, Town and Country Planning Act and Watershed Protection Act, Fisheries Industries Act and National Heritage Trust Act.

The Forest Act 1937 (see Annex), provides for the establishment of forest reserves where access and exploitation can be controlled (public recreational use is one purpose of such areas, in areas classed as "recreation parks"). Another category, protective area on private land, is also provided for under this Act. The Wildlife Protection Act 1945, provides for the establishment of wildlife or game sanctuaries and reserves; the Beach Control Law 63 1955 provides for the declaration of

marine areas or "parks" to control exploitation and development; the Town and Country Planning Act 1957 provides for "green area" conservation; the Watershed Protection Act 1963, provides for the control of land use within designated watersheds; the Fisheries Industries Act 1975, provides for the establishment of fish sanctuaries, and the Forest Act 1937. The National Heritage Trust Act 1985 provides for the declaration of protected national heritage sites and national monuments, of which a number of small cultural sites have been designated (NRCD and Field, 1987). The legislation, while providing for the establishment of a range of protected areas, does not specify the restrictions or use of sites adequately, nor does provision yet exist for the establishment of national parks, despite a need for such legislation having been recognised for many years. In 1984 a new model Forest Act was drafted, but this has not been enacted (Walters *et al.*, 1989). Under the Tropical Forest Action Plan (TFAP), a National Forestry Action Plan (NFAP) is being exercised, at the request of the Jamaican government (Anon., 1989, 1990a; Walters *et al.*, 1989).

The Natural Resources Conservation Authority Act of June 1991 established the Natural Resources Conservation Authority (NRCA) as the primary government agency with responsibility for environmental management in Jamaica (IRF, 1992).

The most recent review of the status of protected areas legislation is given in the interim report of the Protected Areas Resources Conservation (PARC) Programme. One of the aims of the programme is the development of national legislation in support of the establishment of national parks and protected areas. Five pieces of legislation have been prepared so far: three relating to the establishment of Montego Bay Marine Park and Blue Mountain/John Crow Mountain National Park; the Natural Resources Conservation Act (Marine Park) Regulations providing system-wide regulations for the establishment, management and operations of marine parks; and National Parks Legislation providing system-wide regulations for the establishment, management and operations of national parks (terrestrial)(IRF, 1992).

**International Activities** Jamaica is party to the Caribbean Conservation Association, a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources. Jamaica ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) (1983) and the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region on 24 January 1986. In 1986 the Regional Coordinating Unit of the UNEP Regional Seas

Programme was established on Jamaica. Jamaica is party to the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) which it ratified on 14 June 1983. No natural sites have yet been inscribed on the World Heritage list.

**Administration and Management** A provisional National Parks Committee was established in 1970 in the Forest Department, following a recommendation in the National Physical Plan (1970-1990). Activities of the Committee were to include identification of areas suitable for national parks and to initiate their development. In 1972 the Committee was moved to the Ministry of Mining and Natural Resources, and in 1975 was reformed as the national parks branch of the Natural Resources and Conservation Division (NRCD) of first the Ministry of Agriculture, and later the Ministry of Development, Planning and Production. The NRCD carried out extensive resource inventories during the mid-1970s. The ecological branch subsequently took the first steps towards protected areas establishment in 1979 with the help of the Organisation of American States. Surveys identified Canoe Valley as the NRCD's priority choice for Jamaica's first national park. However, in the 1980s, activities were focused on the Blue Mountain/John Crow Mountain proposed national park area and the Montego Bay proposed marine national park area (Allen, 1990). The provisions of the Watershed Protection Act, the Wildlife Protection Act and the Beach Control Act are the responsibility of the NRCD. The NRCD has since been replaced by the National Resources Conservation Authority (NRCA), a statutory body currently falling within the portfolio of the Ministry of Tourism and the Environment. This major change has greatly improved the climate for advancing the cause of national parks legislation (IRF, 1992).

The Forestry and Soil Conservation Department (FSCD), also within the Ministry of Agriculture, is responsible for administration of the Forest Act. Activities relevant to protected areas include forest protection and conservation, watershed management and responsibility for the development of Blue Mountain/John Crow Mountain National Park, identified under the PARC project. The Department has proposals for additional national parks, as identified in its annual reports (see Annual Report 1989-90). Expenditure in the financial year 1989/1990 included US\$ 4.89 million recurrent (forest administration and soil conservation) and US\$ 2.50 million capital (forestry, watershed management and conservation) (Anon., 1990b). The National Forestry Action Plan was accomplished during the financial year 1989/90 in preparation for the Tropical Forestry Action Plan in cooperation with FAO. The NFAP was implemented as a government-executed project, and the Planning Institute of Jamaica (PIOJ) was designated as the executing agency (Anon., 1990a).

The Fisheries Division has responsibility for provisions of both the Fishing Industry Act and the Morant and Pedro Cays Act.

In February 1986, the Ministry of Tourism established a Marine Parks Action Committee (MPAC) to investigate ways of implementing effective administration and management of marine parks already designated by legislation. The Committee's primary aim is to develop a funding proposal to manage Montego Bay Marine Park. Attention is also given to the need for improved legislation to protect, develop and manage proposed marine parks. The National Heritage Trust Act is administered by the Office of the Prime Minister.

On 28 August 1989, US-AID and the government of Jamaica signed a project agreement resulting in implementation of the Protected Areas Resources Conservation Project (PARC), designed to protect biological diversity and promote tourism. Phase I of the project, which terminated in August 1992, was designed to contribute to the establishment of an effective National Parks and Protected Areas System for Jamaica. Two sets of activities were involved: the immediate initiation of protected areas activities in two pilot areas (Blue Mountain/John Crow Mountain area and Montego Bay Marine Park), and building the policy, legal, financial and institutional foundation for a national system of protected areas. This includes establishment of a Conservation Data Centre (CDC) at the University of the West Indies, to provide planners and managers with a comprehensive base of scientific information. Commencing in 1990, the PARC project had an operational budget of US\$ 1.75 million for a three-year period. In the long run, however, the PARC project is designed to be self-sustaining. An interim assessment of the project was made in May 1992, which includes recommendations for inclusion in phase II of the programme (Allen, 1990; IRF, 1992).

Priorities for development of a parks and protected areas system, outlined by NRCD and Field (1987), emphasised the need to establish and develop an independent, non-profit National Parks and Protected Areas Trust. It was regarded that the establishment of the Trust would ensure enactment of parks and protected areas legislation, be instrumental in establishing the institutional framework, and also establish the process for selection of areas to be included in the system. As a consequence, the Jamaica Conservation and Development Trust (JCDDT), an NGO dedicated to the creation and financing of national parks, was formed in 1987. The trust is supported by both The Nature Conservancy and the Caribbean Conservation Association. The JCDDT has been identified by US-AID as a suitable non-governmental organisation capable of exerting leadership responsibilities under the PARC project, specifically: produce a Jamaican National Park System Plan; setting up a National Park Trust Fund and handle the details of a debt-for-nature swap engineered by The Nature Conservancy, with assistance from the US-AID and the Puerto Rico Conservation Trust (IRF, 1992). Other NGOs include the Natural History Society and the Gorse Bird Club (Allen, 1990).

Management of protected areas is hampered by inadequate legislation, and the general lack of enforcement. Staff shortages in relevant agencies are



acute. Allen (1990) reported that the NRCD had no enforcement branch. Fines following successful prosecution are minimal, being approximately US\$ 14 for violators of the Wildlife Protection Act, US\$ 6 for violators of the Beach Control Act, and US\$ 7 for violators of the Forest Act. Management constraints include cashflow problems at the Forest Department, which have reportedly led to a lack of trust and confidence amongst casual labourers and field staff (Anon., pers. comm., 1990).

**Systems Reviews** The landmass of Jamaica, which emerged from the ocean in the mid Miocene, has never been connected to any other land mass. The central spine of the island is mountainous, reaching 2,256m at Blue Mountain Peak. It is surrounded by a flatter coastal strip, which is narrow on the north. The southern coastal plains are broad, and include flat alluvial areas, swamps and dry hills. The land surface is two-thirds limestone, the rest is composed of igneous rocks, sedimentary shales and alluvium. Mean annual rainfall varies from less than 750mm to more than 7000mm per annum (Anon., 1989).

Jamaica was almost entirely forested before human settlement in the 1st century AD. Now, only the most remote and inaccessible forests may be considered relatively untouched. Most forests have been radically affected by clearing, fire and introduced species, the most acute effects having occurred in the last 350 years. By 1983, less than 67,000ha (6%) of the country was covered in undisturbed natural forest. Three broad groups of forest occur: limestone forests of the John Crow Mountains, central and western Jamaica, predominantly shale forests of the Blue Mountains and Port Royal Mountains, and alluvial and wetland forests of the coastal plains. The original lowland forest has been almost entirely replaced by plantations and artificial savannas (Anon., 1989). In addition, there are small areas of mangrove and herbaceous swamp (Braatz, 1982). The north coast is fringed by a narrow system of well-developed, spectacular and diverse reefs. Reef development on the south coast is not continuous but is more diverse than on the north coast (UNEP/IUCN, 1988).

There are an estimated 3,000 flowering plants, 784 (27%) of which are endemic. In addition, there are 5,500 species of fern (including 82 endemics) and 300 species of moss (Johnson, 1988). Twenty six species of endemic birds occur (more than any other oceanic island in the world), five endemic mammal species and 20 endemic amphibians (Anon., 1989).

The first protected areas, Morant and Pedro Cays established in 1904, were followed by Clydesdale and Hardware Gap Forest Reserves in 1937, in the Blue Mountains. Another 60 forest reserves were designated in the 1950s, the first in 1950 and the last in 1955. No recent information is available concerning the status of forest reserves, or about which areas of them are covered by natural forest or plantations, or leased for coffee, pines or occupied by squatters (Anon., 1989). The first

nature protection areas were Mason Wildlife Reserve, established in 1944, Ocho Rios Marine Park in 1966, followed by Bouge Estate Game reserve in 1963 and Kingston and St Andrew Game Reserve in 1971. The most recently established protected areas include Stanmore Hill Game Reserve in 1988, and the redesignated Montego Bay Marine Park in 1991 (originally set up in 1974). Blue Mountain/John Crow Mountain National Park is expected to be designated in the near future (C. Sutherland, pers. comm., 1991).

In 1990 there were 62 forest reserves totalling 116,781ha (74,392ha of natural forest); two marine parks totalling over 1,530ha, five-seven multiple use management areas (forest recreational parks areas); five game reserves totalling 336ha, two fish sanctuaries and 16 natural sites, caves or middens protected as natural monuments (C. Sutherland, pers. comm., 1991).

Numerous reports have been produced stressing the need for the development of an effective protected areas system. Six obstacles to the development of a park system are noted in Thorsell (1981): low level of public awareness and political support; lack of protected areas legislation; lack of comprehensive park system policy statement; need for definition of priority areas; restrictions of management capacity and limited involvement in international and regional conservation agency programmes. NRCD and Field (1987) list the major benefits of an effective national system of protected areas, and also identify a range of problems and issues affecting the establishment and management of protected areas. In particular, they list pressures through development of both industrial and agricultural nature, vegetation clearance, poor land use practices and uncontrolled use of resources, as typified in the Negril area. Thirteen areas which might qualify as national parks are listed in the profile. The profile also refers to two National Physical Plans. A wide range of parks, recreation and conservation areas was included in the National Physical Plan of 1970-1990, which stated the need for "an integrated regional system of a wide range of parks, recreational and conservation areas reflecting Jamaica's social needs and natural environment". The subsequent National Physical Plan (1978-1998) recommended that national parks be legally designated and priority areas selected for implementation. However, despite this the level of implementation is still low. Allen (1990), in a paper reviews these previous reports, and outlines the aims of the PARC project. Other relevant reports include: Braatz (1982), Clark (1987), Cotterell (1977), Mailer (1982, 1984), WWF (1982, 1985), and Worthington (1970).

In May 1992 an Evaluation Report of the PARC project was produced, providing a mid-term summary of progress made in the establishment of two parks, national park framework development, project management and institutions, and recommendations for future activities (IRF, 1992).



Although absence of adequate legislation has hindered protected area development, according to Allen (1990), the fundamental reason for the lack of environmental protection in Jamaica is rooted in its pervasive poverty.

**Other Relevant Information** In 1990, 1.24 million tourists arrived in Jamaica, spending about US\$ 700 million (Hunter, 1991). The seven forest recreation areas were visited by less than 10,000 people during the year 1989/90. The PARC project aims to increase visitor facilities and so encourage ecotourism (Allen, 1990).

#### Addresses

Natural Resources Conservation Division (NRCD),  
National Parks Branch, 53 1/2 Molyneux Road,  
PO Box 305, KINGSTON 10 (Tel: 809 923 5155)  
Fisheries Division, Ministry of Agriculture, Marcus  
Garvey Drive, PO Box 470, KINGSTON  
Department of Forestry and Soil Conservation,  
173 Constant Springs Road, KINGSTON 8  
UNEP Caribbean Environmental Programme Regional  
Coordinating Unit, 14-20 Port Royal Street, KINGSTON  
(Tel: 809 922 9267/9; FAX: 809 922 9297)  
Jamaica Conservation and Development Trust,  
46 Duke Street, PO Box 1225, KINGSTON 8  
(Tel: 809 924 9400/6; FAX: 809 924 9407)

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## ANNEX

Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration

## Title: Watershed Protection Act

Date: 1963

**Brief description:** Enabling legislation for the designation of watersheds**Administrative authority:** NRCD**Designations:****Watershed** Provides for the control of land use within designated watersheds (which cover more than 100,000ha).**Source:** Allen (1990)

## Title: The Wildlife Protection Act

Date: 1945

**Brief description:** Enabling legislation for the designation of wildlife/game sanctuary or reserves**Administrative authority:** NRCD**Designations:****Wildlife/game sanctuary or reserve****Source:** Allen (1990)

## Title: The Beach Control Law No. 63

Date: 1956

**Brief description:** Enabling legislation for the designation of marine parks**Administrative authority:** NRCD**Designations:****Marine park** To control exploitation and development affecting the area.**Source:** Allen (1990)

## Title: The Fisheries Industry Act

Date: 1975

**Brief description:** Enabling legislation for the designation of fish sanctuaries**Administrative authority:** Fisheries Division**Designations:****Fish sanctuary** To control fishing in designated areas. These parks may include mangrove swamps and other coastal wetlands.**Source:** Allen (1990)

## Title: Morant and Pedro Cays Act

Date: 1904

**Brief description:****Administrative authority:** Fisheries Division**Designations:**

Provides for control of access to cays and exploitation of their resources. However, enforcement of the provisions of the Act is difficult.

**Source:** Allen (1990)

## Title: Forest Act

Date: 1937

**Brief description:** Provides for the establishment of forest reserves and protective areas. Forestry reserves were established mainly to conserve the natural hardwood forests on upper mountain slopes vital for soil conservation and watershed protection.**Administrative authority:** Forestry and Soil Conservation Division**Designations:****Forest reserve** The Act originally provided for forest reserves on any Crown land on the island. It provides for the establishment of forest reserves where access and exploitation can be controlled. Public recreational use is one purpose of such areas. Due to land characteristics, a section or a number of sections within a single forest reserve may be set aside for conservation, while other areas on the same reserve may be used for commercial forestry.**Protective area on private land** Under Articles 10-15 the Minister may declare any lands other than

*Crown lands as a protective area.* Regulations prohibit cultivation, cattle pasture, fire or other activities preventing soil conservation. If an owner does not comply with the regulations, the government may assume control of the land on lease.

Source: Original legislation

**Title:** The National Heritage Trust Act

**Date:** 1985

**Brief description:** Provides for the declaration of protected natural heritage sites and natural monuments.

**Administrative authority:** Office of the Prime Minister

**Designations:**

*Protected national heritage site*

*Protected national monuments*

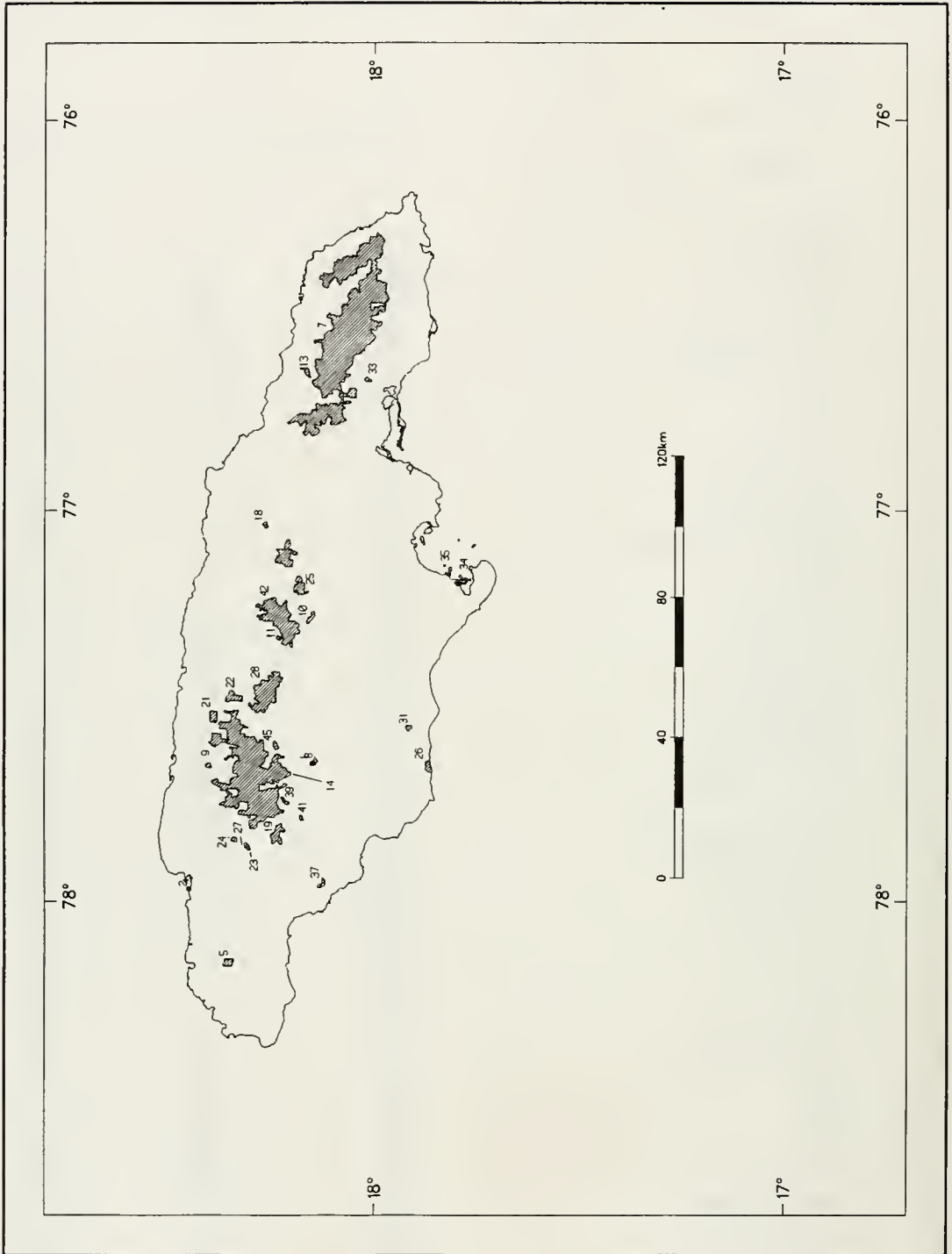
**Source:** NRCD and Field (1987); Smith, pers. comm. (1991)

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## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>Game Reserve</i> Bouge Estate	VIII	243	1963
2	<i>Marine Park</i> Montego Bay	II	1,530	1991
	<i>Forest Reserves</i>			
3	Ballintoy Block "A"	VIII	245	1950
4	Ballintoy Block "C"	VIII	440	1950
5	Bath Mt. Block "A"	VIII	121	1950
6	Baulk Pen Block "B"	VIII	107	1950
7	Blue Mountain Reserve	VIII	41,940	1950
8	Bogue	VIII	112	1955
9	Bottom Hamden	VIII	118	1950
10	Bull Head	VIII	220	1950
11	Cedar Valley	VIII	243	1950
12	Chatsworth Block "A"	VIII	314	1950
13	Chepstowe Reserve	VIII	150	1950
14	Cockpit Country	VIII	22,327	1950
15	Cockpit Country - Peru Mt.	VIII	270	1955
16	Cooks Bottom	VIII	197	1955
17	Discovery	VIII	149	1950
18	Fergis Ramsay	VIII	120	1950
19	Fyffe and Rankine	VIII	966	1950
20	Haycock Hill	VIII	147	1950
21	Hyde Block "C"	VIII	433	1950
22	Hyde Hall Mountain	VIII	662	1950
23	Jericho Block "A"	VIII	113	1950
24	Jericho Block "E"	VIII	138	1950
25	Kellits - Camperdown	VIII	1,498	1950
26	Lovers Leap	VIII	175	1950
27	Lychfield Matheson's Run	VIII	4,485	1950
28	Mt. Diablo Block "A"	VIII	853	1950
29	Mt. Diablo Block "B"	VIII	231	1950
30	Mt. Diablo Block "C"	VIII	261	1950
31	New Forest Reserve	VIII	161	1950
32	Norris Block "A"	VIII	115	1950
33	Orchard	VIII	142	1950
34	Peak Bay Block "A"	VIII	303	1950
35	Peak Bay Block "B"	VIII	153	1950
36	Pennants Forest Reserve	VIII	169	1950
37	Petersville	VIII	170	1950
38	Rockfort	VIII	733	1950
39	Ruthven	VIII	191	1950
40	Sealthshire Hills	VIII	4,856	1950
41	Shuna	VIII	458	1950
42	Stephney John's Vale	VIII	6,713	1950
43	Teak Pen Block "A"	VIII	533	1950
44	Teak Pen Block "B"	VIII	150	1950
45	Troy Block "A"	VIII	244	1955
46	Troy Block "B"	VIII	100	1955
47	Troy Block "C"	VIII	173	1955





Protected Areas of Jamaica

# MARTINIQUE

Area 1,100 sq. km

Population 341,000 (1990)

Natural increase: 0.6% per annum

## Economic Indicators

GDP: US\$ 7,879 (1987)

GNP: US\$ 9,200 (1992) (J. Nosel, pers. comm., 1992)

**Policy and Legislation** From 1635, Martinique was a French colony until its status changed to an overseas department of France on 19 March 1946. In 1974 it also became an administrative region. The territory is covered by French legislation, some of which is applicable specifically to Martinique. For a complete list of legislation concerning protected areas under French jurisdiction, see the country sheet for France (Volume 2).

Several pieces of legislation relate to Martinique's protected areas system. A law of 2 May 1930 provides for the protection of natural sites and monuments. Decree No. 67-158 of 1 March 1967 relates to regional natural parks (Décret relatif aux parc naturel régionaux) (see Annex). It is updated by Decree No. 75-983 of 24 October 1975, and Law No. 76/629 concerning nature protection (Loi no. 76/629 relative à la protection de la nature) (see Annex). This law provides definitions of nature reserves (réserves naturelles), and several decrees relate to its implementation (including nos. 77/1141; 77/1295; 77/1296; 77/1297; 77/1298; 77/1300) (see Annex). Decree No. 67-158 also stipulates the procedure to be followed for the classification of regional natural parks. This classification procedure includes presentation of a file including the name of the organisation responsible for the park's management, a map of the park limits, and details of provision of finance to enable park superstructure to be installed. Under a law of 10 July 1975 (decree of application 11 December 1975), the purchase of parts of the littoral zone for purposes of protection, especially from building, is provided for.

A further category of protected area, natural zone of ecological, faunal and floral interest (ZNIEFF) exists, but information concerning the legislation under which these are established is not available.

Martinique Regional Nature Park was established in 1976 following a French Decree of 24 October 1976 and subsequent Ministerial Act of 24 August 1976. The concept of regional natural parks was advanced in the early 1960s, to provide facilities for tourists, preserve traditional architecture and landscapes, and stimulate local enterprises and rural development. In Martinique Regional Natural Park, wildlife conservation is also of importance, and areas within the park are zoned to safeguard different land uses.

A law of 10 July 1975 (degree of application of 11 December 1975), provides for establishment of an administrative public centre, the building for conservation of the littoral space and of lake banks. The aim of the centre is the purchase of the littoral zone when it is of biological interest, to provide protection them from any kind of speculation, especially development.

**International Activities** Conventions to which France is a member, which are of relevance to Martinique, include the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region (both of which were ratified by France on 13 November 1985) and a second Protocol Concerning Specially Protected Areas and Wildlife, signed by France in 1991. Together, the Convention and associated protocols are known as the Cartagena Convention. Martinique is a member of the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources.

**Administration and Management** The French governmental body responsible for the establishment of parks and reserves (and setting hunting regulations) is the Direction de la Protection de la Nature, part of the Ministry of the Environment. Within Martinique, the Office Nationale des Forêts (ONF) is responsible for administration and management of all national and public forests, and part of the littoral zone (J. Nosel, pers. comm. 1992).

The regional nature park, which covers two-thirds of the island, is administered by a board composed of representatives of the municipalities, the region, and the department. The park has a separate budget from the ONF, and is under direct control of a Director, who supervises a staff, with widespread technical expertise, responsible for all management work. Caravelle Peninsula Reserve is maintained by the nature park authorities for its nature conservation interest and is protected by a local wardening system (J. Nosel, pers. comm. 1992).

There are several non-governmental conservation groups, including the Société pour l'Etude de la Protection et l'Aménagement de la Nature en Martinique, the Société des Amis du Parc, the Alliance Nature et Développement, and the Association pour Nature et Environnement. All these NGOs are included within the Union Régionale des Associations pour la Patrimoine et l'Environnement de la Martinique (J. Nosel, pers. comm. 1992).

**Systems Reviews** Martinique, one of the Lesser Antilles, is a mountainous volcanic island with lower lying areas to the south. The highest point, Mt Pelée, is an active volcano. The climate is tropical with a well-defined dry season from November to March. The island lies within the hurricane belt (Johnson, 1988).

Some 25% of the land area is still forested, but no natural rain forest is thought to remain, and heavy demographic pressure has led to general environmental degradation (Desjeux and Desjeux, 1984). In the centre and at low elevations there is secondary forest: at higher elevations, montane thicket, palm brake and elfin woodland. Recent figures for plant endemism are not available (Davis *et al.*, 1986). An early estimate (Stehle *et al.*, 1935-1939) of 4% is known to be an overestimate since many of the species have been found on neighbouring islands. 'Almost pristine', well-developed mangrove and seagrass beds occur on the coast in the south-east. Martinique has the second largest mangrove area in the Lesser Antilles at Fort-de-France Bay (2,200ha). Narrow fringing reefs occur around much of La Caravelle Nature Reserve on the east coast. Barrier reefs occur along the southern half of the east coast. Reefs also occur along the south, and in the Fort-de-France bay on the west coast (UNEP/IUCN, 1988).

The protected area system comprises principally Martinique Regional Natural Park, La Caravelle Nature Reserve, and several other, much smaller, reserves.

Portecop (1984) identifies a number of the problems facing conservation efforts, including deforestation, degradation of tourist attractions, and loss of wildlife through poorly controlled hunting and fishing. Marine resources, notably of lobster and Queen conch *Strombus gigas*, have been over exploited as a result of the tourist industry, and certain reefs are now under serious threat from siltation (UNEP/IUCN, 1988).

## Addresses

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97200 FORT-DE-FRANCE  
Siège du Parc, Tivoli, Ancien Collège Agricole, 97200  
FORT-DE-FRANCE  
Société d'Etude, de Protection et d'Aménagement de la  
Nature en Martinique, SEPANMAR, s/c Office du  
Tourisme, 97200 FORT196DE 6FRANCE

## References

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title: Décret No. 67-158 relatif aux parc naturel régionaux (Decree No. 67-158 relating to regional natural parks) and subsequent Decrees Nos. 75-983 and 88-443**

**Brief description:** Provides the criteria for the establishment and designation of regional natural parks. The 1975 Decree gave more responsibility to the regions concerning the designation of these areas, a move that was strengthened by the 1988 Decree which replaced it.

**Date:** 1 March 1967, 24 October 1975, 25 April 1988

**Administrative authority:** Separate administrative organisations are established for each park.

**Designations:**

*Parc naturel régional (Regional nature park)*  
An area may be classified as such if it is of particular interest due to its natural and cultural heritage, for reasons of leisure, recreation and tourism, or if it merits protection.

- The term 'parc naturel régional' is reserved for areas classified as such according to the terms provided in this decree.
- A territory with a fragile ecological balance and rich natural and cultural heritage.
- To be actively managed for the protection of the environment; to contribute to the social and economic development of the area; to encourage promotion of facilities for public recreation, education and information; and the performance of experiments and contribute to research programmes.
- Each park is governed by a Charter drawn up by common agreement between the regions and the interested local communities.

**Source:** Original legislation in French

**Title: Loi no. 76/629 relative à la protection de la Nature (Nature Conservation Act No. 76 629); and decrees relating to the implementation of this Act (including nos. 77/1141; 77/1295; 77/1296; 77/1297; 77/1298; 77/1300)**

**Date:** 10 July 1976

**Brief description:** A wide-ranging Act, covering the protection of natural areas and the countryside, the preservation of animal and plant species, and the maintenance of biological equilibrium through the protection of natural resources against all causes of degradation. This Act includes framework provisions for the definition, designation and establishment of nature reserves, voluntary nature reserves and biotope protection orders.

**Administrative authority:** Directorate for Nature Conservation

**Designations:**

*Réserve naturelle (Nature reserve)*

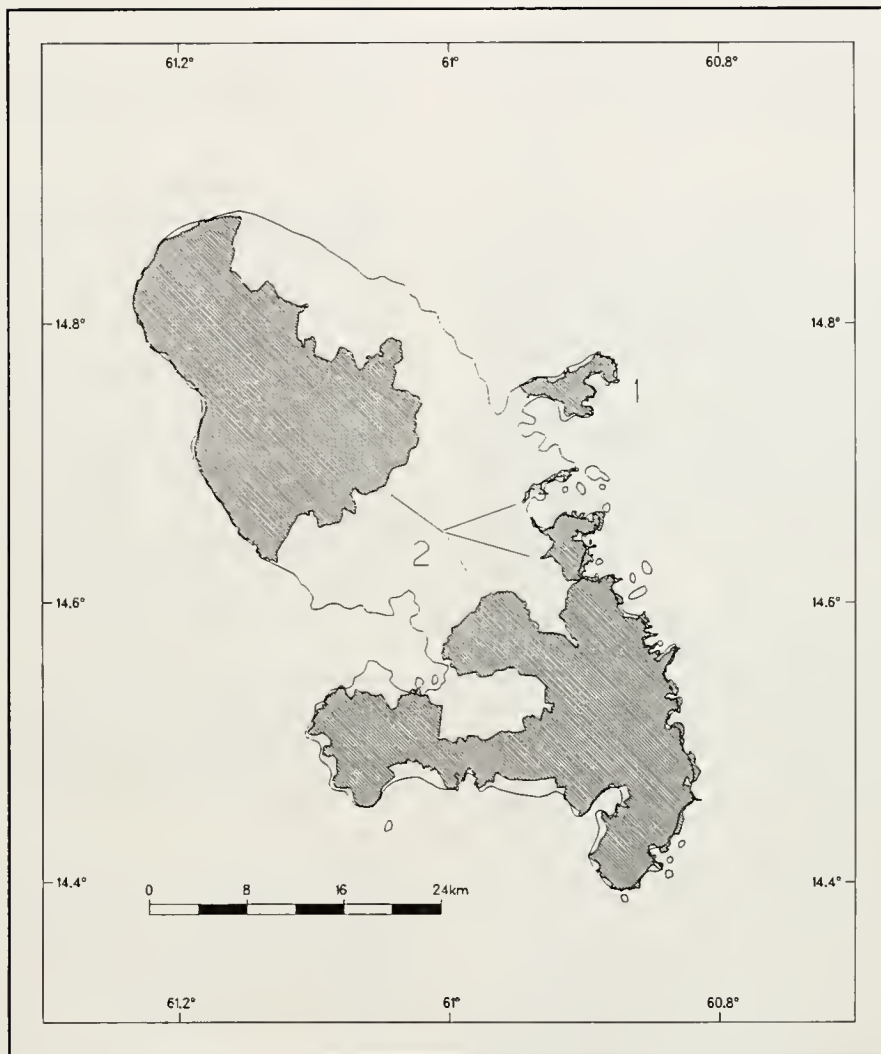
- Where the conservation of the fauna, flora, subsoil, water, mineral and fossil deposits and, in general, the natural surroundings is of particular importance, or which require the suspension of all artificial intervention that might lead to their degradation.
- Classification of sites may include areas of French territorial waters.
- Factors taken into consideration include: preservation of species and habitats; conservation of botanical gardens or arboretums; preservation of biotopes and formations of geological, geomorphological or speleological interest; preservation or creation of stop-over points on major migration routes; scientific or technical studies and sites of particular interest for the study of evolution.
- Established with the approval of the Ministry of the Environment under an agreement of a contractual nature. Subject to the owner's consent the decision to establish a reserve is issued in the form of a decree; if the owners object, publication is followed by a survey and the reserve is designated by a Council of State decree, setting out details of permitted activities.

**Source:** Original legislation in French



### SUMMARY OF PROTECTED AREAS

Map ref.	<i>National/international designations</i> Name of area	IUCN management category	Area (ha)	Year notified
1	<i>Nature Reserve</i> Caravelle		1517	1976
2	<i>Regional Nature Park</i> Martinique	V	70,150	1976



Protected Areas of France – Martinique



# MONTSERRAT (UNITED KINGDOM)

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Area 104 sq. km

Population 11,852 (1985)

Natural increase: No information

## Economic Indicators

GDP: US\$ 3,769 per capita (1987)

GNP: No information

**Policy and Legislation** Montserrat is a dependent territory of the United Kingdom. The island's constitution came into force in 1960 and has been amended in 1971 and 1975.

There is no substantive legislation for establishing and managing natural areas for either the conservation of fauna and flora or the declaration of terrestrial or marine parks (Butler, 1991). The Forestry Ordinance, 1956 gives the government power to declare private land to be protected forest, on lands susceptible to erosion, or important sources of water or timber. It is not known to what extent these provisions are enforced (Miller *et al.*, 1988). Administratively, forests above the 1,500 foot altitude line are considered to be protected, and the Ordinance has stringent powers to deal with land clearance. These powers have apparently not been invoked (Butler, 1991). In 1987 a draft Forestry and Wildlife Ordinance was prepared under the auspices of the FAO. This makes provision for the establishment of forest reserves, protected forests and conservation areas. The Ordinance is currently under final review.

Foxes Bay Bird Sanctuary, owned by the Montserrat Company, is on lease to the Montserrat National Trust and was a declared a protected wildlife area in 1979. A few other areas have also been set aside for conservation, land being vested with the National Trust or the tourism authorities.

**International Activities** Montserrat is included in the UK's ratification of the following international agreements; the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).

The UK Government ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) on 23 February 1986, and has signed the Protocol on Specially Protected Areas and Wildlife in 1991. Montserrat is not, however, included in the UK's ratification of the Cartagena Convention.

The Montserrat National Trust has been a member of the Caribbean Conservation Association since 1971. The government of Montserrat joined the Association in 1979.

**Administration and Management** The Forest Administration within the Ministry of Agriculture, Housing, Labour and Tourism, is responsible for administering provisions of the Forest Ordinance. According to Miller *et al.* (1988), low salaries, in comparison with the agricultural sector, were a cause of problems in recruiting competent personnel.

There is currently no governmental organisation with responsibilities for wildlife conservation, although the draft Forestry and Wildlife Ordinance makes provision for a single government department responsible for management and wildlife, the Forestry and Wildlife Division.

The 400-member Montserrat National Trust is the main body that promotes conservation. It was established in 1970 under the Montserrat National Trust Ordinance (1970) with which the government delegated its interest in the conservation of the island's cultural and natural heritage. Since its inception, the Trust has encouraged designation of sites for conservation, development of legislation, collection of information, and public awareness programmes. Core funding for the work of the Montserrat National Trust is provided by WWF-UK. At present funding from WWF provides office premises together with support for a national parks coordinator and secretary.

**Systems Reviews** Montserrat is a small volcanic island with two main areas of highland reaching altitudes greater than 740m. Much of the land surface is very rugged, with deep gorges, and the coastline is characterised by truncated spurs and hanging valleys. Rainfall is seasonal, and varies with altitude. On lands with rainfall of more than 1750mm per year, lower montane and montane rain forest represent the climax vegetation. The need to preserve forest areas in order to protect water supplies and maintain the visual appearance of the island has been repeatedly stated, for example by Corker (1986) and Oldfield (1987).

Margetson (1984) identified three major problems in conserving resources: low financial and technical input in resource use; deforestation and over exploitation of fish resources; and conflict between individual and national needs and conservation needs. An additional concern is the lack of a coordinated government policy on conservation.

Tourism potential is likely to feature strongly in the development of the island's economy. Increased demand for suitable land may result in areas of conservation value being threatened. For example, a planned resort development at Little Bay coincides with one of the most important sea turtle rookeries on the island. Positive aspects of tourism include the management of sites for ecotourism, with the production of brochures, placement of signs and improvement of trails.



In 1980 the CCA, through the Eastern Caribbean Natural Areas Management Programme (ECNAMP), assisted the Montserrat National Trust in preparing a proposal to establish a national park. Plans to create Montserrat National Park, that would include Soufriere Hills and Galway Estate (total 810ha), have existed since 1982. Sites within the area of the proposed park are already maintained by the National Trust, and the development of the national park remains an urgent necessity (Butler, 1991).

#### Addresses

Montserrat National Trust (Coordinator, National Parks), Parliament Street, PLYMOUTH (Tel: 809 491 3086)

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

#### Title: Forest Ordinance

Date: 1956

Brief description: No information

Administrative authority: No information

#### Designations:

**Protected Forest** To declare private land to be protected forest, on lands susceptible to erosion, or important sources of water or timber. Under the Ordinance, clearing of forest, cutting of timber or fuelwood and livestock grazing is illegal without the permission of the Forestry Board. It is not known to what extent these provisions are enforced.

# NETHERLANDS ANTILLES (NETHERLANDS)

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Area 800 sq. km

**Population** 192,866 (1988 estimate) (Hunter, 1991)  
Natural increase: 6% decrease per annum (1985-1989)  
(CBS Statistical Yearbook, 1990)

## **Economic indicators**

GDP: US\$ 4,519 per capita (1985) (CBS national accounts)  
GNP: US\$ 4,797 per capita (1985) (CBS national accounts)

**Policy and Legislation** Until 1 January 1986 the Netherlands Antilles consisted of six islands, Aruba, Curaçao, Bonaire, St Maarten, St Eustatius and Saba. From 1 January 1986, Aruba became an autonomous state within the Kingdom of the Netherlands, which now comprises The Netherlands, The Netherlands Antilles, and Aruba.

Protected areas legislation passed by the central government of the Netherlands Antilles (in Curaçao) has in the past provided the basis for measures in the dependent territories. Responsibility for the environment is now being devolved, which creates the need for each island government to develop its own legislation. Marine protected areas legislation was published in 1978, but never came into force (PB 1976, No. 157).

Bonaire Island government has passed several ordinances dealing with the conservation of marine resources. An island Ordinance (AB Bonaire 1967, No. 7) was published to establish terrestrial parks, but is not in force. In 1985 the Marine Environment Ordinance was passed which incorporates existing marine environmental legislation, and provides for comprehensive management regulation with regard to fisheries, coral reefs and the vulnerable Lac Lagoon. This Ordinance has been amended during 1992 to include user fees, licensing of tour operators and total ban on marine turtle catching (AB Bonaire, 1991 No. 8, 21, 22).

The existing marine conservation legislation in Curaçao is the Reef Management Ordinance, Curaçao (1976), No 48. This applies to all island waters and forms the basis for the establishment of Curaçao Underwater Park. The Ordinance prohibits spearfishing and the breaking of corals. The Ordinance also provides for the introduction of island resolutions to provide further protection. A draft Island Ordinance on Nature Reserves has been submitted to the Curaçao Island government, to provide a general framework for the designation of areas on land or underwater as parks or protected areas; this draft awaits discussion in the island council. A similar ordinance on marine reserves exists at central government level.

Saba Marine Park was designated by the island government on 25 June 1987, through the Marine Environment Ordinance (AB Saba 1987, No. 10) and its accompanying island resolutions. In addition to a zoning plan, overall park regulations exist in all zones of the park, prohibiting nearly all spear fishing, taking of coral, anchoring in coral and dumping waste. This Ordinance and its resolutions also provide for licensing of tour operators and a visitor fee system. The ordinance was amended in 1991, to introduce yachting fees and to raise the existing visitor fees.

**International Activities** The Kingdom of the Netherlands ratified the Convention for the Protection and Development of the Wider Caribbean Region (Cartagena Convention) on 24 March 1983 and the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region on 16 April 1984. On 28 January 1990 a second Protocol concerning Specially Protected Areas and Wildlife was signed; the ratification was made on behalf of the Netherlands Antilles and Aruba. The Kingdom of Holland also acceded to the Convention concerning the Protection of Wetlands Especially as Waterfowl Habitat (Ramsar Convention) on 23 May 1980, with the Netherlands Antilles listed on accession on the same date. Five sites in the Netherlands Antilles have been designated under the Convention. The Netherlands participates in the Unesco Man and the Biosphere Programme, although no biosphere reserves have been established within the Netherlands Antilles.

In 1981, STINAPA St Maarten published proposals for a protected area that would include both Dutch and French territory on this island (see Systems Reviews).

**Administration and Management** Administration and management of protected areas used to be the responsibility of a non-governmental organisation (NGO), the Netherlands Antilles National Parks Foundation (Stichting Nationale Parken Nederlandse Antilleaan (STINAPA)), with headquarters in Curaçao and established in 1963. The aim of the organisation is to promote nature conservation through acquisition of land, establishment of parks, and education. Due to decentralisation of responsibility for the environment, today all islands of the Netherlands Antilles have their own independent conservation NGO. In Bonaire this is STINAPA Bonaire; in Saba, the Saba Conservation Foundation; in St Maarten, STINAPA St Maarten; and in St Eustatius, STINAPA Statia.

The establishment of terrestrial and underwater parks in Bonaire, Curaçao and Saba has been made possible by funding from WWF-Netherlands, the Prince Bernhard Fund, the Netherlands government and the island governments. Terrestrial parks in Bonaire and Curaçao have a well-established management structure. The



underwater parks are managed both by implementation of effective legislation and by preventing accidental damage to the reefs. They are patrolled by staff members who have some law enforcement authority. Of particular concern is spear fishing which, if unchecked, would severely reduce the population of larger fish. Mooring buoys are provided to minimise damage to the reef in protected areas.

Management of underwater parks aims both to maintain their biological value, and to permit the development of their economic potential (fisheries and recreation) on a sustainable basis. Research needs are determined in cooperation with the Caribbean Marine Biological Institute (CARMABI) and other research institutions. The park staff primarily address aspects of park management that require relatively quick answers, while the CARMABI focuses on more fundamental studies that provide baseline data for reef management. Scientific backing for the establishment of marine protected areas has come from CARMABI. The Institute has been engaged in coral reef research since 1957, and a research programme on coral reef management has been conducted by the Institute since 1971. Most work has been done on Curaçao.

**Systems reviews** The Netherlands Antilles comprises two groups of islands. Bonaire and Curaçao are referred to as the "Leeward Islands", although they lie geographically within the Windward Islands of the Lesser Antilles. St Maarten, St Eustatius and Saba, which lie 900km north of the Leeward group are referred to as the "Windward" group, although geographically they lie within the Leeward Islands. The island of St Maarten is divided territorially between the Netherlands and France.

The reefs off the south-west coasts of Bonaire and Curaçao generally have a common profile. The main features are a submarine terrace extending 50-100m from the coast to a 8-12m deep dropoff and a steep slope from the drop-off to a depth of 50-60m. The most prolific coral growth is found over this terrace and slope, although individual corals penetrate deeper and are found on a second drop-off at 80m, which is separated from the steep slope by a sediment-covered terrace. St Eustatius is on a relatively shallow bank with St Kitts and Nevis, and has an inactive volcano at the southern end. Much of the shoreline is rocky and steep with few sandy beaches. Saba is also an inactive volcano and rises steeply to the 870m peak of Mt Scenery, with a nearly continuous steeply sloping, eroding shore. Depths exceeding 500m are found within 1km of the shore, yet approximately 2km from the shore two sea mounts rise to a depth of only 30m. There are few sheltered bays around the rocky coastline and no permanent beaches. There are no wetlands on Saba or St Eustatius, but St Maarten has a few large saline lagoons (Scott and Carbonell, 1986). A coral reef survey was carried out in 1989 (Van 't Hof, 1989).

Tourism is being developed among the islands and is an increasingly important source of revenue, diving tourism in particular enjoying strong growth. The attraction of the coral reefs depends on their unspoilt nature; consequently, if the diving industry is to develop, the quality of the reefs must be sustained. This need to maintain natural resources is reflected in an increase in active reef management. A brief survey of the Saba coast was carried out in 1984 to provide information on which to plan the establishment of the marine park (Van 't Hof, 1985). There are 35 dive sites on Saba, which are now within Saba Marine Park, intended to preserve the coast while allowing sustainable use of its resources. On St Maarten, the most populated island, rapid tourism development is taking place, and three SCUBA operators take divers out to dive sites along the southeast coast of the island (J. Sybesma, pers. comm., 1991).

In 1981, STINAPA St Maarten published proposals for a protected area that would include both Dutch and French territory. The recommendation emphasises protection of natural beauty of the French side (Les Deux Frères) and protection of the cultural heritage on the Dutch side (Belvedere). The recommendation suggests that the Parc Naturel de Guadeloupe or any French foundation should own the French part and that STINAPA should own the Dutch part. Administration would be by one bi-national management committee with two sub-committees (Kristensen and Vliegen, 1981). Funding was secured during 1991 for the establishment of a land park in the Belvedere area (J. Sybesma, pers. comm., 1991).

Backhuis (1984) identified lack of regulation on ground water management as a problem facing conservation on Curaçao, loss of land to industry and urbanisation, and loss of wildlife on all islands. Lack of development planning for tourism, agriculture and industry are also the main threats to natural areas and wetlands identified by de Boer (1986). A draft Island Development plan is under review (1992) and hopefully will be passed in the near future.

#### Addresses

Caribbean Marine Biological Institute (CARAMBI),  
PO Box 2090, WILLEMSTAD, Curaçao  
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Netherlands Antilles National Parks Foundation  
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Saba Conservation Foundation, c/o Administration  
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STINAPA Bonaire, PO Box 368, Bonaire Saba  
Conservation Foundation, The Bottom, Saba

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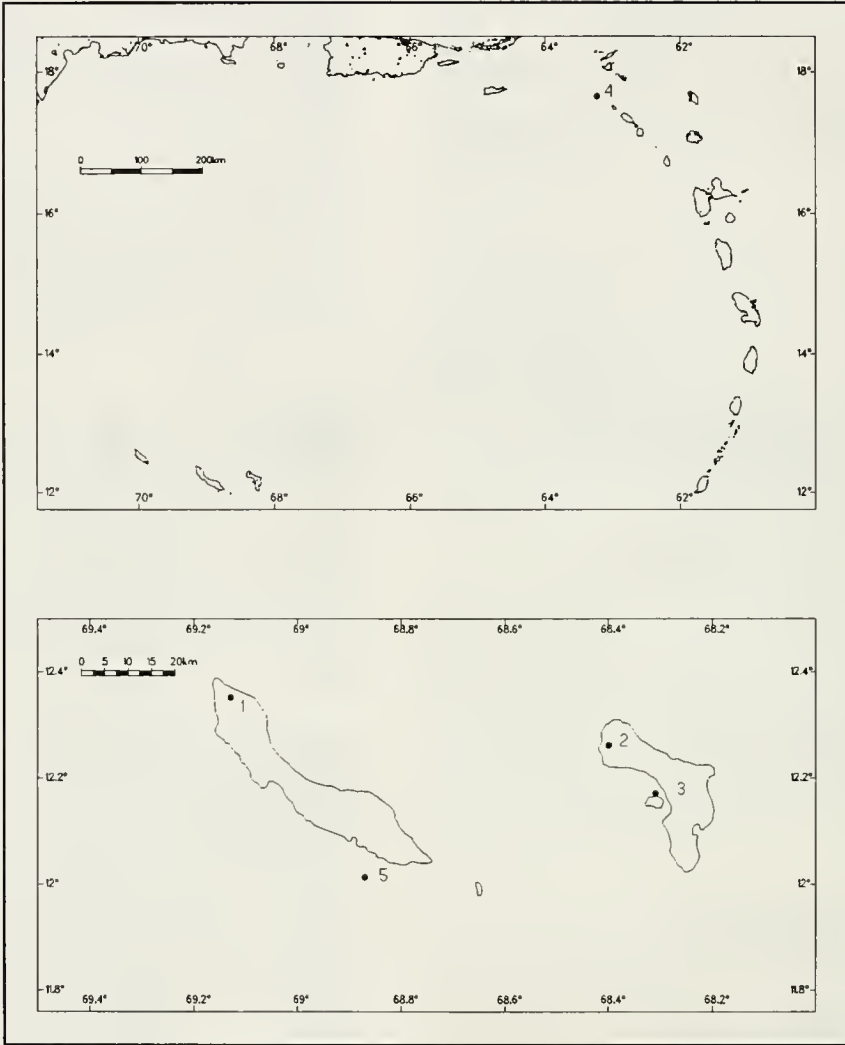
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## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>National Parks</i>			
1	Christoffel (Curacao)	II	1,860	1978
2	Washington-Slagbaai (Bonaire)	II	5,900	1969
	<i>Marine Parks</i>			
3	Bonaire	VIII	6,000	1979
4	Saba	VIII	1,000	1987
	<i>Underwater Park</i>			
5	Curacao	VIII	1,036	1983
	<i>Ramsar Wetlands</i>			
	Slaagbaai	R	90	1980
	Gotomeer	R	150	1980
	Lac	R	700	1980
	Pekelmeer	R	400	1980
	Klein Bonaire Island	R	600	1980

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Protected Areas of the Netherlands Antilles

# PUERTO RICO

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**Area** 8,897 sq. km

**Population** 3,480,000 (1990)

Natural increase: 1.00% per annum

## **Economic Indicators**

GDP: US\$ 6,856 per capita (1987)

GNP: No information

**Policy and Legislation** Puerto Rico is a self-governing commonwealth in free association with the United States of America, and laws and regulations enacted by both US federal and Puerto Rican (commonwealth) legislatures apply. While the United States has a wide range of legislative measures dealing with the protection of sites, no national parks, monuments or marine sanctuaries have been established in Puerto Rico. Only three categories of protected area have been created under US federal legislation in Puerto Rico: national wildlife refuge, national forest, and national estuarine research reserve. The only designation which comes under the jurisdiction of the US National Park System is San Juan Historic Site, established under the 1935 Historic Sites Act.

National forests are established under the authority of the Creative Act or Forest Reserve Act, 1891, which authorises the President to withdraw portions of the public domain for designation. Several later acts clarify the management and objectives of the reserves, including the Organic Administration Act, 1897, which defines areas as being for the protection of water flow and the provision of a continuous supply of timber; and the McSweeney-McNary Act, 1928, which established research as a major function of the Forest Service. The Multiple Use-Sustained Yield Act, 1960 recognised the range of uses to which forest lands could be put, and areas of natural forest can be designated under the Wilderness Act, 1964.

The Coastal Zone Management Act, 1972 makes provision for the creation of a national system of estuarine research reserves representative of the various biogeographical regions and estuarine types in the United States, called the National Estuarine Research Reserve System. Areas are designated by the National Oceanic and Atmospheric Administration (NOAA).

Provision for the establishment of national marine sanctuaries is made under the Marine Protection, Research and Sanctuaries Act, 1972. The Act authorises the Secretary of Commerce to designate ocean and coastal waters as national marine sanctuaries for the purpose of preserving or restoring their conservation, recreational, ecological or aesthetic value. Designation under the Act has the advantage of protecting a discrete ecosystem, as opposed to individual natural resources and species under several different laws. The sanctuary designation process was significantly amended in 1984

to increase the emphasis on sustainable multiple use and planning. The designation process begins when NOAA selects an area from its own site evaluation list to be an active candidate. Only after the drafting of management plans, two environmental impact statements and a public hearing can the area be designated.

Puerto Rican laws make provision for the designation of commonwealth forests, wildlife refuges and natural reserves. The Forestry Law (*Ley de Bosques*) No. 133, 1975 makes provision for protection and administration of forests. Wildlife habitats can be protected under the Department of Natural Resources (*Departamento de Recursos Naturales*) (DRN) Organic Law, as amended, and the Wildlife Law (*Ley de Vida Silvestre*) No. 23, 1972, under which two wildlife refuges have been declared. Natural reserves are designated by the Puerto Rico Planning Board and the DRN, under the Puerto Rico Coastal Zone Management Plan.

The Department of Natural Resources conducted a review of endangered species of flora and fauna as part of the Natural Heritage Programme (*Programa de Patrimonio Natural*), initiated in 1983. The study identified the areas most important to their survival, and as a result, a Regulation on Threatened and Endangered Species, taking its authority from the Wildlife Law, was developed. This regulation sets out procedures for protecting species and their habitats, and lists species and critical habitat in the appendices. Section 5 of the Regulation gives the Secretary authority to designate areas as critical habitats, and 12 areas providing habitat for 7 species have so far been designated (DRN, 1985). Wildlife is also protected under federal legislation, namely the Endangered Species Act (Scott and Carbonell, 1986).

The Natural Heritage Act (*Ley del Programa de Patrimonio Natural*), 1988 makes provision for the creation of a natural heritage programme within the DRN, with funds to acquire, restore and manage areas of natural value identified by the programme. The aim of this programme is to augment conservation efforts currently in effect by facilitating the acquisition of land, and increasing cooperation between governmental and nongovernmental conservation organisations.

**International Activities** Puerto Rico joined the Caribbean Conservation Association (CCA), a regional, nongovernmental, nonprofit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources, in 1984.

The United States has ratified the following international conventions on behalf of Puerto Rico: the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), and the Convention of Wetlands of International Importance

especially as Waterfowl Habitat (Ramsar Convention) but no sites have been listed under either convention. Through the United States, Puerto Rico also participates in the Unesco Man and Biosphere Programme and has two sites listed.

**Administration and Management** Four US federal agencies and three Puerto Rican agencies, as well as private conservation organisations, have a role in protected areas administration.

The US National Park Service (USNPS), part of the US Department of the Interior, is responsible for administration and management of the national park system. However, no natural sites in Puerto Rico have been assigned the national park designation, and the NPS has responsibility for only one site, San Juan Historic Site (H. Díaz-Soltero, pers. comm., 1988).

The US Fish and Wildlife Service (USFWS), a federal agency within the US Department of the Interior, is responsible for managing national wildlife refuges in Puerto Rico (Díaz-Soltero, pers. comm., 1988). These form the major direct habitat preservation effort of the Service, and there are four established refuges. The FWS is also responsible for the implementation of the Endangered Species Act and the protection of wetlands (S.R. Silander, pers. comm., 1991).

National wildlife refuges can be established under an Act of Congress, but can also be transferred to the authority of the FWS by administrative action, such as transfer of land from another agency (federal or state), or by receipt of a gift of land (from a state or unit of local government, a private organisation or an individual). While management objectives may vary considerably from site to site, refuges are established essentially for the restoration, preservation and management of wildlife habitat, and for the preservation of threatened and endangered species.

The US Forest Service (USFS), which is a part of the US Department of Agriculture (USDA), is responsible for national forests and wilderness areas. In Puerto Rico the USFS is responsible for the management of Caribbean National Forest, or Luquillo Experimental Forest (H. Díaz-Soltero, pers. comm., 1988).

The National Oceanic and Atmospheric Administration (NOAA), which is a part of the US Department of Commerce, is responsible for administering the National Estuarine Reserve Research System (NERRS), through the Marine and Estuarine Sanctuaries Division of the Office of Ocean and Coastal Resource Management (OCRM), Sanctuary's Program Division. Jobos Bay NERR is administered by the Puerto Rico DRN and a management plan was prepared in 1983.

There are three Puerto Rican agencies with responsibility for natural resources: the Department of Natural Resources (Departamento de Recursos Naturales) (DRN), the Planning Board and the Environmental Quality Board (EQB). The DRN is the

governmental organisation responsible for nature conservation, and administers various state and federal laws affecting wildlife and its habitats. The 14 commonwealth forest reserves (bosques estatales) are administered by the Puerto Rican Forest Service, which is a part of the DRN. The wildlife refuges (refugios de vida silvestre) and natural reserves (reservas naturales) are managed by the Division of Sanctuaries and Natural Reserves, which is within the Area of Forests, Sanctuaries, and Natural Reserves of the DRN.

The Puerto Rican Planning Board, working with the DRN, is able to recognise recreational and natural resource values of areas, within the planning process. There are, for example, special planning areas designated in the Puerto Rico Coastal Management Plan.

Several non-governmental organisations (NGOs) work in conservation and promote protected areas, including the Puerto Rico Conservation Foundation (Fundación Puertorriqueña de Conservación), and the Conservation Trust of Puerto Rico (A.M. Vera, pers. comm., 1992). The Nature Conservancy, Conservation International and the Puerto Rico Conservation Foundation provide support to establish the conservation data centre of the Natural Heritage Programme of Puerto Rico (Programa de Patrimonio Natural de Puerto Rico) (A.M. Vera, pers. comm., 1992). This centre has produced a number of reports of direct value in conserving the flora and fauna of the island, and has enabled increased input to environmental impact assessment by the department. The information managed by the centre has also allowed reviews to be made of the protected areas system (Figueroa Colón *et al.*, 1984).

The Natural Heritage Programme, established in 1988, encourages coordination between governmental institutes and NGOs in order to improve protected area selection and management. As part of this programme, a Consultative Council (Consejo Consultivo) was created to assess the activities of the DRN, ensuring cooperation with NGOs and compliance with the objectives of the programme.

**Systems Reviews** Puerto Rico is a small and fairly mountainous island, with 80% of all level land situated in the coastal plain, where overpopulation and development results. Following the classification system formulated by Holdridge (1967), six life zones occur, ranging from dry forest at sea level to rain forest and wet montane forest (Ewel and Whitmore, 1973).

The dominant life zone is subtropical moist forest, covering over 58% of total land area, characterised by annual rainfall of 1100mm to 2220mm and temperatures between 18°C and 24°C. This zone is located in the central mountain region and along the coast (Ewel and Whitmore, 1973). Much of this region has been deforested. Grasses now form the predominant vegetation type, and farming is extensive.



The subtropical wet forest zone occupies much of the higher parts of mountains with a high annual rainfall of 2000mm to 4000mm. Characteristic vegetation types are epiphytic ferns, bromeliads and orchids. Much of this zone is covered by coffee plantations, particularly in the western region of the island, and some sugar cane has also been grown here. The zone is very important as a source of runoff, supplying water to the drier coastal areas where the majority of the population is located (Ewel and Whitmore, 1973).

There are two lower montane life zones, subtropical lower montane wet forest and subtropical lower montane rain forest. The former is the most extensive of the two, covering the eastern and central parts of the island up to the summits of most mountains above 1,000m, and is characterised by three types of vegetation: mature, open canopy colorado forest; cloud forest comprising dwarf trees and mosses; and palm brakes consisting of pure stands of a single palm species. This zone is too fragile for any commercial forestry or agriculture, although some dairy cattle are grazed. The latter, subtropical lower montane rain forest zone, is the smallest area of all the zones, and accounts for only 0.1% of total land area. It is located in a single band on the leeward side of the Luquillo Mountains, entirely within Luquillo Experimental Forest. The vegetation is very similar to that of the subtropical lower montane wet forest zone but with a greater abundance of epiphytes.

Immediately below these two zones is the subtropical rain forest zone, also occurring only in a single band and characterised by heavy rainfall. Located in the alluvial coastal areas is the subtropical dry forest zone, the driest on the island with average annual rainfall of 600mm to 1000mm. The vegetation tends to form complete ground cover and is almost entirely deciduous (Ewel and Whitmore, 1973).

Since the arrival of European colonists, 90% of Puerto Rico has been deforested, and almost all remaining forests are intensively disturbed. Much of the present tree cover is in the form of coffee plantations and secondary forest. The area covered by secondary forest has indeed increased more recently to about 40%, with the decline of the sugar cane industry (Brash, 1987). Only 0.2% of the original forests now remain, largely in Luquillo Experimental Forest and Guánica Commonwealth Forest (Wiley, 1985).

The first reserve to be established was Caribbean National Forest, also known as Luquillo Experimental Forest, from land that previously belonged to the Spanish Crown in 1907 (Little and Woodbury, 1980). By 1980, a system of 14 commonwealth forests was well distributed across the island, covering 24,000ha ranging from mangrove forest in coastal regions to high alpine forest at the peaks of the Luquillo Mountains (Little and Woodbury, 1980).

In the United States, estuarine research reserves collectively form the National Estuarine Reserve Research System (NERRS), which is a nationwide network of reserves established in various representative

biogeographic regions and estuarine types across the country, and includes the Commonwealth of Puerto Rico. They are to provide longterm education and research opportunities (NOAA, 1987). In 1987, the system comprised 16 sites, with one in Puerto Rico, Jobs National Estuarine Research Reserve, established through US federal-Puerto Rican cooperation. No marine sanctuaries have been established in Puerto Rico; the proposed La Parguera NMS was not implemented. There are no candidate national marine sanctuaries, but Cordillera Reefs remains on the (1983) NMS site evaluation list (Foster and Archer, 1988).

Further details on the extent of coverage of protected areas, and the degree of protection afforded to the major ecosystems, are required.

#### Addresses

- Caribbean Field Office, US Fish and Wildlife Service, PO Box 491, BOQUERON, Puerto Rico 00622 (Tel: 809 851 7297; FAX: 809 851 7440)
- Caribbean Islands National Wildlife Refuges, US Fish and Wildlife Service, PO Box 510, BOQUERON, Puerto Rico 00622
- Caribbean National Forest, Forest Service, US Department of Agriculture, PO Box 25000, RIO PIEDRAS, Puerto Rico 00928
- Departamento de Recursos Naturales, (DRN), Programa de Patrimonio Natural, PO Box 5887, PUERTA DE TIERRA, Puerto Rico 00906 (Tel: 809 723 1464/3090; FAX: 809 722 2785)
- Institute of Tropical Forestry, Forest Service US Department of Agriculture, PO Box 25000, RIO PIEDRAS, Puerto Rico 00928
- Marine and Estuarine Sanctuaries Division, Office of Ocean and Coastal Resources, NOAA, 1825 Connecticut Avenue NW, Suite 714, WASHINGTON DC 20235
- National Park Service, PO Box 712, OLD SAN JUAN, Puerto Rico 00902
- Conservation Trust of Puerto Rico, PO Box 4747, SAN JUAN, Puerto Rico 00905
- Fundación Puertorriqueña de Conservación, Calle O'Neill #11, HATO REY, Puerto Rico 00918 (Tel. 809 7639875; FAX: 809 7639895)

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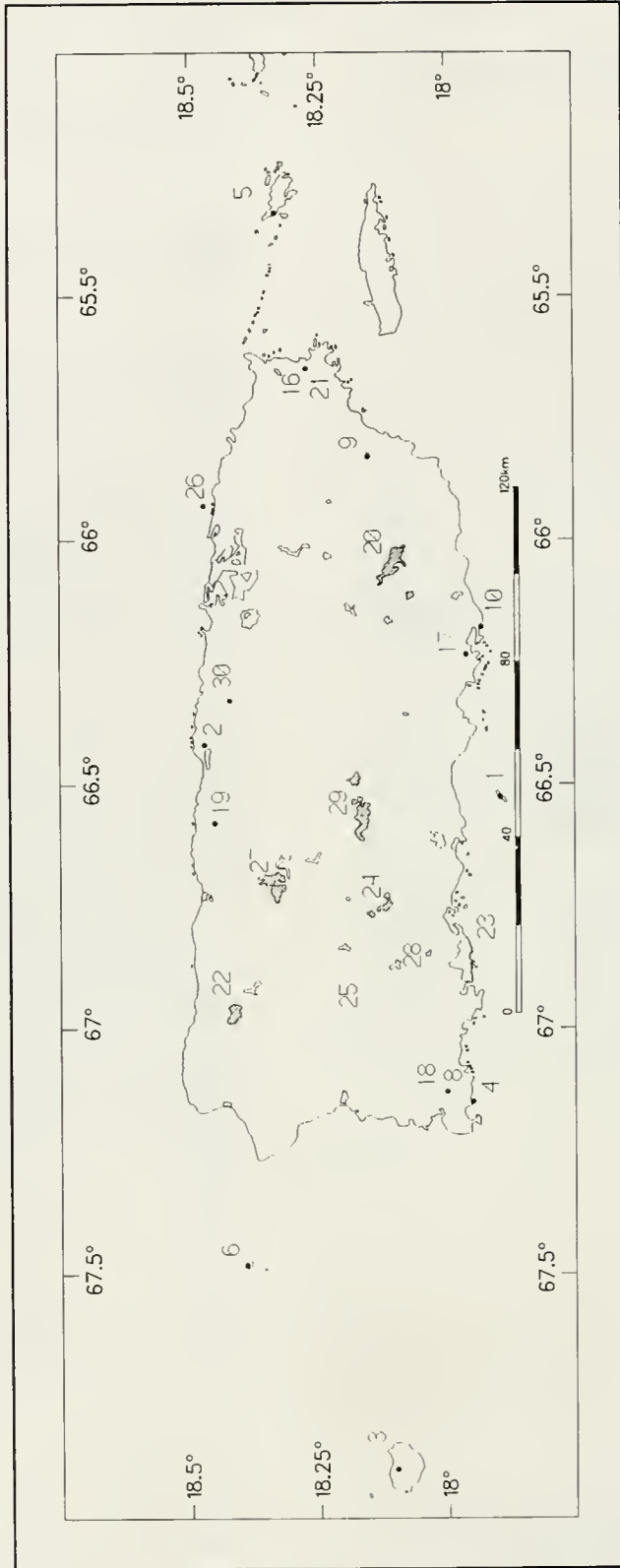
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## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Natural Reserves</i>			
1	Caja de Muertos	IV	188	
2	Laguna Tortuguero	IV	1,000	
3	Mona	IV	5,554	
	<i>National Wildlife Refuges</i>			
4	Cabo Rojo	IV	238	1974
5	Culebra	IV	633	1909
6	Desecheo	IV	146	1968
7	Laguna Cartagena	IV	324	1989
	<i>Wildlife Refuges</i>			
8	Boquerón	IV	237	
9	Humacao	IV	1,026	1984
	<i>National Estuarine Research Reserve</i>			
10	Jobas Bay	IV	1,371	1981
	<i>Natural Areas</i>			
11	Cabezas de San Juan	IV	128	1975
12	Cañón de San Cristóbal	IV	332	1974
13	Hacienda La Esperanza	IV	922	1975
14	Laguna Guaniquilla	IV	157	
15	Lands adjacent to the Bioluminescent Bay	IV	131	
	<i>National Forest</i>			
16	Caribbean/Luquillo Experimental Forest	VIII	11,340	
	<i>Commonwealth Forests</i>			
17	Aguirre	IV	936	1918
18	Boquerón	IV	803	1918
19	Cambalache	IV	374	1951
20	Carite	IV	2,695	1936
21	Ceiba	IV	143	1918
22	Guajataca	IV	927	
23	Guánica	IV	4,006	1919
24	Guilarte	IV	1,457	1935
25	Maricao	IV	4,149	1919
26	Piñones	IV	630	1918
27	Río Abajo	IV	2,275	
28	Susúa	IV	1,315	1935
29	Toro Negro	IV	2,733	1934
30	Vega	IV	448	1951
	<i>Biosphere Reserves</i>			
	Guánica Commonwealth Forest Reserve	IX	4,006	1981
	Luquillo Experimental Forest (Caribbean National Forest)	IX	11,340	1976



Protected Areas of Puerto Rico

# ST KITTS AND NEVIS

Area 261 sq. km

Population 43,410 (1987) (Hunter, 1991)

Natural increase: No information

## Economic Indicators

GDP: No information

GNP: US\$ 2,770 (Hunter, 1991)

**Policy and Legislation** The National Conservation and Environment Protection Act No. 5 (NCEPA), 1987 provides for management and development of natural and historic resources, establishment of protected areas to help conserve these resources, and the establishment of a Conservation Commission. Any protected area designated under this Act has the following broad purposes and objectives: to preserve the biological diversity of wild flora and fauna species that may be endemic, threatened, or of special concern, and the land and marine habitats upon which the survival of these species depends; to protect selected examples of representative or unique biological communities, both on land and in marine areas, and their physical environments; to sustain natural areas important for protection and maintenance of life support systems, and basic ecological processes including water recharge and soil regeneration; and to protect selected natural sites of scenic beauty or of special scientific, ecological, historical or educational value, including sites that are already degraded and need protection for restoration or sites that may become degraded if not protected. Part II of the Act provides for the establishment of protected areas, identified as national parks, nature reserves, botanic gardens, marine reserves, protected marine areas, historic sites, scenic sites, or areas of special concern (see Annex). National parks are relatively large areas of land and/or sea protected for their natural, scenic or cultural features, while allowing sustainable scientific, recreational and educational activities. Nature reserves are created to protect an area in an undisturbed state, where the only permitted activities are management, controlled scientific research and educational study. Under Part IV of the Act, authority is conferred on the Brimstone Hill Fortress National Park Society to make and enforce regulations for that area of the same name.

After consultation with the Conservation Commission, the Minister can designate a protected area by publishing a notice in the *Gazette* describing boundaries, intended classification, and activities regulated or prohibited. Where a proposed protected area includes private land, the Minister of Development can either require compulsory purchase, using the Land Acquisition Act, or enter into an agreement with the land owner for the right of access, and the right to control such land.

The Fisheries Act No. 4, 1984, modelled on the unified draft circulated by FAO, provides for the establishment

of marine reserves and priority fishing areas, and authorises the Minister to make regulations for the management and protection of such areas (see Annex). Although none has yet been declared (OECS, 1986), the Conservation Commission is actively studying proposals to implement the act (K. Archibold, pers. comm., 1991).

The legal authority to designate a marine area as a national park, marine reserve or a protected area is given in both Part II, Section 3-6 of the National Conservation and Environmental Protection Act and Part II, Section 23 (a-d) of the Fisheries Act. Although neither act specifies an administrative authority to manage such an area, both acts assign sufficient authority to the minister responsible in both fields to make declarations and rules to establish reserves and protected areas without first obtaining the consent of parliament (Anon., n.d.)

Part VII of the NCEPA covers forestry, soil and water conservation, and Section 35 provides for the establishment of forest reserves. The Minister (in consultation with the Conservation Commission) is required to establish forest management schemes and the necessary regulations, including the prohibition of livestock grazing, although, to date, no regulations have been promulgated (CCA/IRF, 1991). The Act also provides for protection of soil in areas of critical natural drainage, and authorises the imposition of a fine for those who burn the land, fell trees or allow grazing in critical areas. Areas of special interest may be created where it is prohibited to cultivate the land, graze livestock, construct buildings or extract sand.

The Forestry Ordinance No. 10, 1903 was amended by Ordinance No. 22, 1921 and No. 5, 1928. Regulations for implementation of the legislation are found in the Forestry (St Christopher) Regulations, the Forestry (Fuel Supply) (St Christopher) Regulations, 1927 and the Forestry (Nevis) Regulations, 1940. These regulations mostly deal with the granting of permits for exploitation, with specific requirements for charcoal burning, control of fires and land clearing (DFS, 1983). While the Forestry Ordinance, as amended, declares as forest reserves all land covered with trees above the existing line of cultivation when the law was passed in 1903, these reserves have never been surveyed, gazetted or demarcated (Miller *et al.*, 1988). On St Kitts, particularly, there is clearly a need for modern forestry legislation due to growing pressures on the land (OECS, 1986). On Nevis, where land above 1,000 feet is now totally protected through administrative means, there is interest in developing legislation which would provide authority to declare some forested areas as national parks and other protected areas (OECS, 1986).

Part VI, Section 31 of the NCEPA makes provision for the protection of beaches and the coastal zone out to



2km, and the Minister, through consultation with the Conservation Commission, is responsible for the preparation and implementation of a coastal zone management plan to regulate development. The Minister may declare certain areas to be protected beaches, where activities such as fishing, the use of boats, certain sports, mining, or removing treasures or artifacts from the sea bed are prohibited. The Beach Control Ordinance Cap. 281, 1961 provides authority to control sand mining and construction on the foreshore (tidal zone). Use or encroachment of the foreshore or floor of the sea is prohibited, except with the permission of the Minister of Agriculture, Lands, Housing and Development (OECS, 1986).

The South-east Peninsula Act designates the whole peninsula as a conservation area, with purposes clearly laid out in the act (K. Archibold, pers. comm., 1991).

Outdated legislation (forestry) and lack of enforcement (beach protection) are two deficiencies in current legislation, although it is generally recognised that protected area legislation needs strengthening in most sectors (OECS, 1986).

**International Activities** The Convention for the Protection and Development of the Wider Caribbean Region, the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region and the Protocol on Specially Protected Areas and Wildlife (Cartagena Convention) has been neither signed nor ratified. The Convention Concerning the World Cultural and Natural Heritage (World Heritage Convention) was accepted on 10 July 1986, although, to date, no sites have been inscribed on the World Heritage List.

**Administration and Management** The Ministry of Agriculture, Lands, Housing and Development is the leading agency for the protection and conservation of natural resources of the Federation of St Kitts and Nevis (Anon., n.d.). The functions of this Ministry, in so far as the selection, management, and administration of any protected area are concerned, are carried out by the advisory Conservation Commission. The Commission is required to prepare management plans for protected areas based on the best information available. Each management plan must be approved by the Minister and reviewed at least every five years, with a view to revision where necessary. The management plans must contain objectives with respect to different activities, and time frames within which management activities will be undertaken. The Commission currently consists of eight members (there is provision for nine); the Chairman, Deputy Chairman and up to three other representatives are appointed by the Minister, while the six remaining members are drawn from the Nevis Island Administration, Brimstone Hill Fortress National Park Society, and from the Nevis Historical and Conservation Society. The current budget for recurrent expenditure is US\$ 100,000.

The Minister may, however, delegate powers and functions to a competent authority (as defined) to manage and administer any particular protected area. Brimstone Hill Fortress National Park Society, a local NGO originally established in 1965, runs the protected area of the same name in this role.

The principal non-governmental organisation (NGO) in Nevis concerned with environmental issues is the Historical and Conservation Society, which, *inter alia*, aims to promote and facilitate the protection and preservation of the ecology and natural life forms on the island. On St Kitts, the St Christopher Heritage Society has as its major goals and objectives the safeguarding and preservation of the country's environmental, historical, and cultural national heritage. The Society serves as the local NGO coordinator for the implementation of the Country Environmental Profile (CEP) Project in St Kitts, and produces a journal entitled *Heritage* (IRF, 1991).

St Kitts-Nevis is party to the Caribbean Conservation Association, a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources. The Caribbean Natural Resources Institute, formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), also supports St Kitts (South-eastern Peninsula) in its goal to strengthen local capacity to manage the living natural resources critical to development in the Caribbean region (Putney and Renard, n.d.). The Caribbean Conservation Association and the Caribbean Natural Resources Institute are currently working together on a marine parks programme and the "Caribbean Heritage Programme" for institutional development in support of the region's natural heritage at national and regional levels (ECNAMP, 1989).

**Systems Reviews** According to Mills (1988), it is generally accepted that about 37% of the land area of St Kitts (approximately 6,500ha) is covered by forest. Nearly all forested areas, except for the South-east Peninsula, are owned by the government (CCA/IRF, 1991). The forest on Nevis is similar to that on St Kitts and covers 20% (1,900ha) of the island. The St Kitts forest cover can be classified as follows: rain and cloud forest (2,300ha); moist forest (2,100ha) and dry forest (2,100ha) (CCA/IRF, 1991). The main threat to the forest is loss of trees to charcoal burning, although under the 1987 Act the Minister can regulate charcoal burning and its export. There has been a trend towards the abandonment of upper hill slopes for agriculture in favour of more suitable sites, and some areas are reverting to secondary forest. FAO, under the auspices of the Tropical Forestry Action Plan, is currently involved in developing forestry programmes which aim to protect forest resources on St Kitts.

The availability and quality of ground water on St Kitts is better than on Nevis. Wetlands and ponds cover about

240ha of St Kitts, and are found in the south-east as well as at Great Heed Pond, Conarce. Nevis has four wetlands, Cotton Ground, Pinneys, Hurricane Hill and the Bogs at Bath. Provision in the 1987 Act for soil conservation and drainage systems identified natural drainage channels (ghauts) as areas of concern. Measures in the Act are intended to preserve the ghauts and gives the Chief Agricultural Officer authority to intervene in their maintenance, if necessary. Both islands have beaches and coral reefs to the south that are relatively unspoilt, and, under Section 25 of the 1987 Act, the public has the right of access to all beaches.

Brimstone Hill Fortress was established as the first national park in 1985, the second being the South-east Peninsula Conservation Area. Apart from these sites, St Kitts and Nevis have no formally established national parks or protected areas, although there are various lists and studies of prospective and recommended sites, some habitat focused, some wildlife focused, and a few, mostly in Nevis, which deal with the protection of landscape features. A summary of proposed protected areas is given in CCA/IRF (1991). The establishment and management of the South-east Peninsula Marine Park and Recreation Area is outlined in a recent marine parks and recreation plan (Anon., n.d.), and the Conservation Commission is attempting to set up a marine park system under the Fisheries Act.

A recent environmental profile (CCA/IRF, 1991) highlights recommendations regarding the development of protected areas. A parks and protected areas plan is needed to ensure that all critical natural and cultural resources receive adequate protection, and that management is carried out in an integrated fashion. Further, it is recommended that the Conservation Commission gives early attention to the development of a comprehensive plan which approaches the subject of national parks and protected areas from a national perspective, and which includes identification of appropriate mechanisms for coordinating management responsibilities within a national system. Allocation of manpower resources for enforcement and management activities is to be made on the basis of priorities established in the plan.

Williams (1984) identified and discussed three problems relating to the management of natural resources: loss of agricultural land to urbanisation; exploitation of fisheries; and sand utilisation. The impact of sand mining has been assessed, and recommendations by a Cabinet committee are being implemented by the Conservation Commission under the provisions of the National Conservation and Environment Protection Act (1987).

## Addresses

The Ministry of Agriculture, Lands, Housing, and Development Physical Planning Officer, Planning Unit,  
Ministry of Development and Planning, Church Street,  
PO Box 186, BASSETERRE  
Brimstone Hill Fortress National Park Society, PO Box  
588, BASSETERRE, St Kitts  
Historical and Conservation Society, Hamilton House,  
CHARLESTOWN, Nevis  
St Christopher Heritage Society, P.O. Box 338, Bank  
Street, BASSETERRE (Tel: 809 465 5584)

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ANNEX

Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration

**Title: National Conservation and Environment Protection Act**

**Date :** 27 April 1987, effective July 1989

**Brief description:** Provides for the better management and development of the natural and historic resources of Saint Christopher and Nevis for the purpose of conservation, the establishment of national parks, historic and archaeological sites and other protected areas of natural or cultural importance including the Brimstone Hill fortress National Park; the establishment of a Conservation Commission, and for other matters connected thereto.

**Administrative authority:** The Minister for the time being charged with the subject of development (Conservation Commission)

**Designations:**

**Protected Area** A national park, nature reserve, botanic garden, marine reserve, historic site, scenic site or any other area of special concern or interest designated under Section 3(1) of the Act. The Act also allows for the creation of forest reserves.

The Minister is empowered to lay down provisions regarding the management of such areas, making it a crime to remove coral, flora or fauna, to dig or remove artifacts, to pollute the water, or to deposit waste material.

**National park** Consisting of a relatively large land or marine area or some combination of land or sea, containing natural and cultural features or scenery of national or international significance and managed in a manner to protect such resources and

sustain scientific, recreational and educational activities on a controlled basis.

**Nature reserve** Containing outstanding or fragile natural features or life forms of national importance that need protection in an undisturbed state where the only permitted activities are management measures, controlled scientific research and educational study.

**Marine reserve** An area provided for in Section 23 of the Fisheries Act 1984.

Such areas may be declared to protect valuable flora and fauna and their aquatic habitats, areas for scientific research and sites of natural beauty.

Fishing or the taking or destroying of any flora or fauna is prohibited except by permit when needed for proper management.

**Source:** FAO Legislation (37): 227-247

**Title: The Forestry Ordinance No. 10**

**Date:** 1903; amended by Ordinance No. 22, 1921 and No. 5, 1928

**Brief description:** Declares as forest reserves all land covered with trees above the existing line of cultivation when the law was passed in 1903.

**Administrative authority:** Forestry Board

**Designations:**

**Forest reserve** Prohibited activities include the grazing of cattle.

**Source:** FAO Legislation (37): 227-247; Miller *et al.* (1988)

SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	National Park Southeast Peninsula and Recreation Area	II	2,610	

# ST VINCENT and THE GRENADINES

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Area 389 sq. km

Population 107,598 (1991) (N. Weekes, pers. comm., 1992)

Natural increase: No information

## Economic Indicators

GDP: US\$ 1,234 per capita (1987)

GNP: US\$ 1,360 (1988)

**Policy and Legislation** Protected areas legislation dates back to the 18th century, when St Vincent's first forest reserve, King's Hill, was set aside by Order No. 5, 1791. This is thought to be the first piece of legislation providing for protected areas in the Americas. More than a century later the Birds and Fish Protection Ordinance 1901 was passed, under which the Governor General could designate any area as a sanctuary, affording year-round protection from hunting for all species. In 1912, all land above 330m in elevation was designated as Crown land, reserved by law to protect forests in the upper watersheds. However, the legal definition of Crown lands in various acts is very vague, and virtually useless for the purposes of land management.

The Forests Act (Cap. 23, 1945) provides for the responsibilities of the Forestry Division, to protect and manage the nation's forests and wildlife. This act also authorises the government to declare any Crown land to be a forest reserve, protecting the land from transfer to private ownership, and provides for certain land to be strictly protected. The Crown Lands Forest Reserve (Declaration) Order, 1948 set aside three areas, La Soufrière, Mesopotamia and Colonarie as forest reserves, but according to sources within the Forestry Division (N. Weekes, pers. comm., 1992) these reserves no longer exist.

Under Proclamations 43, 1947 and 82, 1950, six areas were declared as bird sanctuaries. In 1987, the Wildlife Protection Act (No. 16, 1987) (see Annex) was passed, which repealed and in part replaced the Birds and Fish Protection Ordinance, defined and established wildlife reserves (including all the areas previously gazetted as bird sanctuaries), and set aside a large central block of St Vincent as a parrot reserve. Penalties for contraventions against the Wildlife Protection Act include fines of up to US\$ 2,000 for a first offence and US\$ 4,000 for a second, or to imprisonment for a term of one year or both.

The Town and Country Planning Act (No. 8, 1976), as amended, provides for the control and guidance of land use and development. Under this act, consideration for environmental conditions and the future need for, and availability of, land for natural areas and forestry reserves must be given. It appears this authority has not yet been used. In addition, the Central Water and Sewerage Authority Act (No. 6, 1978) authorises the

establishment of protected areas to safeguard water resources.

The legal base for marine protected areas is relatively strong. The Fisheries Act (No. 8, 1986) (see Annex) is modelled on the unified draft prepared by the FAO and passed by most islands in the region. It authorises the Minister of Trade, Industry and Agriculture to declare any area of fishery waters and adjacent land as a marine reserve, and also provides for the duties of the Fisheries Division to protect these areas. Penalties for infringements to articles in the fisheries act concerning marine reserves comprise fines of up to US\$ 1,000. Under the fisheries act, nine marine conservation areas were established, one on St Vincent, the remainder on islands throughout the Grenadines. Under the Mustique Conservation Act, 1989 the entire island of Mustique, including its marine environment, is designated as a conservation area.

Draft forest conservation legislation (proposed Forest Conservation Act) was due to be enacted in 1990. Provisions for the designation of national parks had originally been included within this new draft legislation. However, an administrative decision was made recently to draft a separate bill for national parks. A preliminary design for national parks legislation is under consideration (CCA, 1991).

The St Vincent National Trust Ordinance (No. 32, 1969) and amendment (No. 29, 1971) provides for the establishment of the Trust.

The country was included in a study of environmental legislation of six countries prepared as part of the Natural Resources Management Project of the Organisation of Eastern Caribbean States (OECS, 1986).

**International Activities** On 11 July 1990, the country ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region and a second Protocol Concerning Specially Protected Areas and Wildlife. Together, the Convention and associated protocols are known as the Cartagena Convention. The country is a member of the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources.

**Administration and Management** Primary responsibility for the environment has shifted recently, at least symbolically, to the recently formed Ministry of Health and the Environment, although an organisational basis for the Ministry's new environmental responsibilities has not yet been introduced. In practice,



none of the existing protected areas, which have been created in an *ad hoc* manner over the years without any overall plan, enjoys any real protection. Responsibility for forest and wildlife reserves in practice rests with the Forest Division, and for marine reserves, with the Fisheries Division. Enforcement in all cases is hampered by the lack of sufficient manpower in designated agencies, and by the fact that forest guards and fisheries officers do not have powers of arrest (CCA, 1991).

The Forest Act, 1945 does not provide guidance on managing and conserving forest resources, nor does it include concepts such as management plans and zoning for various purposes. The staff level of the Forestry Division, within the Ministry of Agriculture, Industry and Labour is currently at 34, although this is being increased to approximately 50. The Forestry Division is responsible for implementation of the Wildlife Protection Act, and hence for the protection of wildlife reserves, as well as for forest reserves. The proposed Forest Conservation Act, when enacted, will provide for the creation of a new forest department, the introduction of modern forest concepts, such as management plans and conservation "zones", and the provision of a more integrated approach to forest management and watershed protection (CCA, 1991).

The St Vincent National Trust, although a statutory body, functions in many ways as a nongovernmental organisation (NGO), to conserve and protect the historical and natural heritage of the country. The Trust has recently been reactivated, with first aims being the establishment of a National Registry to include historic sites, natural features, and cultural objects worthy of preservation as part of the natural patrimony. A first step was the completion in 1990 of a Unesco funded project to inventory national archaeological and historical places (CCA, 1991). A further local NGO, the Jems Progressive Community Organisation, has conservation as one of its areas of interest, and one recent project concerned Kings Hill Forest Reserve.

A Country Environmental Profile for St Vincent and the Grenadines has recently been produced (CCA, 1991), by cooperation between various organisations: those local to the country, to the region, and international. It was prepared under the aegis of the Caribbean Conservation Association, on behalf of the government of St Vincent and the Grenadines, with the technical support of the Island Resources Foundation and the St Vincent National Trust, and funded by the US Agency for International Development.

In general, management of protected areas is ineffective. The proclamations declaring six bird sanctuaries were never enforced, and the laws prohibiting the cultivation of Crown lands (including forest reserves) are not adequately enforced. This is due to numerous difficulties, including the sale or granting of leases to Crown land above 330m; outdated forest legislation; forest officers having no powers of arrest; lack of surveys and demarcation of boundaries on the ground; and road

development, opening new areas to cultivation. Besides patrolling forest reserves and some reforestation of illegally cleared areas, little actual management of forest reserve is currently practised. A five-year (1989-1994) Can\$ 4.5 million forestry programme, funded by CIDA, is currently addressing many of these problems.

Some declared "wildlife reserves" are actually developed tourist resort islands with greatly altered habitats and continuous human disturbance; the value to wildlife of such reserves is not documented (CCA, 1991). With the exception of the approved but not implemented Tobago Cays National Park, no management plan has been written for any protected area (CCA, 1991). Boundaries of nine marine conservation areas have been established on paper, but no action has been taken to enforce prohibitions against fishing, or to regulate other damaging activities in these designated areas. Boundary markers have not been established, and it is considered likely that locals are unaware of the location of the reserves (CCA, 1991). Tobago Cays National Park is currently suffering from near extinction of the dominant elkhorn coral stands, due to whitehorn disease, and further reef damage from boat sewage, anchoring, collecting etc. (J.R. Clark, pers. comm., n.d.).

**Systems Reviews** St Vincent is a rugged, mountainous island with deeply dissected valleys and steep hillside slopes, except for the relatively flat areas found on the east coast. The northern end of the island is formed by the active volcano, La Soufrière (1,219m), which last erupted in 1979, while the southern section comprises of the remains of several extinct volcanoes. The Grenadines comprise about 32 islands, threequarters of these being on the Grenadine platform, about 30-40m deep. The islands comprise low dry hill, white sand beaches and extensive coral reefs (CCA, 1991).

Much of St Vincent's vegetation has undergone major changes as a result of agricultural practices. However, significant stands of primary forest, some of it tropical rain forest, remain on the largely inaccessible interior mountain ridges and at the heads of the deep, steep valleys of the leeward coast. Almost all land below 330m is under permanent cultivation, although many steep slopes above this have also been cleared and planted by shifting agriculturalists. Secondary vegetation is, therefore, a common feature due both to shifting cultivation, and in some areas, to recent volcanic activity. Natural vegetation remains in inaccessible highland areas, with some isolated stands of rain forest located between 300m and 490m. In 1984, forests covered 13,000ha or 38% of the land. Five per cent of the total land area was primary forest, 25% secondary forest, dry scrub forest and plantation forests, and a further 8% of the land palm forest and dwarf forest. A few very small areas of mangroves remain, although it is probable that there never were extensive areas of this habitat. Vegetation on the Grenadines consists mostly of badly degraded secondary, dry scrub and brush, with mangroves on several islands. Coral reefs occur in

patches around St Vincent, and throughout the Grenadines (CCA, 1991; UNEP/IUCN, 1988).

The existing protected natural areas are a disparate collection of water catchments, wildlife reserves, forest reserves, and marine conservation areas. Included within these is St Vincent Botanical Garden (part of Government House Grounds Wildlife Reserve), the oldest botanical gardens in the Western Hemisphere, established by the military governor of the Windward Islands in 1765 (CCA, 1991).

A national park system has been considered but not fully approved or implemented. Draft legislation for creating such a system is being circulated for review, but as yet only Tobago Cays National Park has been designated (CCA, 1991). Proposals for conservation action, including enactment of recently drafted conservation legislation, and assigning of adequate funds and resources for the enforcement of this legislation, are given by Johnson (1988).

The protected areas system is reviewed, and numerous recommendations given for action to prevent environmental degradation, in CCA (1991). Short term recommendations which relate specifically to improvement of the protected areas system include: control of illegal activities in water catchment areas, forest reserves and marine conservation areas; control of sand mining; and control of coastal erosion. A longterm recommendation is for the development of an integrated national parks and protected areas system, to evaluate all presently designated protected areas, deleting (at least for the present time) those that may be of minimal value and adding other areas which are not presently protected. Outstanding sites which are not presently designated as protected areas include many marine sites known for their importance to the dive tourism industry, the proposed Soufrière Volcano National Park and sites on Canouan and Union Island. It is also proposed in CCA (1991) that a single agency should be given the task of coordinating resource management in parks and protected areas, that allocation of manpower resources for enforcement and management activities should be made on the basis of priorities set out in the plan, and that critical areas should be delineated on national land use maps for incorporation into a national parks and protected areas system.

Recommendations given in OECS (1986) as priorities, which are relevant to protected areas, include substantial

strengthening of existing legislation concerning forest management, to ensure sustainable use of the resource.

Coastal protected areas are threatened by the unregulated mining of sand and rocks from beaches for use in the construction industry. Virtually all the beaches which are accessible by road have been mined to some extent, and many beaches are thought to be greatly diminished in width as a result. Severe beach erosion is also caused by hurricanes. Widespread coral deterioration (from disease, yacht damage and pollution) is causing concern, particularly at the famous Tobago Cays reefs (CCA, 1991).

#### Addresses

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JEMS Progressive Community Organisation,  
Enhams Post Office, ENHAMS, St Vincent  
(Tel: 809 456 9614)

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**ANNEX**  
**Definitions of protected area designations, as legislated,**  
**together with authorities responsible for their administration**

**Title: The Fisheries Act No. 8**

**Brief description:** Provides amongst other things for the establishment of marine reserves and conservation measures.

**Date:** 1986

**Administrative authority:** Minister to whom matters relating to fisheries have been assigned.

**Designations:**

*Marine reserve* To afford special protection to the flora and fauna of such areas and to protect and preserve the natural breeding grounds and habitats of aquatic life, with particular regard to flora and fauna in danger of extinction; to allow for the natural regeneration of aquatic life in areas where such life has been depleted; to promote scientific study and research in respect of such areas; or to preserve and enhance the natural beauty of such areas. Activities prohibited without permission include: fishing; destruction of any flora or fauna other than fish; dredging, extracting sand or gravel, discharging or depositing waste or any other polluting matter, or in any way disturbing, altering or destroying the natural environment; or constructing or erecting any buildings or other structures on or over any land or waters within such a reserve. Any of these activities may be permitted by authorisation of the Minister to

whom matters relating to fisheries have been assigned, if the doing of such things is required for the proper management of the reserve.

**Source:** Original legislation

**Title: The Wildlife Protection Act No. 16 of 1987**

**Brief description:** Provides amongst other things for definitions of forest reserves.

**Date:** 1986

**Administrative authority:** Chief Wildlife Protection Officer

**Designations:**

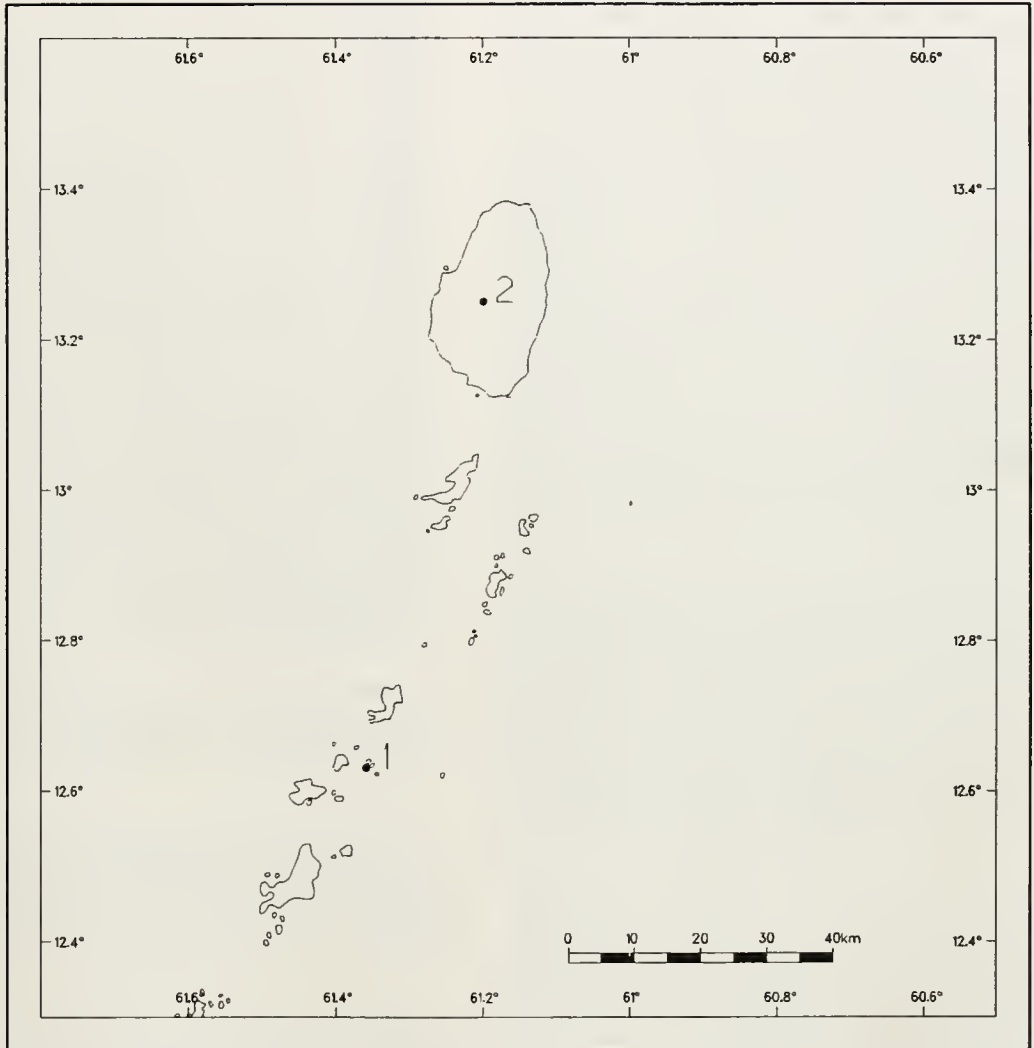
*Wildlife reserve* To be managed as natural areas. Prohibited activities include: hunting of any sort; possession of a gun; disturbing the nest, egg, fry or young of any animal; damage to any tree; cultivation or clearing of land; introduction of livestock; kindling or keeping a fire (unless by a resident of the reserve, with official approval, for food preparation); removing any forest produce. Within which no land may be granted, devised, sold or leased.

**Source:** Original legislation

**SUMMARY OF PROTECTED AREAS**

Map ref.	National/international designations Name of area	IUCN Management category	Area (ha)	Year notified
1	<i>Marine Reserve</i> Tobago Cays	IV	3,885	1986
2	<i>Reserve</i> St Vincent Parrot	IV	4,399	1987





**Protected Areas of St Vincent and the Grenadines**





# ST LUCIA

**Area** 616 sq. km

**Population** 141,685 (1990)

Natural increase: 1.61% per annum

**Economic Indicators**

GDP: US\$ 237 (1985)

GNP: No information

**Policy and Legislation** In 1975, a draft wildlife act was proposed making provision for the establishment of national parks, wildlife reserves, and national monuments (Swank, 1975). Following this, the Wildlife Protection Act No. 9, 1980 was passed, providing for the protection of wildlife, the establishment of wildlife reserves, and effecting St Lucia's accession to the CITES treaty. Maria Islands Wildlife Reserve was declared using the provisions of this Act. The National Trust Act No. 16, 1975 provides for a statutory trust to promote, conserve, and manage land and marine areas of special natural (or historic) interest to protect the wildlife which they support (see Annex) (McCalla, 1990). The Trust has the authority to make bye-laws to regulate activities within areas, called heritage sites or tourist attractions, under its control. A Bill has recently been proposed which seeks to amend the National Trust Act, 1975, to provide for the coordination of the planning and administration of areas not vested in the Trust. It also makes provision for the development of management plans, the establishment of a Protected Areas Advisory Board and the use of private lands as protected areas. The Bill also includes a clause for public participation and consultation (G. Romulus, pers. comm, 1992).

By virtue of the Crown Lands Act Cap. 108, 1946, lands above 600 feet are protected. A new ordinance, the Land Conservation Board Ordinance, will address land use of all lands.

The Fisheries Act No. 10, 1984 provides for the creation of marine reserves and fisheries priority areas. This legislation was modelled on a unified draft proposal produced by FAO for the Organisation of Eastern Caribbean States, and prescribes regulations to control fishing and other activities on reef ecosystems (see Annex).

The Forest, Soil and Water Conservation Ordinance Cap. 25, 1946, as amended (1957 and 1983), contains provisions governing the declaration of forest reserves and protected forests on private land (see Annex). The Department of Forests and Lands, formerly the Forestry Division, of the Ministry of Agriculture, can declare any lands as protected forest, if it becomes necessary for the protection of timber resources. However, this is difficult to apply as Cabinet approval is required (Miller *et al.*, 1988). The Department is also vested with authority under the provisions of the Wildlife Protection Act, 1980, Crown Lands Ordinance, 1946, and the Timber

Industry Development Board Ordinance, 1963, to survey and demarcate all Crown land and forest reserves, and control squatting, poaching of timber and wildlife, and all other illegal uses of Crown land and forest reserves. Under the provisions of the Water and Sewerage Act, 1984, the Water and Sewerage Authority may request that the Chief Forest Officer take action to protect any catchment area threatened by deforestation.

The Department of Forests and Lands of the Ministry of Agriculture has prepared a comprehensive management plan for the country's forests, in collaboration with CIDA (OECS, 1986), which is now being implemented. The Forest Management Plan has been accepted by government as the basic policy document for future forestry development; objectives include, *inter alia*, the preservation and protection of natural forest on slopes greater than 30°, along river banks, in critical watersheds, on unstable soils, and which are the habitat of endangered or rare wildlife, in order to prevent erosion, and to provide good water and recreation. The plan divides forests into three categories; strictly protected; protected with selected production; and production forests. In addition, new legislation and policies concerning forest and land use are recommended which will promote sustainable yield forestry, protection of wildlife, watersheds, sites of natural interest, and land use planning (CIDA, n.d.).

The Beach Protection Act No. 2, 1967, as amended No. 9, 1984, deals with sand removal and other issues affecting beaches, while the Parks and Beaches Commission Act, 1983 provides for the control, maintenance and development of public parks, gardens and beaches (Talbot, 1986). However, both acts are limited in scope in providing integrated protection of delicate coastal ecosystems. Consequently, these ecosystems are being damaged irreparably by pollution, overexploitation, strip and dredge mining. Current legislation protecting critical watersheds is inadequate.

**International Activities** St Lucia ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region and the Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region (Cartagena Convention) on 30 September 1984. In addition, St Lucia has ratified the protocol concerning specially protected areas for wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean region. St Lucia ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) on 14 October 1991.

**Administration and Management** All government policies relating to wildlife are undertaken by the Department of Forests and Lands and the Department of

Fisheries (DoF). The DoF is responsible for all marine life and the management of marine reserves, other than those vested in the National Trust. Although there is an effective legislative framework for management of these reserves under the provisions of the Fisheries Act, 1984, full implementation of regulations is hampered by a variety of circumstances, including limited mobility and communication systems (CCA/IRF, 1991). The Fisheries Regulations have been approved recently by the Cabinet of Ministers and will be gazetted soon.

The Department of Forests and Lands, formed in 1985 from the former Forestry Division (established in 1946), is headed by the Chief Forest and Lands Officer (formerly Chief Forest Officer), who is assisted at middle management level by two senior assistant officers, one each for conservation and operations. Field work is divided into five forest ranges, each under the charge of a range officer, plus staff (CCA/IRF, 1991). The Department of Forests and Lands is responsible for managing the 1,600ha Central Forest Reserve, Crown lands, Queen's Chain (land extending 60m inland from the mean high water mark), and the Pitons.

The Parks and Beaches Commission, a statutory body created in 1983 and responsible to the Ministry of Trade, Industry and Tourism, manages tourist beaches and regulates beach vendors. It has an advisory role over certain uses in the coastal zone, including the removal of coral and on any matters related to protection of the sea-coast from erosion (OECS, 1986).

The St Lucia National Trust, a statutory body that receives support from the government, is the main non-governmental organisation (NGO) concerned with environmental issues, and is the principal institution responsible for protected areas. Amongst other activities, it has primary management responsibility for Pigeon Island National Park, Maria Islands Nature Reserve and Fregate Islands Nature Reserve (opened but not officially designated). The Trust has the authority to make bye-laws to regulate all activities within these areas to protect the resources, preserve order and prevent nuisances (OECS, 1986). The Trust has been involved in the development of the Plan for a System of Protected Areas for St Lucia, and is the local implementing organisation for the Caribbean Heritage Programme (IRF, 1991). Other important NGOs are the St Lucia Naturalists' Society, whose primary area of activity is environmental education, and the Jersey Wildlife Preservation Trust which has supported the establishment of the St Lucia Parrot Sanctuary, amongst other initiatives.

St Lucia is a member of the Caribbean Conservation Association (CCA), a regional, non-governmental, non-profit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources. In May 1987, the Caribbean Conservation Association (CCA) and the government of St Lucia (Ministry of Planning) agreed to produce a Country Environmental

Profile (IRF, 1988; CCA/IRF, 1991). The National Research and Development Foundation (NRDF) was designated as the local organisation with responsibility for the project. The project is completed and the Country Environmental Profile is now being widely circulated.

The Caribbean Natural Resources Institute (CANARI), formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), is another regional organisation involved in conservation programmes in St Lucia. CANARI concerns itself with issues of conservation, development, and environment in the insular Caribbean, and emphasises participatory planning and co-management as it works to strengthen the capacity of human communities and their institutions to manage natural resources critical to their development. Research, information, training, and technical support services, with particular application to protected areas and common property resources (forests, reefs, wetlands, and coastal resources), are its major programmatic themes (Putney and Renard, n.d.; Y. Renard, pers. comm., 1992). Together with CCA, the Institute has embarked upon a marine parks programme for the region, and has developed a "Caribbean Heritage Programme" for institutional development in support of the region's natural heritage at national and regional levels (ECNAMP, 1989).

Enforcement of the Forest, Soil and Water Conservation Ordinance has been hindered by a lack of equipment and shortage of field staff. Until very recently, forest reserves were undemarcated on the ground, and, when Crown lands abutted private lands, boundary identification was almost impossible. In addition, enabling legislation did not give the Department of Forests and Lands authority over private land, short of acquiring it and declaring such areas as forest reserves. Recent events, however, have improved the situation, with amendments to the appropriate legislation and boundary demarcation (CCA/IRF, 1991). Other management constraints include weaknesses in physical planning procedures, and a lack of coordination between agencies involved in natural resources management (Talbot, 1986). Improvement of the latter would be particularly useful in land and water conservation and in coastal zone management (OECS, 1986).

**Systems Reviews** St Lucia is part of the Lesser Antilles in the Windward Islands group. The island is of volcanic origin, and mountainous with rugged relief, culminating in Mount Gimie at 3,117m (DRD, 1989). The dry season lasts from January to April and the rainy season from May to November. Approximately 20% of the island is classified as "uninhabited wildland" (ECNAMP, 1980), which coincides with highland supporting rain forest and moist forest. Only 22% of land has less than 10° slope, while 50% of the land has slopes of more than 20° (Miller *et al.*, 1988). Beard (1949) was the first to classify forest resources by cover types with ecological descriptions of each. The principal types identified today are rain forest and lower montane forest (16,752ha, or 13% of total area), montane thicket



(1,501ha, or 1% of total area), elfin woodland (329ha, or 1%), secondary forest/mixed agriculture (78,440ha, or 61%) and dry scrub woodland (30,911ha, or 24%)(CIDA, n.d.). Another estimate of cover has been made (Piitz, 1983), indicating rain forest/lower montane forest (6,780ha), montane thicket (608ha), elfin woodland (133ha), secondary forest (31,745ha, comprising 29,873ha agricultural land and 1,872ha of open woodlands) and dry scrub woodland (12,510ha). Some 200ha of mangroves occur, mainly along the east and north-west coasts (Scott and Carbonell, 1986). It has been estimated that 80% of St Lucia is under some form of forest or mixed agriculture (CIDA, n.d.).

Estimates of the rate of deforestation have been made, varying between an annual loss of 0.2% overall forest cover (Stevenson, 1986) to 2.0%. Such changes as have occurred can be attributed, in part, to the partially regulated harvesting of individual species, illegal squatting by landless farmers in forested regions, agricultural practices, and the several hurricanes which have impacted directly on the forest this century. Increasing population pressure, urban developments, and development of access roads have exacerbated this problem (IRF, 1985).

The island has several small wetland sites (Scott and Carbonell, 1986), the most important of which are Bois d'Orange, Aupicon Pond, Esperance, Marigot Bay, Marquis, Praslin and Savannes, also St Urbain, Trougascon and Volet. Although their total area is small, the wetlands are important as nursery sites and as staging posts for migrant birds. Charles and Butler (1986) note that all wetlands are seriously threatened. Coral reefs and coral veneers are found on all of St Lucia's coasts; available information is summarised in UNEP/IUCN (1988).

The first step for establishment of a management and protection framework for forest resources occurred when, in recognition of the need to protect water catchment areas, Castries Waterworks Reserve was established in 1916. Following forest surveys in the early to mid 1940s, the government held title to a little over 2,000ha of forested land, including a number of reserves. From 1982, under a CIDA-sponsored Forest Management and Conservation Project, the entire forest reserve was surveyed and demarcated, with a total of some 7,496ha (11% of total area) included in the system. A number of marine reserves were declared in 1986, two were vested in the National Trust in 1982, and a number of other sites have been declared in recent years. In total, however, excluding the forest reserves, only 0.3% of St Lucia is included within protected areas. Proposals for strengthening the system further are given in CCA/IRF (1991), in particular the need to classify and evaluate potential protected areas more systematically, establishment of priorities which assess high risk as opposed to less threatened sites, evaluation of tourism potential, development of an acquisition schedule, and the development of management criteria which

minimise and regulate intrusions or disturbances within protected areas.

Presently, the St Lucia National Trust, in collaboration with 12 other governmental and non-government organisations, is nearing the completion of a project (funded by US-AID and the National Trust) to develop a Plan for a System of Protected Areas (to be published in September 1992). With the adoption of the plan, a comprehensive framework for protected areas planning and management will be established. A participatory approach is being used to ensure public input during the development phase of the plan, as well as collaborative management of the sites themselves. An advisory committee has been formed with representatives from the Central Planning Unit, the Department of Forests and Lands, the Department of Fisheries, the Crown Lands Department, the Parks and Beaches Commission, the St Lucia Tourist Board, the St Lucia Hotel and Tourism Association, the National Youth Council, the Folk Research Centre, the Caribbean Natural Resources Institute, a representative from the private sector, and the National Trust. This committee has been in existence for the last three and a half years. At the national level, both formal and informal media are being used to inform and encourage public participation in the development of the plan. The project will, on completion, (i) identify representative areas of the natural and cultural environment worthy of conservation and active management; (ii) identify and determine the most suitable management categories which will be adapted from the IUCN management categories; and (iii) draft suitable legislation for the systematic planning and management of protected areas. This will take the form of an amendment to the St Lucia National Trust Act No. 16, 1975. The proposed legislation will be presented for consideration and approval to the Cabinet of Ministers through the Minister of Planning in 1992. These revisions contain three major additions: the establishment of a 13-member advisory board with the National Trust as the coordinating agency; provisions for the development of management plans and designation of protected areas; and provision for public involvement in the planning and management of protected areas (G. Romulus, pers. comm., 1991).

An overall work plan for a five-year CIDA-funded Forest Management and Conservation Project is detailed in CIDA (1987); objectives are based on the Forest Management Plan (1984-1994) and include implementation of a programme of forest management and conservation, provision for watershed management, and strengthening of the Department of Forests and Lands (CIDA, n.d.; DRD, 1989).

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## ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title: Saint Lucia National Trust Act**

Sources: CIDA (n.d.); CCA/IRF (1991)

**Date:** 26 September 1975**Brief description:** To establish a body corporate to known as the St Lucia National Trust.**Administrative authority:** St Lucia National Trust**Designations:**

Objectives of the National Trust include the preservation of beauty or natural or historic interest, including the flora and fauna found therein.

**Source:** Original legislation**Title: Forest, Soil and Water Conservation Act****Date:** 1946, amended (1957 and 1983)**Brief description:** Contains provisions governing the declaration of forest reserves and protected forests (on private land).**Administrative authority:** Ministry of Agriculture**Designations:****Forest reserve** Such areas are managed for water and wildlife conservation, and timber production.**Title: The Fisheries Act****Date:** 1984**Brief description:** Provides, amongst other measures, for the creation of marine reserves.**Administrative authority:** Department of Fisheries**Designations:****Marine reserve** Such are declared in order to protect important flora and fauna, promote scientific research, or preserve natural beauty.

Prohibited activities, except when necessary for proper management of the reserve, include, fishing; taking or destroying any flora or fauna; extracting sand; and causing pollution or constructing structures.

The Minister is authorised to make specific regulations for the management and protection of such areas.

**Source:** OECS (1986)

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>Nature Reserve</i> Savannes Bay Mangrove Area MR	IV	500	1982
2	<i>Reserve</i> De Suze Estate	VIII	108	1946
3	<i>Sanctuary</i> Parrot Sanctuary (Central FoR)	IV	1,494	1980
	<i>Forest Reserves</i>			
4	Addition to Central "B"	VIII	121	
5	Barre-de-L'Isle North	VIII	231	
6	Barre-de-L'Isle South	VIII	724	
7	Castries Waterworks	VIII	1,392	1916
8	Central "A"	VIII	1,631	
9	Central "B"	VIII	1,474	
10	Dennery Waterworks	VIII	145	1946
11	Marquis Estate Parcel M-1	VIII	134	
12	Quillesse	VIII	1,400	1946
13	Salibus Grand Magazin	VIII	107	



Protected Areas of St Lucia





# TRINIDAD AND TOBAGO

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**Area** 5,128 sq. km

**Population** 1.24 million (1988)

## **Economic Indicators**

GDP: US\$ 3,761 per capita (1987)

GNP: US\$ 4,220 per capita (1987)

**Policy and Legislation** Trinidad was ceded to Great Britain by the Treaty of Amiens in 1802. Trinidad and Tobago unified in 1889, becoming independent within the Commonwealth on 31 August 1962. A Republican Constitution was adopted on 1 August 1976.

The first wildlife sanctuary in Trinidad and Tobago was created in 1928 (Bacchus and Vorrán, 1990), although no information is available concerning the legislation under which this was established.

An Ordinance to afford protection to wildlife was passed in 1933. Under this, areas of existing forest reserves were set aside as game reserves, in which all forms of hunting were prohibited (Cooper and Bacon, 1981).

This Ordinance has subsequently been superseded by the Conservation of Wildlife Ordinance No.16, 1958 (although this did not become law until 1963), which makes provision for the establishment of wildlife (or game) sanctuaries (see Annex). According to this piece of legislation, the Chief Game Warden, with the approval of the Minister, may modify sanctuary boundaries, and all forest officers are wildlife wardens. The Conservation of Wildlife legislation has proven very weak with respect to protection of plants, invertebrates and amphibia, while its general structure has made implementation of various international treaties difficult (R. Cross, pers. comm., 1992).

The Forest Ordinance, 1950 makes provision for the establishment of forest reserves, but is basically concerned with the sale of timber. The legislation is limited in providing for protection of the environment, for example, a forest officer may charge a squatter for removing trees within a forest reserve, but does not have the power to evict squatters from reserves. Land within forest reserves, or other Crown land, can also be designated as prohibited areas by the President.

The Marine Areas (Preservation and Enhancement) Act, 1970 provides for marine areas to be protected as restricted areas. These areas can be established to preserve natural beauty, to protect flora and fauna, to promote the enjoyment of the area, and to promote scientific research. However, the Act makes no provision for institutional structures necessary for the effective management of any areas designated.

Other legislative acts that are relevant include the Town and Country Planning Ordinance, 1960, the Land

Acquisition Ordinance, 1947, and the State Land Ordinance, 1950.

A policy for the establishment and management of a national park network was initiated in 1979/1980 in conjunction with the Organization of American States (OAS). It was concluded that the existing legislation governing protected areas was not adequate to ensure proper protection. Hence, the 1980 report set out a detailed policy which could be used in the development of future legislation. The Forestry/OAS project identified 61 locations in six different subcategories to be established under a general national park category. Areas were identified irrespective of current land use or ownership. Of the 61 sites, eight units are recommended as national parks, eight as natural landmarks, thirteen as scientific reserves, thirteen as nature conservation reserves and six as scenic landscapes. The 61 areas represent about 14% of the total land surface. The government has agreed in principle with the proposals, but legislation was not enacted. However, amendments have been made subsequently to existing wildlife and land use legislation to control poaching, squatting on forested lands, and agricultural fires (Bacchus and Vorrán, 1990; Thelen and Faizool, 1980).

A draft Forest Resources Policy, 1981 has as one of its aims the creation of a forest estate of at least 33% of the land area of the country (Bacchus and Vorrán, 1990).

As part of a collaborative project between the Forestry Division and the OAS, a policy for the establishment and management of a national park system was published in 1980. This policy is relatively comprehensive, covering legislation, government policy, objectives and categories, together with procedures for establishment and management of a national park system. Six categories of protected area are suggested: scientific reserve, national park, natural landmark, nature conservation reserve, scenic landscape and recreation park (Thelen and Faizool, 1980). It has also been reported that the government anticipates a protected areas system that will protect cultural features as well as the natural environment (Huber and Meganck, 1987; Meganck and Ramdial, 1984).

The environmental legislation of Trinidad and Tobago is reviewed by Bacchus and Vorrán (1990).

**International Activities** Trinidad and Tobago signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention) in 1940, and it has since been ratified. Trinidad and Tobago is party to the Caribbean Conservation Association, a regional, nongovernmental, nonprofit organisation dedicated to promoting policies and practices which contribute to conservation, protection and wise use of natural and cultural resources, and has ratified the Convention for the Protection and

Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region both on 24 January 1986. The country is currently seeking to become a signatory to the Ramsar convention.

**Administration and Management** Responsibility for certain areas of conservation and the environment lies with the Ministry of the Environment and National Service (1991), but prior to March 1989 was with the Ministry of Food Production, Marine Exploitation, Forestry and the Environment. In 1991, the budget for parks and protected areas was TT\$500,000. Personnel responsible for management of national parks totalled 19, comprising: an assistant conservator of forests, seven diploma level foresters and eleven forest rangers (R. Cross, pers. comm., 1991).

Since inception the Minister has been attempting to set up a National Environmental Authority to coordinate environmental management. The Forestry Division within the Ministry is responsible for management of the wildlife sanctuaries, forest reserves and recently declared prohibited areas through its wildlife section. The Game and Wildlife Section was actually set up in 1950. The entire northwest peninsula of Trinidad (the proposed Chaguaramas National Park) is the responsibility of the Chaguaramas Development Authority, which was established by Act of Parliament.

Forest wardens are designated as wildlife wardens under the Conservation of Wildlife Ordinance, 1958. In addition, a number of honorary game wardens were appointed in the 1970s by the Ministry for three-year terms of office, to assist in wildlife protection. A custodian looked after Little Tobago Sanctuary (Dardaine, 1977).

Establishment of a National Environmental Authority is suggested by Bacchus and Vorrán, 1990. The mandate of such an agency would be to coordinate the activities of all agencies which make demands on the environment, a role which it is considered critical to establish immediately.

Nongovernmental organisations (NGOs) have long been involved in nature protection; in the 1970s private reserves included such areas as the Asa Wright Nature Centre and Reserve, and two private bird sanctuaries (Dardaine, 1977). Bodies interested in nature conservation include the Trinidad and Tobago Field Naturalists' Club and the University of the West Indies Biological Society, the latter of which seeks to address environmental protection by implementing public awareness programmes and reforestation projects (F. Homer, pers. comm., 1988). The Crusoe Reef Society was set up in 1986 to monitor, conserve and protect the marine and coastal environment and resources in Tobago. In 1986 its work included concentrating on halting the damage to Buccoo Reef Protected Area (K. Kenny, pers. comm., 1986).

In the late 1970s and early 1980s it was widely agreed that the level of conservation management being undertaken throughout all protected areas was minimal: in wildlife sanctuaries, including in Bush and Caroni Swamp, exploitation of timber was the principal activity (Chalmers, 1981). A decade later the indications were that very little had changed. Patrolling was reported to be inadequate in all wildlife sanctuaries, and only Caroni had active habitat management and a wardening system (F. Homer, pers. comm., 1988). In general, management is inadequate, except in Caroni Swamp and Little Tobago Wildlife Sanctuary.

**Systems Reviews** Situated in the Caribbean Sea, Trinidad is the most southerly of the West Indian Islands, and lies 11.3km north of the Venezuelan coast of South America. Tobago is a mountainous island, 80.5km long and 59.5km wide, lying 30.4km to the northeast of Trinidad. On Tobago, four major vegetation communities have been described: littoral woodland, deciduous seasonal woodland, rain forest and swamp forests; the rain forest is restricted to sheltered mountain valleys of the Main Ridge. Lower montane forest, xerophytic rain forest, evergreen formations and some elfin woodland also occurs. At the foot of the Northern Range are marsh grasslands of Aripo savanna. Mangroves occur in patches on the coast (Beard, 1944; Davis *et al.*, 1986; Thelen and Faizool, 1980). In 1990, just over 300,000ha, or approximately 60% of the land surface, could still be classified as forest land, although much of this is under severe pressure for alternative uses (Bacchus and Vorrán, 1990).

Offshore, the Buccoo reef/Bon Accord area represents the most outstanding example of coral reefs and beaches in the country (Thelen and Faizool, 1980; UNEP/IUCN, 1988). The waters surrounding the islands are strongly influenced by ocean currents; between June to December low salinity water from the Orinoco washes the region.

Trinidad has approximately 2,200 species of flowering plant, 110 of which are endemic to the island. There are also reported to be over 400 species of bird, 25 amphibians and 55 reptiles (Huber and Meganck, 1987). A summary of the natural resources has been published (Cooper and Bacon, 1981).

In the 1940s, increasing forest exploitation and the conversion of natural forests to teak and pine plantations brought about an interest in preserving small relict areas of natural forest as nature reserves. These were generally small, ranging from eight to 350ha (Bacchus and Vorrán, 1990).

In 1977 there were 13 game sanctuaries, with a total area of 24,049ha, and 11 nature reserves. The legal status of the nature reserves is unclear. However, as they are all located within forest reserves, a certain degree of protection is guaranteed. (Cooper and Bacon, 1981; Dardaine, 1977).



By 1980, under the Policy for the Establishment and Management of a National Park System in Trinidad and Tobago (Thelen and Faizool, 1980), 61 areas worthy of being protected were identified, covering approximately 69,000ha, to be classified under six different categories. These comprised: 13 scientific reserves; eight national parks; eight natural landmarks; 13 nature conservation reserves; six scenic landscapes and 13 recreation parks. Of the lands within the proposed system, 31% were at the time forest reserves and a further 12% were game sanctuaries. In addition, several marine reserves were proposed. The eight proposed national parks, Caroni Swamp, Chaguaramas, Madamas, Maracas, Matura, Nariva Swamp and in Tobago, Buccoo Reef and Eastern Tobago, cover almost half the proposed protected areas system. This proposed plan is still to be approved by the Government of Trinidad Tobago, but may serve to indicate the future directions in resource conservation (Thelen and Faizool, 1980).

In December 1991, four areas, Aripo and Caroni Swamp, Matura Bay and Fishing Pond, were listed as gazetted forest reserve prohibited areas under the Forest Ordinance. By 1988 there were reported to be 13 wildlife sanctuaries totalling 16,000ha (P.R. Bacon, pers. comm., 1988; R. Cross, pers. comm., 1989, 1992).

Environmental concerns include those areas that are extensively mined with the associated loss of top soil, vegetation and fauna. Legislation generally is inadequate to prevent excavation, forestry, squatting and other potentially environmentally harmful activities (F. Homer, pers. comm., 1988). All the sanctuaries and many of the forest reserves have been invaded by squatters. The former Kronstadt Island, Morne L'Enfer and Valencia wildlife sanctuaries have been mined, quarried or logged to such an extent that by 1988 they were degazetted (R. Cross, pers. comm., 1989). In 1987 significant fire damage affected Northern Range Wildlife Sanctuary (P.R. Bacon, pers. comm., 1988).

Tourism and recreation are a major consideration in the protected areas of the islands; in the early 1980s up to 4,500 people annually visited the most popular site, Caroni Swamp Wildlife Sanctuary (Chalmers, 1981).

In 1972, the Wildlife Conservation Committee published *The Wildlife Sanctuaries of Trinidad and Tobago* which provided a guide to the 13 sanctuaries, covering aspects of location, history, general description, access and management practices.

A review of existing and potential and private nature parks has been produced as a research paper for the National Environment and Conservation Council (Reddock, 1974).

## Addresses

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Crusoe Reef Society, Maraval, Trinidad and Tobago  
Caribbean Forest Conservation Association, PO Box 679, Port of Spain, Trinidad (Tel: 624 5439; FAX: 624 5439)

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ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title: Conservation of Wildlife Ordinance  
No. 16**

**Date:** 1958

**Brief description:** The Conservation of Wildlife Ordinance No. 16, 1958 makes provision for the establishment of wildlife (or game) sanctuaries. This ordinance did not become law until 1963.

**Administrative authority:** Forest Division

**Designations:**

**Wildlife (or game) sanctuary** Makes provision for the establishment of this category of protected area.

Hunting is prohibited, although other activities such as timber exploitation or quarrying may take place. The Chief Game Warden, with the approval of the Minister, may modify the boundaries of the sanctuaries.

**Source:** Bacon and French (1972); Wildlife Conservation Committee (1972)

**Title: Forest Ordinance**

**Date:** 1950

**Brief description:** The ordinance makes provision for the establishment of forest reserves and prohibited areas.

**Administrative authority:** Forest Division

**Designations:**

**Forest reserve** Management is primarily geared towards forest products.

**Forest reserve (Prohibited area)** Areas which are part of a forest reserve or Crown land may be declared by the President to be a "prohibited area". Regulations under this ordinance prohibit any unauthorised entry.

**Source:** Bacon and French, 1972; Wildlife Conservation Committee, 1972

**Title: Marine Areas (Preservation and  
Enhancement) Act**

**Date:** 1970

**Brief description:** Provides for marine areas to be protected as restricted areas.

**Administrative authority:** Forest Division

**Designations:**

**Marine area** Provisions for marine areas to be protected as restricted areas. Can be established to preserve natural beauty, to protect flora and fauna, to promote the enjoyment of the area, and to promote scientific research. The Act makes no provision for institutional structures necessary for the effective management of any areas designated.

**Source:** Bacon and French (1972); Wildlife Conservation Committee (1972)

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>Nature Reserve</i> Buccoo Reef	I	650	1973
	<i>Game Sanctuaries</i>			
2	Bush Bush	IV	1,554	1968
3	Central Range	IV	2,153	1934
4	Eastern Tobago	IV		100
5	Little Tobago	IV	101	1928
6	Maracas	IV	900	
7	Nariva Swamp	IV	1,500	
8	Northern Range	IV	936	1935
9	Southern Watershed	IV	1,874	1934
10	Trinity Hill	IV	8,246	1934
	<i>Prohibited Areas</i>			
11	Aripo Savannas	I	1,800	1987
12	Caroni Swamp	I	200	1987



Protected Areas of Trinidad and Tobago

# TURKS AND CAICOS ISLANDS (UNITED KINGDOM)

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Area 500 sq. km

Population 12,000 (1990 estimate)

Natural increase: No information

## Economic Indicators

GDP: US\$ 667 per capita (1987)

GNP: No information

**Policy and Legislation** The Turks and Caicos Islands became a separate colony of the United Kingdom in 1973 after association at various times with the colonies of the Bahamas and Jamaica. A new Constitution was introduced in 1976.

The National Parks Ordinance, 1975 provides the legal framework for protected areas. Four different categories of protected area can be created under Section 3 of the Ordinance: national park, nature reserve, sanctuary and area of historic interest (see Annex). The decision to gazette a protected area is the responsibility of the Executive Council, which is advised by a National Parks Committee, currently comprising ten people.

There is no specific forestry legislation. However, forestry is partly covered under the National Parks Ordinance, and other ordinances relating to plants, wild birds, fisheries and coasts. There is no stated or formal forestry policy (CDB, 1983).

**International Activities** The Turks and Caicos is included in the UK's ratification of the following international agreements with provisions for protected areas: the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention); and the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). One Ramsar site has been designated.

The UK Government ratified the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) on 23 February 1986, and has signed the Protocol on Specially Protected Areas and Wildlife in 1991. The UK's ratification includes the Turks and Caicos Islands.

The Turks and Caicos government is not a member of the Caribbean Conservation Association (CCA), but participates in regional CCA activities.

**Administration and Management** Administration and management of the protected area system is the responsibility of the Director of Parks who is attached to the Department of Planning and Environment. A National Parks Adviser was employed on a two-year contract, commencing October 1991, funded by the UK Overseas Development Administration (ODA). In 1987, Executive Council approved the creation of a new

Department to be known as the Department of Environment, National Heritage and Parks.

The National Parks Committee, in discussions with the Turks and Caicos government, has examined the possibility of setting up a National Trust. Legislation for this is in final draft and is expected to go to the Legislature during February 1992 (P. Bradley, pers. comm., 1992).

The government has accepted a proposal that the civilian police should be responsible for policing marine parks, and local dive operators will be encouraged to continue acting as park rangers (a role they have been undertaking for a number of years). One aim of marine park management is to protect reefs from increased dive traffic by the installation of mooring buoys. This has been approved by the Executive and work is currently in hand at Grand Turk. Buoys are also planned for Providenciales, South Caicos and West Caicos using information provided by Operation Raleigh.

Forestry is not well developed in the islands: in the 1980s there was a Department of Agriculture within the Ministry of Development and Commerce. This Department had some role in amenity treeplanting, but has since closed down, along with its tree nursery on North Caicos (CDB, 1983; Garland, pers. comm., 1991).

Much of the initiative and impetus for environmental protection and conservation in the Islands has come from non-governmental organisations (NGOs), principally PRIDE (Foundation for the Protection of Reefs and Islands from Degradation and Exploitation), and the Turks and Caicos Development Trust, supported by the government, the UK ODA, bilateral and multilateral donors and international environmental groups (Anon., 1990). PRIDE is a charity, registered in Washington, concerned with the management and use of natural resources on the islands. The Turks and Caicos Development Trust, based on Grand Turk, aims to contribute to sustainable social and economic development by the wide use of the islands' resources.

**Systems Reviews** The Turks and Caicos are low-lying limestone islands (less than 75m in altitude) with a number of lagoons and salinas and outlying coral reefs. The Caicos Islands are relatively fertile, and support an understorey of scrub bush and cacti below a canopy of low trees. The Turk Islands have an unproductive, fine, sandy dune topsoil which supports a sparse vegetation of sedge and cacti. Intact stands of mangrove exist at South Creek on Grand Turk and along the creeks of all the Caicos.

Scrub-type forest has been estimated to cover some 90% of the total land area; swamp and mangrove forest covers something less than 5% of the total land area. Matured forest stands are rare in many places because of the high



demands for fuelwood and charcoal production (CDB, 1983).

A series of scientific surveys of the marine and coastal resources has been carried out by Operation Raleigh. Areas of study have been the north coast of Providenciales and Leeward Cays (Operation Raleigh, 1986a, b) and the island of Grand Turk (Operation Raleigh, 1987a, b). In September 1987 an expedition to South Caicos and Long Cay culminated in proposals for a Long Bay/East Bay Underwater Park and Conservation Zone and for Middleton Cay Island Sanctuary. Operation Raleigh visited Providenciales from November 1988 to January 1989 and North Caicos in 1990. The information on marine resources has been used to help formulate management proposals for the areas studied. As well as surveying marine areas, Operation Raleigh assists with the siting and installation of mooring buoys, and with an experimental conch replenishment exercise in cooperation with the principal fisheries officer.

A comprehensive survey of wetlands was undertaken, from July to October 1987, with the funding of WWF-UK, Department of the Environment and ODA and administered by WWF-UK. The aim of the survey was to assess the potential of wetlands for nomination as Ramsar sites, and as a result a large area of North, Middle and East Caicos has been designated. In addition, a comprehensive survey of the country's ecology has been undertaken recently by resource consultants.

Considerable progress has been made in the designation of protected areas. It is now necessary to prepare an overall plan that takes account of the need to achieve broad support for the system from the local community; to develop an indigenous management capability; and to draw up a sound financial strategy to pay for the management system. Overall management of protected areas in such a way would be facilitated by the formation of the new statutory body which is being considered (Anon., 1990).

Steps are now being taken to implement an overall plan for national parks. Regulations have been drafted for the management of national parks with financial assistance from the UK government. Funds have also been made available for signs, buoys and boundary markers for the national parks and Ramsar site.

In July 1987 the National Parks Committee presented a list of 33 recommended sites to the Executive. The National Parks Order of 4 March 1988 designated five national parks, one nature reserve, two sanctuaries and two areas of historical interest. In total, the Executive Council has now approved 27 of the 33 recommended sites and these are now protected by law (Lightbourne, 1991).

## Addresses

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The Turks and Caicos Development Trust, Front Street,  
Grand Turk  
PRIDE, Caribbean Field Headquarters, Pine Cay, Turks  
and Caicos

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## ANNEX

### Definitions of protected area designations, as legislated, together with authorities responsible for their administration

#### Title: The National Parks Ordinance

Date: 1975

**Brief description:** Provides the legal framework for protected areas

**Administrative authority:** National Parks Committee

#### Designations:

**National Park** Activities permitted within protected areas are governed by Section 4 of the Ordinance: an area designated as a national park shall be open to members of the public for recreational use such as camping, fishing and sailing. Developments, such as the erection of buildings, construction of roads and marinas, must be licensed by the Governor. The criteria which the Ordinance sets down for an acceptable development include the requirement that the proposal will "facilitate the enjoyment by the public of the natural setting of the area".

**Nature Reserve** Certain activities are also allowed within nature reserves. The need to sustain a "proper balance in the natural ecology of the area"

determines permissible activities in a nature reserve". The Ordinance lists agriculture, arboriculture, pisciculture, sport and recreation as permissible activities. The only buildings and developments permitted will be those required for one of the permitted uses, and before a development can be undertaken a licence has to be granted by the Governor.

**Sanctuary** The primary purpose of a sanctuary is to protect the natural ecology, or any particular form of living organism (including any marine life) in the area, and to avoid disturbance by human beings. Entry into a sanctuary is not permitted, except in accordance with any regulations made in respect of the sanctuary. No development is permitted.

**Area of Historic Interest** Provision for the protection of areas of historical interest is made, such that an area may be included within one of the previous categories, in which case it will be subject to the same restrictions as that area. Where the area does not coincide with one of the above, the public may have access, subject to conditions set down by appropriate regulations. No development is permitted without licence granted by the Governor.

## SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
<i>National Parks</i>				
1	Admiral Cockburn Land and Sea Park	IV	154	
2	Chalk Sound	II	1,460	1987
3	Columbus Landfall Marine Park	IV	518	
4	East Bay Islands	II	3,541	1987
5	Fort George Land & Sea Park	IV	494	1987
6	Grand Turk Cays Land and Sea Park	IV	156	1987
7	Leeward Land & Sea National Park and Nature Reserve	II	500	1987
8	North West Point	II	1,026	1987
9	Princess Alexandria	II	2,645	
10	West Caicos Marine Park	IV	397	
<i>Nature Reserves</i>				
11	Admiral Cockburn	IV	431	
12	Bell Sound	IV	1,142	1975
13	Dick Hill Creek, Bellfield Landing Point	III	394	
14	Lake Catherine	II	392	
15	Little Water Cay, Donna Cay and Mangrove Cay	III	182	
16	Pigeon Pond and Frenchman's Creek	IV	2,393	
17	Pumpkin Bluff Pond	IV	173	
18	Vine Point Ocean Hole	IV	757	1987
<i>Sanctuary</i>				
19	Big Sand Cay	IV	151	1987
<i>Area of Historical Interest</i>				
20	Salt Cay	V	176	1987
<i>Ramsar Wetland</i>				
	Turks & Caicos	R	250,000	1990



Protected Areas of the Turks & Caicos





# VIRGIN ISLANDS (UNITED STATES OF AMERICA)

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Area 341 sq. km

Population 101,809 (1990)

Natural increase: No information

## Economic Indicators

GDP: No information

GNP: No information

**Policy and Legislation** The United States Virgin Islands is an unincorporated territory of the United States. Much self government has been provided incrementally by the United States Congress. The Virgin Islands has been electing its own Governor since 1970, and has been represented in Congress by a nonvoting delegate since 1972. The Legislature, comprised of 15 members, has all the powers inherent in legislative bodies subject to the United States Constitution and the Virgin Islands Organic Act.

Federal and local legislation has been enacted to ensure protection and preservation of natural, cultural and historic resources. For further details of the federal legislation and administration see the entry for the United States of America. The Indigenous Species Act (Act 5665) provides protection to threatened and locally threatened and indigenous species as well as mangroves.

The Coastal Zone Management Act which was established in 1978 made provision for the Coastal Zone Management Program (CZM). The Department of Planning and Natural Resources (DPNR) is the lead agency, and has jurisdiction in exercising general control over the enforcement of laws relating to planning, conservation and the development of natural resources. The CZM is responsible for the protection, maintenance, preservation and, where feasible, the enhancement and restoration of the overall quality of the environment in the coastal zone. The United States Fish and Wildlife Service (USFWS) provides funding for wildlife and fisheries restoration through all the DPNR.

National parks, national monuments, and other categories of protected areas within the national park system are established by individual Acts of Congress. Virgin Islands National Park, which encompasses 56% of the island of St John, was established on 2 August 1956 (Public Law 925) and designated a biosphere reserve in June 1976. Buck Island Reef National Monument was established by Presidential Proclamation No. 3443, 1961. A variety of regulations governs the use of the areas within the national park system, most are intended to provide for the safety of park visitors and to protect the natural and cultural resources. The use or possession of any type of spearfishing equipment within park boundaries is prohibited. All taking of marine life is prohibited throughout the park. A natural resource protection programme that designates anchoring and mooring zones in the park has been implemented.

National wildlife refuges can be established by Act of Congress, but can also be transferred to the authority of the USFWS by administrative action, such as transfer of land from another agency (federal or state), or by receipt of a gift of land (from a state or unit of local government, a private organisation or an individual). While management objectives may vary considerably from site to site, refuges are essentially established for the restoration, preservation and management of wildlife habitat, and for the preservation of threatened species.

Provision for the establishment of national marine sanctuaries is made under the Marine Protection, Research and Sanctuaries Act, 1972. The Act authorises the Secretary of Commerce to designate ocean and coastal waters as national marine sanctuaries for the purpose of preserving or restoring their conservation, recreation, ecological or aesthetic values. Designation under the Act has the advantage of protecting a discrete ecosystem, as opposed to individual natural resources and species under several different laws. The sanctuary designation process was amended significantly in 1984 to increase the emphasis on sustainable multiple use and planning, and less on prohibitions. The sanctuary designation process begins when the National Oceanic and Atmospheric Administration (NOAA) selects an area from its own site Evaluation List to be an active candidate. Only after the drafting of management plans, two environmental impact statements and a public hearing can the area be designated. There are two USVI areas on the Site Evaluation List (1983), Southeast St Thomas and East End St Croix (Foster and Archer, 1988).

The Department of Planning and Natural Resources (DPNR) is charged with the task of planning and programming the development of the Territorial Park System which was legally mandated in 1972. The Department is also responsible for the preservation and management of natural resources, wildlife, and archaeological and historical resources. The Government of the Virgin Islands, with the DPNR and the Department of Housing Parks and Recreation (DHP&R) as the lead agencies, will be working on a management plan together with the federal government to make Salt River Bay in St Croix a national park. The DHP&R administers approximately 13 beaches and a number of recreational fields (or parks) together with the maintenance and upkeep of open spaces in the territory.

**International Activities** The United States is a participant in the following international conventions and programmes: Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), The Unesco Man and the Biosphere Programme, The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), The Convention for the

Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention), The Convention for the Protection of the Natural Resources and Environment in the South Pacific Region (SPREP Convention). Virgin Islands National Park was designated a biosphere reserve in June 1976.

**Administration and Management** The enforcement of federal regulations within the national park system is the responsibility of the National Park Service (United States Department of Interior), and enforcement of territorial laws is held by the territorial government. The United States Department of Interior (USDI), therefore, has responsibility for Virgin Islands National Park, Buck Island Reef National Monument and Christiansted National Historic Site. National park lands are classified into four general zones: natural, historic, development and special use. Funding comes from the National Park Service and supports not only the management of the area, but also research work by the Virgin Islands Resource Management Cooperative (VIRMC). Total budgets for these three sites in 1991 was US\$ 7.76 million, with the 73 staff.

National wildlife refuges are administered by the USFWS, also part of the USDI. The Virgin Islands Coastal Zone Management Program is the responsibility of the DPNR, which has jurisdiction over all wetlands and coastal areas. There are at present no national marine sanctuaries within the Virgin Islands, but if recommendations by NOAA (1981) are fulfilled, management of proposed sanctuaries will be shared by NOAA and the Virgin Islands authorities.

**System Reviews** Two of the three main islands, St Thomas and St John, are on the same submerged bank as Puerto Rico and the British Virgin Islands. The third island, St Croix, lies further south in the Caribbean Sea. The southwest and central-south parts of St Croix are relatively flat, and over half has slopes of less than 10%. Vegetation varies from the windswept east, where rolling hills support cactus and thorn scrub, to a moist forest in the west end. St Thomas is noted for its steep terrain, and more than 70% of the island has slopes exceeding 20%. General vegetation varies from the scrub of the rather dry east end to cooler and quite lush central mountain tops. St John is the smallest of the islands and 54% of the island is a national park. St John has generally steeper terrain, with 80% of the island having slopes of 30% or more (Boulon, 1984).

The tourist industry is the leading economic activity, and in 1980 the islands were visited by approximately one million tourists. Subsequent pressure on land and sea use makes active management essential to sustain the value of the natural features. Boulon (1984) identified three major problems with respect to management of natural resources: loss of land through population increase and subsequent construction, overexploitation of marine resources, and maintenance of marine, nearshore water quality. The islands have also been the subject of a significant number of scientific studies. In recent years

the Virgin Islands Resource Management Cooperative has worked to provide coordinated environmental research and its funding, and to ensure application and dissemination of results. One result of this has been a range of Biosphere Reserve Research Reports, 29 of which were published 1986-8. Most of these reports relate to Virgin Islands National Park, but some include information from Buck Island Reef National Monument and the British Virgin Islands. A synthesis of major findings in these and other pertinent research reports appear in Rogers and Teytaud (1988). Virgin Islands National Park currently has an active programme of long-term monitoring of marine and terrestrial resources, including coral reefs, reef fishes, dry and moist forest, and soils. Several long-term research sites have been established.

#### Addresses

Department of Planning and Natural Resources, Suite 231  
Nisky Center, No. 45A Estate Nisky, ST THOMAS  
Department of Housing Parks and Recreation,  
ST THOMAS  
Property and Procurement Building, Room 206,  
Subbase, ST THOMAS  
National Park Service, US Department of the Interior,  
WASHINGTON, DC, USA  
Virgin Islands National Park Service, PO Box 710,  
ST JOHN

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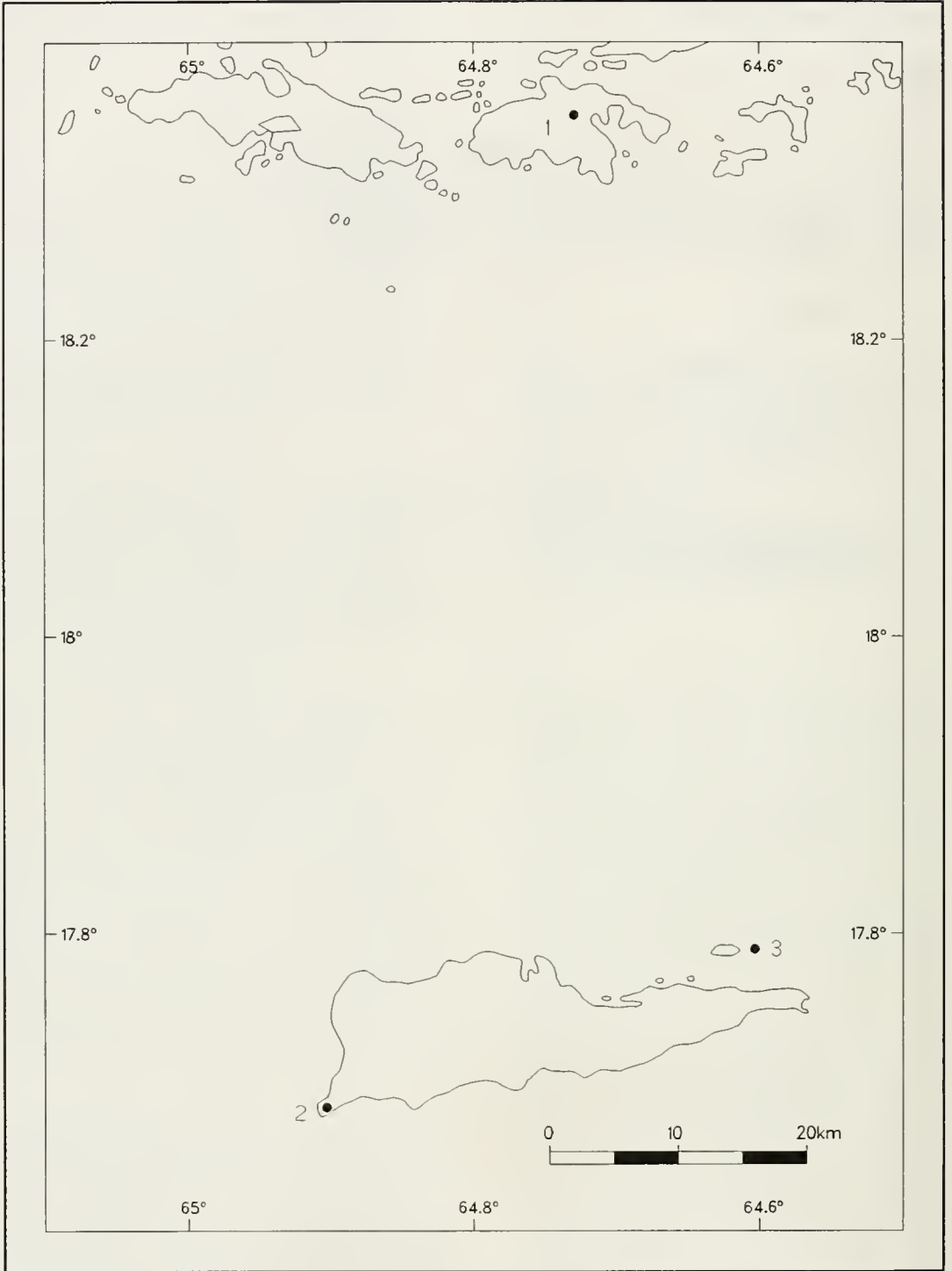
Virgin Islands Resource Management Cooperative (19868). *Biosphere reserve research reports 1-29*.

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**SUMMARY OF PROTECTED AREAS**

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>National Park</i> Virgin Islands	II	5,308	1956
2	<i>National Wildlife Refuge</i> Sandy Point	IV	134	
3	<i>National Monument</i> Buck Island Reef	III	356	1961
	<i>Biosphere Reserve</i> Virgin Islands National Park	IX	6,127	1976





Protected Areas of the US Virgin Islands

# SOUTH GEORGIA

**Area** 3,755 sq. km

**Population** Staff of the British Antarctic Survey (approximately 3-4) on Bird Island (increased numbers in summer) and garrison at Grytviken.

**Economic Indicators** Not relevant

**Policy and Legislation** South Georgia is claimed by the United Kingdom and by Argentina (as *Islas del Atlantico Sur*) but governed from the Falkland Islands as part of the territory South Georgia and the South Sandwich Islands (formerly the Falkland Island Dependencies). Conservation and protection of the flora and fauna is governed by the Falklands Islands Dependencies Conservation Ordinance 1975. Three forms of designated area for conservation may be established under this law: specially protected area; site of special scientific interest; and area of special tourist interest (see Annex). It is now prohibited to land on South Georgia for mountaineering or other recreational purposes except in Areas of Special Tourist Interest, unless granted a special permit to visit other places (Bonner and Lewis Smith, 1985).

Administration of South Georgia is provided for in the South Georgia and South Sandwich Islands Order 1985.

**International Activities** South Georgia was included in the UK ratification of the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) and Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), as a dependency of the Falkland Islands.

**Administration and Management** South Georgia is administered by the Commissioner of South Georgia and South Sandwich Islands who is also the Governor of the Falkland Islands. Local administration of conservation measures is delegated to the resident Magistrate (Garrison Commander) and to the Director of the British Antarctic Survey (R.Headland, pers.comm., 1992).

**Systems Reviews** South Georgia is the second largest of the sub-Antarctic islands and lies about 1,400km from the Falkland Islands. It consists of a main island with smaller islands, islets and rocks. Clerke Rocks to the southeast and Shag Rocks to the northwest are included in the dependency. South Georgia is very mountainous, rising to over 2,934m, and about two-thirds of the surface has permanent snow and ice-cover. The climate is cold and wet throughout the year, with strong winds. Precipitation averages about 1,500mm annually and the mean annual temperature is 2°C. Sub-zero temperatures are recorded each month (Bonner and Lewis Smith, 1985; R.Headland, pers.comm., 1992).

Extensive areas of vegetation occur only at low altitudes in coastal areas, particularly on the more sheltered northern coast. Vegetation consists of coastal tussock grassland, dry meadows, moss communities and fellfield vegetation. Tussock grassland, dominated by *Parodiochloa flabellata*, the largest of the island's plants comprises the most prominent plant community (Headland, 1991). The vascular flora comprises 26 indigenous species. The cryptogram flora is richer with about 125 moss species, 85 liverworts and 150 lichens. Terrestrial and freshwater algae are locally abundant. The paucity of the flora is caused more by isolation than climate alone, although cold summers are a critical factor. Terrestrial mammals are all recent introductions. Six species of seal occur, including the fur seal, the population rate of which is currently increasing at a rate of 15% *per annum*, following virtual extinction in the nineteenth century (Bonner and Lewis Smith, 1985; Headland, 1991; Oldfield, 1987; Strange, 1992). Much scientific research has been conducted on South Georgia in the past, and the ecology of the fauna and flora is well known in comparison with most other subantarctic islands (Clark and Dingwall, 1985).

Cooper Island is designated as a Specially Protected Area, and Bird Island and Annenkov Island are classified as Sites of Special Scientific Interest. In addition, Grytviken and Bay of Isles are designated as Areas of Special Tourist Interest.

Rats are a problem on South Georgia. They have wiped out the endemic pipit and smaller seabirds over much of the main island, but fortunately have not spread to offshore islands such as Bird Island (Oldfield, 1987). From 1904 to 1966, several whaling stations operated year-round. Several thousand men were often resident during summer, however, since the closing of the whaling stations, the human population has been very low. Fishing operations occur in the vicinity of South Georgia. Some fish stocks are thought to be have been overexploited, and recent interest has centred on pelagic fishing for krill, and studies of krill populations (Clark and Dingwall, 1985; Headland, 1991; Trathan *et al*, 1992). Close monitoring and control of catches are necessary in view of the dependence on the marine environment of marine mammals and birds which breed on the islands. Tourism has developed in recent years, but is well-regulated, and mainly restricted to sites of Special Tourist Interest (Clark and Dingwall, 1985).

## Addresses

British Antarctic Survey (Director), High Cross, Madingley Rd, Cambridge CB3 0ET (Tel: 0223 61199; Fax: 0223 62616)  
Deputy Commissioner of South Georgia and South Sandwich Islands, Government House, Stanley, Falkland Islands

References

Bonner, W.N. and Lewis Smith, R.I. (1985). Conservation Areas in the Antarctic. Scott Polar Research Institute, Cambridge, U.K. 299pp.

Clark, M.R. and Dingwall, P.R. (1985). Conservation of Islands in the Southern Ocean: A review of the protected areas of Insular Antarctica. IUCN, Gland, Switzerland and Cambridge, UK. 188pp.

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ANNEX

Definitions of protected area designations, as legislated, together with authorities responsible for their administration

**Title:** Falkland Islands Dependencies Conservation Ordinance

**Brief description:** Provides for three categories of protected area, as well as general restrictions concerning flora and fauna.

**Date:** 1975

**Administrative authority:** No information

**Designations:**

**Specially Protected Area** This may be: a representative example of a major land, freshwater, or coastal marine ecological system; an area with a unique complex of species; an area which is the type locality or only known habitat of any native plant or invertebrate species. To be preserved from any interference, to enable future comparison with areas disturbed by man. Permits

to enter only issued for compelling scientific reasons which cannot be served elsewhere, provided the actions permitted will not will not jeopardise the natural ecological system existing in the designated area.

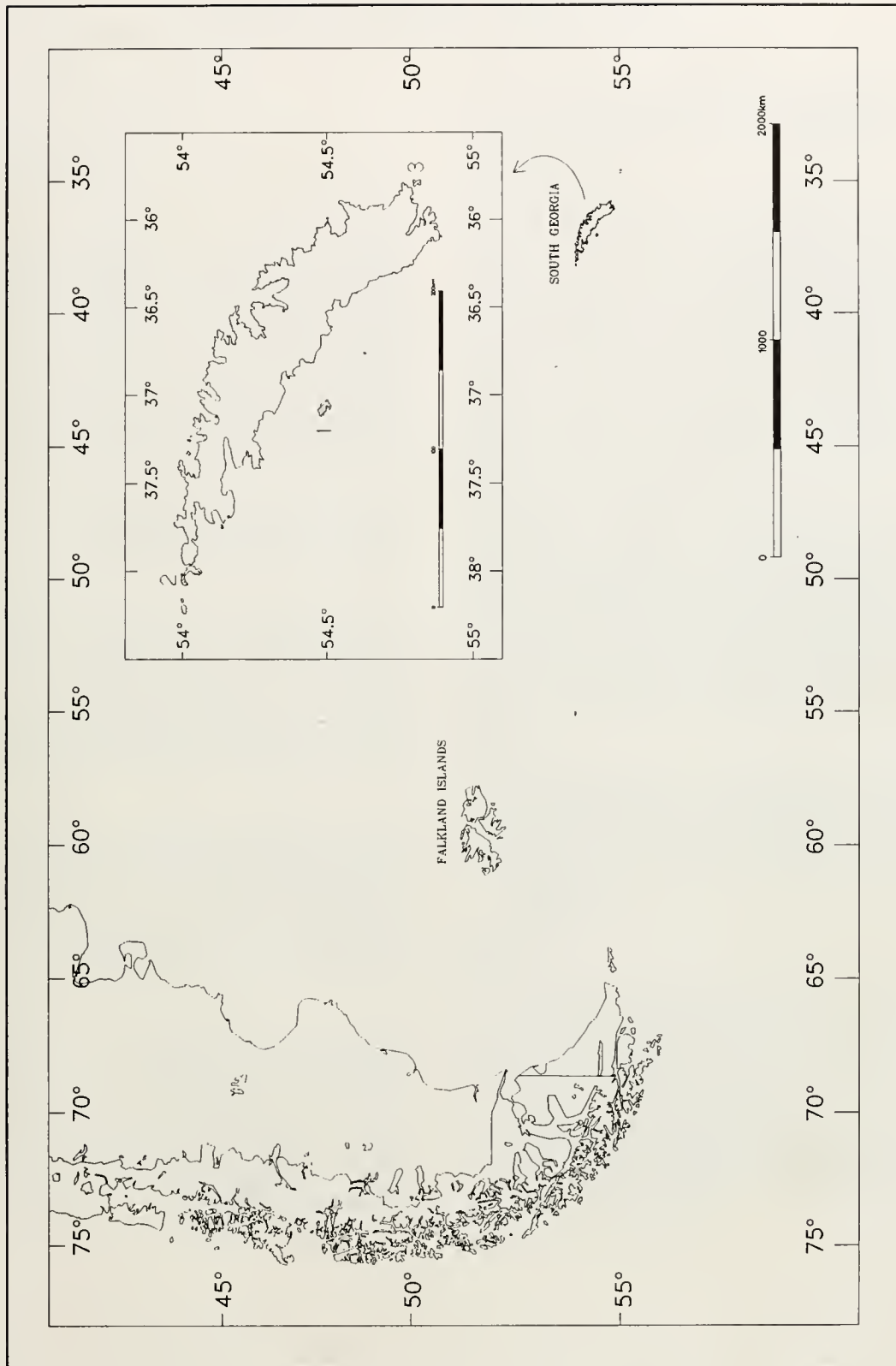
**Site of Special Scientific Interest** Designated to prevent scientific investigations being jeopardized by disturbance. Permits to enter are only issued for compelling scientific reasons which cannot be served elsewhere and provided that the actions permitted will not interfere with the scientific investigations for which the site was designated.

**Area of Special Tourist Interest** Area open for tourism, selected as being representative of wildlife and scenic beauty where the effects of tourist activity may be systematically assessed.

**Source:** Original legislation

SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
	<i>Sites of Special Scientific Interest</i>			
1	Annenkov Island	I		1975
2	Bird Island	I		1975
	<i>Specially Protected Area</i>			
3	Cooper Island	I		1975



Protected Areas of South Georgia





# SOUTH SANDWICH ISLANDS

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**Area** 310 sq. km

**Population** Uninhabited

**Economic Indicators**

No economic activity

**Policy and Legislation** The South Sandwich Islands are claimed by the United Kingdom and by Argentina (as *Islas del Atlantico Sur*) but governed from the Falkland Islands as part of the territory South Georgia and the South Sandwich Islands (formerly the Falkland Island Dependencies). The conservation and protection of the flora and fauna is governed by the Falklands Islands Dependencies Conservation Ordinance 1975. Three forms of designated area for conservation may be established under this law: specially protected area; site of special scientific interest; and area of special tourist interest (see Annex).

Administration of the South Sandwich Islands is provided for in the South Georgia and South Sandwich Islands Order 1985.

**International Activities** The South Sandwich Islands were included in the UK ratification of the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) and Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), as a dependency of the Falkland Islands.

**Administration and Management** The South Sandwich Islands are administered by the Commissioner of South Georgia and South Sandwich Islands who is also the Governor of the Falkland Islands. Local administration of conservation measures is delegated to the resident Magistrate (Garrison Commander) and to the Director of the British Antarctic Survey (R.Headland, pers.comm., 1992).

**Systems Reviews** The South Sandwich Islands, an archipelago of 11 volcanic islands, lie 470km to the southeast of South Georgia, forming a chain 386km long. The islands group forms the only volcanic arc in the Antarctic region and is bounded by a deep sea trench, up to 8,265m deep, on its eastern side. The islands range in length from 1 to 28km and from 190 to 1,370m altitude. The larger islands are mainly covered by ice, the smaller

islands are almost ice-free in summer. Virtually all the islands show signs of recent volcanic activity, several have active fumaroles, and recent eruptions have occurred (Bonner and Lewis Smith, 1985; R.Headland, pers.comm., 1992).

Vegetation is essentially Antarctic in character. The flora consists of at least 13 species of algae, 27 species of lichen, 31 species of moss, 12 species of liverwort, a few basidiomycete fungi, and one grass (but this record is probably incomplete). The major affinities of the flora are with southern South America, South Georgia and the maritime Antarctic. Sealing activities in the 19th century almost eliminated the fur seal, but breeding populations have been increasing since 1957. Elephant, Weddell and leopard seals are all thought to breed on the islands (Bonner and Lewis Smith, 1985; Clark and Dingwall, 1985).

Although there are no gazetted protected areas, protection of the islands is generally considered adequate with no outstanding conservation problems at the present (Oldfield, 1987). Apart from the reduction or elimination of the small population of breeding fur seals in the nineteenth century, the islands have suffered little human disturbance. There are no records of introduced plants or animals (Bonner and Lewis Smith, 1985).

**Addresses**

British Antarctic Survey (The Director), High Cross, Madingley Rd, Cambridge CB3 0ET (Tel: 0223 61199; Fax: 0223 62616)

Deputy Commissioner of South Georgia and South Sandwich Islands, Government House, Stanley, Falkland Islands

**References**

- Bonner, W.N. and Lewis Smith, R.I. (1985). Conservation Areas in the Antarctic. Scott Polar Research Institute, Cambridge, U.K. 299pp.
- Clark, M.R. and Dingwall, P.R. (1985). Conservation of Islands in the Southern Ocean: A review of the protected areas of Insulantarctica. IUCN, Gland, Switzerland and Cambridge, UK. 188pp.
- Oldfield, S. (1987). Fragments of paradise: a guide for conservation action in the U.K. dependent territories. Pisces publications. 192pp.

ANNEX

**Definitions of protected area designations, as legislated,  
together with authorities responsible for their administration**

**Title: Falkland Islands Dependencies  
Conservation Ordinance**

**Brief description:** Provides for three categories of protected area, as well as general restrictions concerning flora and fauna.

**Date:** 1975

**Administrative authority:** No information

**Designations:**

***Specially Protected Area*** This may be a representative example of a major land, freshwater, or coastal marine ecological system; an area with a unique complex of species; an area which is the type locality or only known habitat of any native plant or invertebrate species. To be preserved from any interference, to enable future comparison with areas

disturbed by man. Permits to enter only issued for compelling scientific reasons which cannot be served elsewhere, provided the actions permitted will not will not jeopardise the natural ecological system existing in the designated area.

***Site of Special Scientific Interest*** Designated to prevent scientific investigations being jeopardized by disturbance. Permits to enter are only issued for compelling scientific reasons which cannot be served elsewhere and provided that the actions permitted will not interfere with the scientific investigations for which the site was designated.

***Area of Special Tourist Interest*** Area open for tourism, selected as being representative of wildlife and scenic beauty where the effects of tourist activity may be systematically assessed.

**Source:** Original legislation

# TRISTAN DA CUNHA AND GOUGH ISLAND

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**Area** 159 sq. km

**Population** 306 (1988 census)

Natural increase: Roughly constant (R.Headland, pers.comm., 1992)

## **Economic Indicators**

GDP: no information

GNP: no information

**Policy and Legislation** Tristan da Cunha and Gough Island are both British Overseas Territories. Gough Island is a dependency of Tristan da Cunha which in turn is a dependency of Saint Helena, a British Overseas Territory. The Tristan da Cunha Conservation Ordinance 1976 covers both Tristan da Cunha and Gough Island and makes provision for different degrees of protection. General restrictions are imposed on activities throughout many of the islands, and provision is made for the establishment of Gough Island as a Wildlife Reserve, and for areas of Tristan da Cunha to be declared a sanctuary (see Annex). Present agricultural and horticultural activities and human disturbance on the main island of Tristan are recognised, and provision is made for future concentration of development there.

The Tristan da Cunha Fisheries Limits Ordinance of 1968 as amended by Ordinance No.3 of 1977, specifically protects an area of 200 nautical miles around the Tristan Islands (Ryan and Cooper, 1991).

**International Activities** Tristan da Cunha was included in the UK ratification of the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) and Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), as a dependency of Saint Helena.

**Administration and Management** The islands are the responsibility of the Administrator of Tristan da Cunha, assisted by the Island Council of Tristan da Cunha. There are currently two conservation officers, appointed by the Administrator, together with the islands's policeman. Under the Tristan da Cunha Conservation Ordinance, members of the police force are also conservation officers (Clark and Dingwall, 1985; Cooper and Ryan, 1992a).

A formal management plan for Tristan da Cunha does not exist, although an overall strategy has been outlined by Wace and Holdgate (1976).

A management plan for Gough Island Wildlife Reserve is currently being prepared, on behalf of the Tristan Government, funded by WWF-UK and UK-FCO (Foreign and Commonwealth Office), and to be submitted by 1993 (Cooper and Ryan, 1992b). The management plan will provide guidelines for the

continued operation and supply of the island's meteorological station and for conducting research.

There are no locally based conservation organisations

**Systems Reviews** Tristan da Cunha consists of three islands, Tristan da Cunha, Inaccessible and Nightingale, which lie in the South Atlantic about 2,800km from South Africa and some 3,200km from the nearest point of South America. Gough Island, lies about 350km south-southeast of Tristan da Cunha. The islands are all of volcanic origin, although Gough Island is the summit of a separate volcanic mass from that of the Tristan group. The native flora comprises about 40 species of flowering plant and 30 pteridophytes, with less on Nightingale and Inaccessible (Clark and Dingwall, 1985; Wace and Holdgate, 1976; R.Headland, pers.comm., 1992).

Tussock grassland dominates low lying areas, with wet heath vegetation at higher levels. Extensive beds of kelp surround much of the coast. The avifauna is rich, with a total of 28 breeding birds. Two species of seal are native. They have been exploited in the past but are now protected, and are increasing in numbers once more (Clark and Dingwall, 1985; Oldfield, 1987; Wace and Holdgate, 1976).

Under the Tristan da Cunha Conservation Ordinance, the entire group of islands is protected, to varying levels. Gough Island and its territorial waters out to three nautical miles is protected as a wildlife reserve. Tristan da Cunha has protected status equivalent to a multiple-use management area, with Jews Point specifically protected as a sanctuary. Strict protection is afforded to all other islands, with the exception of provision for some islanders to kill some birds. Overall, legal protection of the biota and environment of the islands is considered to be adequate (Clark and Dingwall, 1985). An area of 200 nautical miles surrounding the Tristan Islands is specifically legally protected. However this has had no effect in keeping illegal driftnetters from operating within this area, resulting high mortality rates among non-target species, including marine mammals, birds, turtles and fish (Ryan and Cooper, 1991). A commercial fishery takes place within the territorial waters of Gough Island Wildlife Reserve (Cooper and Ryan, in press).

## **Addresses**

South Atlantic and Antarctic Department (The Head),  
Foreign and Commonwealth Office, King Charles  
St., London SW1A 2AH (Tel: 071-270 3000)  
The Administrator, Edinburgh, Tristan da Cunha



References

Clark, M.R. and Dingwall, P.R. (1985). Conservation of Islands in the Southern Ocean: A review of the protected areas of Insulantarctica. IUCN, Gland, Switzerland and Cambridge, UK. 188pp.

Cooper, J. and Ryan, P.G. (1992a). The Current Conservation Status of the Tristan da Cunha Islands. SCAR/IUCN Workshop on Protection, Research and Management of Sub-Antarctic Islands. 15pp.

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Ryan, P.G. and Cooper, J. (1991). Rockhopper penguins and other marine life threatened by driftnet fisheries at Tristan da Cunha. *Oryx* 25: 76-79.

Wace, N.M. and Holdgate, M.W. (1976). Man and nature in the Tristan da Cunha islands. *IUCN Monograph No. 6*. 114pp.

ANNEX

**Definitions of protected area designations, as legislated, together with authorities responsible for their administration**

**Title:** Tristan da Cunha Conservation Ordinance

**Brief description:** Provides for the protection of the Tristan da Cunha islands and Gough Island and a three nautical mile territorial waters zone

**Date:** 1976

**Administrative authority:** The Administrator of Tristan da Cunha

**Designations:**

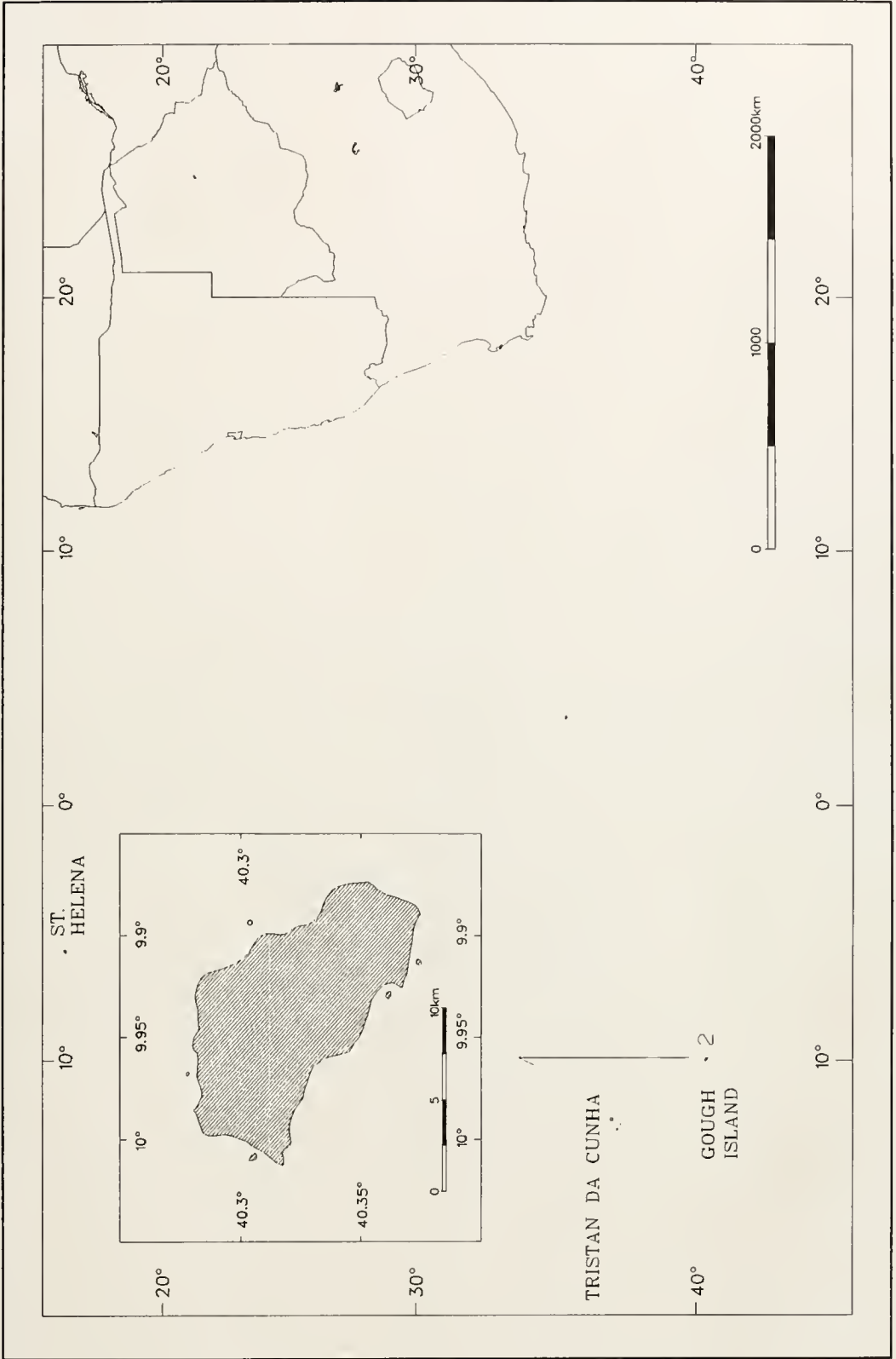
**Wildlife Reserve** Activities prohibited include killing, capture, or molestation of native birds and mammals; interference with native vegetation; introduction of non-native fauna and flora; construction of buildings, roads, and structures without a permit.

**Sanctuary** Activities prohibited include wilful killing, capture or molestation of any native bird or native mammal

**Source:** Wace and Holdgate (1976)

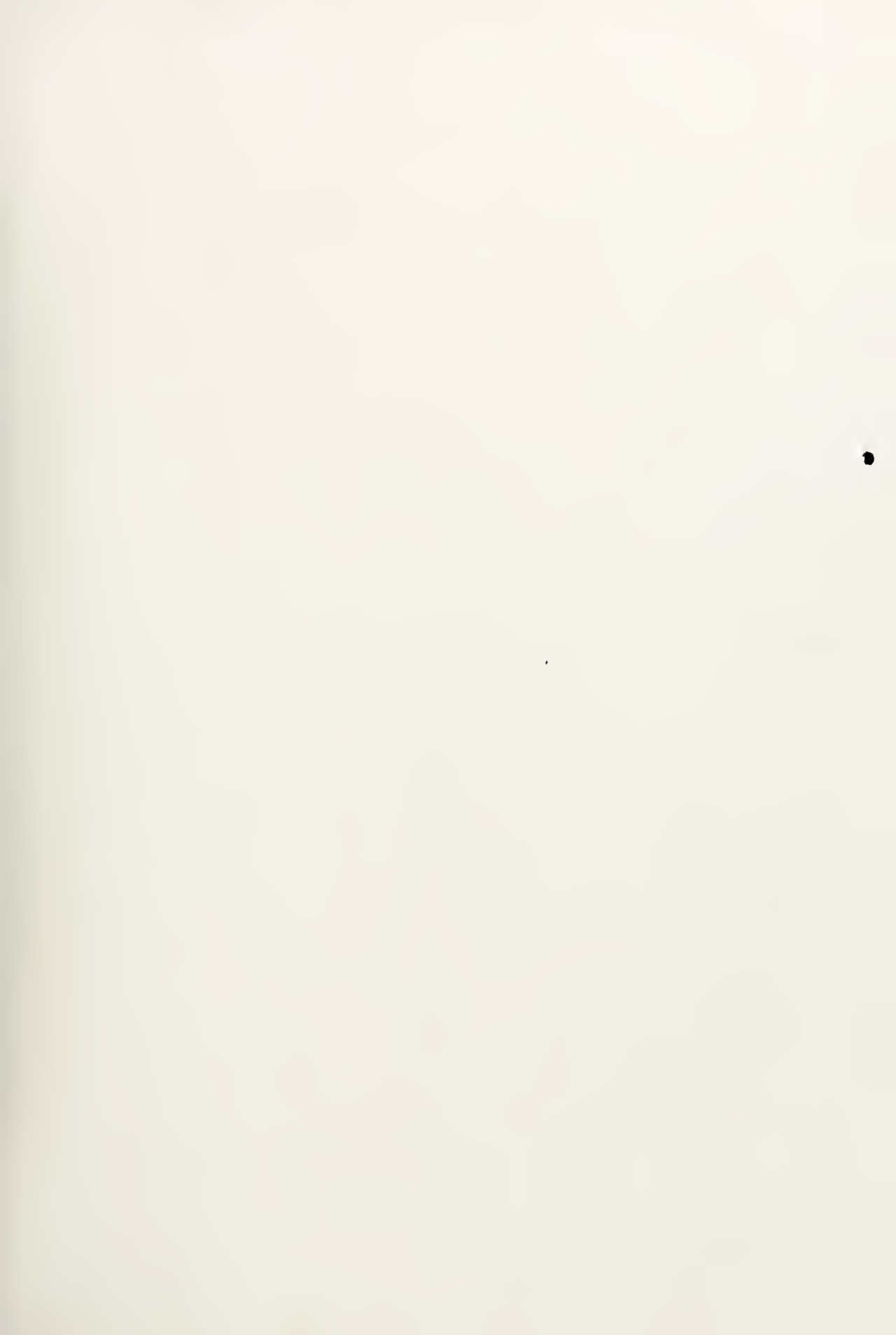
SUMMARY OF PROTECTED AREAS

Map ref.	National/international designations Name of area	IUCN management category	Area (ha)	Year notified
1	<i>Sanctuary</i> Jews Point	I	11,100	1979
2	<i>Wildlife Reserve</i> Gough Island	I	6,500	1976



Protected Areas of Tristan da Cunha and Gough Island











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