

STATUS OF PROTECTED AREA SYSTEMS IN THE WIDER CARIBBEAN REGION



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PREFACE

Coral reefs, mangroves, sea grass beds, wetlands, and other coastal and terrestrial ecosystems are under heavy stress in many countries of the Wider Caribbean Region. Threats to these and other sensitive habitats, as well as the mismanagement of living resources, are undermining the very survival of a number of plant and animal species important for achieving sustainable development in the region.

The Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean (SPAW) to the Cartagena Convention, provides a comprehensive legal framework for the protection and sound management of these threatened and endangered species of regional concern and their habitats. The SPAW Protocol calls for the establishment of protected areas in order "to conserve, maintain and restore, in particular:

- a) representative types of coastal and marine ecosystems...to ensure their long-term viability and to maintain biological and genetic diversity;
- b) habitats and their associated ecosystems critical to the survival and recovery of endangered, threatened or endemic species;
- c) the productivity of ecosystems and natural resources that provide economic or social benefits and upon which the welfare of local inhabitants is dependent; and
- d) areas of special biological, ecological, educational, scientific, historic, cultural, recreational, archaeological, aesthetic or economic values..."

The Protocol also contains several provisions that include detailed protection measures for the areas, measures for the planning and management of the areas, for the listing and development of co-operation programmes for the areas, and for the establishment of common guidelines and criteria, among other things.

According to David Freestone, Managing Editor of the International Journal of Estuarine and Coastal Law, writing in Volume 5 (4), 1990: "The Kingston Protocol is arguably the most comprehensive regional wildlife protection treaty in the world-it is certainly the most comprehensive of its kind. In addition to the formal annexing requirements and the institutional structure which it establishes, its provisions on environmental impact assessment, planning and management regimes, and buffer zones, as well as the range of protection measures it envisages (including species recovery plans), reflects much of the best in modern thinking on wildlife protection and management."

The main consequence of the adoption of the SPAW Protocol is the formulation and implementation of the Regional Programme for Specially Protected Areas and Wildlife (SPAW). Although the SPAW Regional Programme was only formulated and developed in 1980, a number of activities concerning parks and protected areas and species conservation and management have been implemented since 1985 under the framework of the Caribbean Environment Programme (CEP).

The SPAW Regional Programme has developed a number of activities to assist with the implementation of the provisions of the Protocol. These activities include the development of common guidelines and criteria for the identification, establishment and management of protected areas, general guidelines for sea turtle and manatee management and national recovery plans for these species, comprehensive training programmes for trainers and protected area personnel and associated modules and manual, general guidelines for revenue generation by protected areas, assistance to coastal and marine protected areas on management issues, including the development of a marine protected area database and directory, development of common methodology and programme for monitoring coral reefs and associated ecosystems and management and conservation activities of coastal ecosystems.

More recently, the SPAW Regional Programme acts as contact point for the Wider Caribbean on the regional Agenda for Action of the International Coral Reef Initiative (ICRI). Additionally, programmatic linkages are currently being developed with the Convention on Biological Diversity (CBD), to assist with its implementation as appropriate through the Caribbean Environment Programme and its SPAW Regional Programme.

This report was prepared at the request of the Governments of the Wider Caribbean and in an effort to assist them in meeting the objectives of the SPAW Protocol and its SPAW Regional Programme. The report is largely based on the 1992 IUCN Publication "Protected Areas of the World: A review of national systems, Volume 4". The Regional Co-ordinating Unit (RCU) of UNEP, updated the information to the extent possible, through published and unpublished reports and consultations with all relevant Governments. The RCU recognises that there are still gaps in the information and remains committed to continue updating the information as required. In this context, comments from the Governments and organisations from the region are welcomed by the RCU, to further improve the knowledge of the region on this important subject, for the conservation of our natural resources.

1. INTRODUCTION

This report documents developments in the protected areas systems in the 37 states and territories that make up the Wider Caribbean Region. Overall, 1,307 protected areas (20% with marine or coastal resources) covering 116 million ha have been established in the region. An increasing number of conventions and programmes are available to support national efforts to manage protected areas for multiple conservation objectives, including biodiversity, research and training, watershed protection, recreation and ecotourism and sustainable production of timber, fibres, game species, medicinal plants and fruits.

While these figures are heartening, at the same time they illustrate the enormous challenge that the protected areas movement faces. As protected areas coverage has risen the need to provide services and facilities for increasing numbers of tourists and researchers, carry out resource inventories and applied research, and work with local communities to optimise sustainable resource management and local participation become increasingly important. At the same time external pressures produced by urban and industrial expansion, energy and mineral development, agro-industry, global climate change, deforestation and the expansion of the agricultural frontier are increasing with equal speed.

Protected areas management was once seen as a largely technical responsibility best handled by the state, but today the restructuring and down-sizing of governments throughout the region has led many agencies to accept increasing participation from non-governmental organisations. In many cases this has led to the development of strategic alliances to achieve management goals. Co-ordinating efforts between traditional government agencies and NGOs is another challenge that has to be resolved.

Much has been written concerning the gaps that exist in our understanding of the region's exceptional biodiversity. However, equally important gaps exist in our understanding of the social use of natural resources by local communities. It is widely recognised that there is a tremendous shortage of financial resources for management of the protected areas of the region. However, the shortfalls in the development of planning and management techniques, together with appropriate training for protected areas managers, field personnel and community volunteers represent a strategic challenge for protected areas systems. As seen from this perspective much has been achieved, but much more is needed to guarantee that protected areas will efficiently and effectively produce the conservation objectives for which they were established. National agencies and local conservation groups have the opportunity and the obligation to ensure that the limited human, financial and political resources available

are used to establish solid foundations for the development of protected areas systems as we rapidly approach the dawning of the 21st century.

The body of this report begins with Chapter II, which provides background information on the social and ecological indicators for the Wider Caribbean Region. Tables presenting data on population levels, density, GNP, location of major wetlands, forest and marine environments, and biodiversity are included. This chapter also briefly describes the major international agreements and programmes relevant to protected areas management within the region, and adhesion by regional states and territories.

Chapter III opens with an overview of protected areas issues at the regional and sub-regional levels. Individual country profiles are organised in alphabetical order. Each profile includes information on protected areas and natural resources policy, legislation, administration, biodiversity and management issues. Annexes summarising relevant legislation and lists of established protected areas organised by management category are included for each country.

Chapter IV summarises recommendations from a variety of sources which include the World Parks Congress and recent meetings of the Caribbean Environment Programme of UNEP.

2. RELEVANT ISSUES FOR PROTECTED AREA SYSTEMS IN THE WIDER CARIBBEAN

This report on the Protected Areas Systems covers the 37 states or territories in the Caribbean, Central America, South America, and North America which share the coastal waters of the Gulf of Mexico, the Caribbean Sea and the adjacent areas of the South Atlantic of the Wider Caribbean Region as defined in the Cartagena Convention and associated protocols ([Figure 1](#): Map of the Wider Caribbean Region).

In spite of the varied physical, cultural, economic and political differences that characterise the region, governments from all these states combined forces under the Caribbean Environment Programme of UNEP and its Specially Protected Areas and Wildlife Programme (SPAW) to promote the sustainable use and conservation of the marine, coastal and associated terrestrial environments of the region.

Sections 2.1 and 2.2 outline the diverse socio-economic and ecological characteristics of the region which underline the importance of protected areas systems to the sustainable development of the region. Section 2.3 identifies the major conventions and programmes being used regionally to promote conservation and sustainable development.

2.1. Socio-economic Indicators

The Wider Caribbean Region (WCR) states and territories are home to over 200 million people. Nearly half of the total population lives in the Caribbean and Gulf Coast states of Mexico and the USA. In descending order come South American Caribbean (55 million), Insular Caribbean (34 million) and Central American Caribbean (26 million). Other states with large populations include Colombia (34 million), Venezuela (20 million), Cuba (11 million). By the year 2000, the population living in coastal areas of the WCR is projected to exceed 60 million (UNEP 1994).

Average population density is highest for Insular Caribbean (215 per km²), with densities reaching 300-600 persons per km² in Barbados, Puerto Rico and Martinique. North America has the second highest density (52 per km²), followed by Central America, and South America. Population growth rates are highest for Central America (2.7%), followed by Mexico (2%), South America (1.9%), and the Insular Caribbean (0.8%). The region's urban population represents 75 to 65% of the total in North and South America, as compared to 50% for Central America and Insular Caribbean (Table 1).

North America's per capita income (US\$12,635) is almost 10 times that found in Central America and 6 times greater than South America. Not surprisingly, the US has the highest per capita income level, but 5 insular Caribbean states follow with per capita incomes of US\$10-15,000 per year. If US data is excluded, the lower 25% have per capita incomes of US\$370-1,730 per year, while the top 25% have incomes of US\$4,820-13,770 per year.

Mexico and the US account for 85% of the region's GDP of over US\$1.4 billion. South America contributes US\$96 million, followed by the Insular Caribbean (US\$84 million) and Central America (US\$30 million). Individually important economies include Venezuela (US\$53 million), Colombia (US\$41 million) Puerto Rico (\$US32 million) and Cuba (US\$21 million).

TABLE 1. SOCIO-ECONOMIC INDICATORS

	Population (1)				GNP (2)			
	Pop. 1994 (1000s)	Annual % Increase 85-90, 90-95		Urban %	Density per km ²	Infant Mortality per 1000 Births	Million \$US	Per Capita Income
Insular Caribbean								
Anguilla (UK)	9	1.4	1.3	n.d.	99	19.5	28	3,890
Antigua & Barbuda	65	0.7	0.7	32	147	21.2	363	4,430
Aruba (N)	67	0.1	0.25	n.d.	347	9.6	730	11,840
Bahamas	272	1.8	1.6	64	20	26.3	2,913	11,750
Barbados	261	0.35	0.33	45	607	10.9	1,680	6,630
British Virgin Islands (UK)	18	3.2	2.9	12	118	29.8	133	10,760

Cayman Islands (UK)	32	4.7	4.2		124	6.1	357	13,770
Cuba	11,102	1	0.9	72.0	97	11.1	20,900	2,000
Dominica	71	-0.4	-0.2		95	18.4	160	2,440
Dominican Republic	7,759	2.2	2.0	61.0	160	54.0	7,172	940
Grenada	96	0.2	0.3	33.0	278	29.0	199	2,180
Guadeloupe (FR)	411	1.9	1.2	48	231	9.2	1,170	3,200
Haiti	7,045	2	2.0	29.0	254	94.0	2,641	370
Jamaica	2,408	0.9	1.0	53.0	211	15.0	3,497	1,380
Martinique (FR)	375	1.1	0.9	80	348	8.1	1,429	4,100
Montserrat (UK)	12	-0.5	-0.3	15	115	28.2	54	4,540
Netherlands Antilles (N)	192	-0.02	0.12	92	240	6.3	1,375	7,060
Puerto Rico (USA)	3,648	0.9	0.9	75.0	407	14.0	32,469	6,320
St. Kitts & Nevis	43	-0.5	-0.3	49	165	22.2	133	3,960
St. Lucia	142	1.4	1.4	46	231	17.7	286	2,490
St. Vincent & The Grenadines	111	0.9	0.9	25	285	21.3	184	1,730
Trinidad & Tobago	1,292	1.3	1.1	70	252	19.0	4,920	3,670
Turks & Caicos Islands (UK)	15	4.3	3.8	n.d.	35	10.2	69	4,820

US Virgin Islands (USA)	102	0	0.2	39	296	19.4	1,246	11,740
Subtotal	35,548	1.2	1.1	49	215	21.7	84,108	5,250
Central American Caribbean								
Belize	208	2.6	2.0	38	9	36	373	2,010
Costa Rica	3,319	2.8	2.4	48	65	14	5,560	1,850
Guatemala	10,322	2.7	2.7	40	95	60	9,353	930
Honduras	5,367	3.1	3.0	45	48	49	2,661	580
Nicaragua	4,275	2.6	3.7	60	29	56	6,950	460
Panama	2,562	2.1	1.9	54	33	21	5,544	2,130
Subtotal	26,053	2.7	2.6	48	46	39	30,441	1,327
North American Caribbean								
Mexico	48,820	2.2	2.0	73.0	70	36.0	282,526	3,030
USA	42,090	0.9	1.0	75.0	34	9.0	936,082	22,240
Subtotal	90,910	1.6		74.0	52	23	1,218,608	12,635
South American Caribbean								
Colombia	34,415	1.8	1.7	71	30	23.0	41,207	1,260
Venezuela	19,868	2.4	2.1	85	22	34.0	53,480	2,730
Guyana	755	0.2	1.0	34	4	51.0	293	430
Suriname	428	1.9	1.9	62	3	28.0	1,365	3,630
French Guiana (FR)	130	3.7	3.0	73	1	22.7	179	1,830
Subtotal	55,596	2.0	1.9	65	12	31.7	96,524	1,976
Sources: 1) Trobler, W. et al 1995. The Global Demography Project, NCGIA Technical Report 95-6. National Centre for Geographic Information and Analysis, UC Santa Barbara. 2) Almanaque Mundial 1995. Editorial America S.A.,								

2.2. Biodiversity

Biodiversity is defined as the total diversity present at the genetic, species and bio-physical levels. As measured by species numbers, the tropics harbour at least 50% of the world's biodiversity. The diverse environments of the Wider Caribbean in turn contain a significant part of the tropic's biodiversity. Biodiversity conservation is a primary or secondary objective in all protected areas.

While year round environmental stability associated with a range of widely differing ecosystems is often identified as an important factor for species diversification of tropical environments, Prance (1985) describes major climate change (decreases in rainfall, average temperature and sea level) over the past 2-3 million years as the primary factor behind the development of centres of speciation in the Amazon. In Central America, climatic change, together with the consolidation of the inter-American land bridge and ocean barrier, and the associated range of environmental conditions have been cited as major factors which increase biodiversity (Rich & Rich 1983).

Overall biodiversity is undoubtedly due in part to the great the variety of landforms and environmental conditions, periodic climatic swings and island biogeography. Mountainous areas border much of the region from the US-Mexico border through Venezuela, and are also found in Hispaniola, Jamaica, Puerto Rico and the Lesser Antilles. Submarine trenches (Cayman, Puerto Rico) and ridges divide the region into a number of basins and banks.

Coastal lowlands, often associated with wide continental shelves, are characteristic of the USA (Gulf States), the Yucatan Peninsula, the Honduras-Nicaragua border, Los Llanos in Venezuela, the Guyana Shield, and most of Cuba. Over 50 internationally significant wetlands have been identified in the region. Many have been given some type of protection, although few have been submitted under the Ramsar Convention (Table 2).

The most obvious common denominator for the region is the shared status as coastal countries of the Gulf of Mexico, Caribbean Sea and Western Atlantic. If the coastlines of the region were lined up one by one, the combined length would reach almost three-quarters of the way around the globe. Although the land area of the insular Insular Caribbean states is only 5% of the region's total, they possess over 50% of the coasts.

TABLE 2. MAJOR WETLANDS

INSULAR CARIBBEAN

Bahamas: 1) Western Andros Wetlands, 3) Lake Rosa, Inagua National Park
Barbados: 17) Graeme Hall Swamp
Barbuda: 15) Saline Lagoons of Barbuda
Cuba: 4) The Sabana & Camaguey Archipelagos, 5) Zapata Swamp, 6) Cienega de Lanier & Esenada de la Siguanea
Dominican Republic: 13) Lago Enriquillo
Grand Cayman: 7) Central Mangrove Swamp & Booby Cay
Guadeloupe: 16) Grand Cul-de-Sac Marin
Haiti: 11) Artibonite Floodplain & Delta, 12) Etang Saumatre
Jamaica: 8) Negril Morass, 9) Black River Lower Morass, 10) Portland Bight Swamp
N. Antilles: 101) Netherlands Antilles Wetlands
Puerto Rico: 14) Humaco Swamp
Trinidad & Tobago: 104) Caroni Swamp
Turks & Caicos: 2) North & Middle Caicos

CENTRAL AMERICAN CARIBBEAN

Belize: 35) Crooked Tree Lagoon, 36) Northern Lagoon & Southern (Manatee) Lagoon
Costa Rica: 24) Barra de Colorado
Guatemala: 34) El Tigre Lake, 33) Lago de Itzabal, Golfete, Rio Dulce
Honduras: 30) Laguna de Caratasca, 31) Lago de Yojoa
Nicaragua: 29) Rio Grande de Matagalpa Delta
Panama: 23) Laguna de Chiriqui, 20) Gatun Lake

SOUTH AMERICAN CARIBBEAN

Colombia: 96) Lower Rio Atrato Wetlands, 97) Cienaga de Zapatosa, 98) Cienaga Grande de Santa Marta
Guyanas: 105) Coastal Mudflats & Mangroves, 106) Coppermane Rivermouth
Venezuela: 99) Cienagas de Juan Manuel, Aguas Blancas y Aguas Negras 100) Cuare Wildlife Refuge, 102) Los Llanos, 103) Orinoco Delta

NORTH AMERICAN CARIBBEAN

Mexico: 52) Laguna Madre, 53) Rio Tamesi Delta, Tampico Lagoons, & Laguna de Tamiahua, 54) Rio Papaloapan & Rio San Juan Deltas, 55) Usumacinta Delta, Tabasco Lagoons, 56) Laguna de Terminos, 57) Rio de Celestun, 58) Rio Lagartos, 59) Bahia de la Acension
USA: 78) Everglades National Park, 84) Big Cypress Swamp, 86) Everglades System, 87) Mississippi Bottomland Hardwood System, 88) Apalachicola River and Bay, 89) Lake Ponchartrain, 90) Galveston Bay, 91) Mississippi Delta, 92) Southeastern Bottomland Hardwoods, 93) Aranas-Laguna Madre, 95) Lake Okeechobee, 120) Lake Kissimmee and River, 121) Louisiana - Texas Marshes, 122) Mobile Bay-Coastal Marshes

Source: IWRB 1991. The numbers refer to the maps included in the original text.

The 10 countries with the longest coastlines account for nearly 75% of the total coastline. These countries include the US, Cuba, the Bahamas, Venezuela, Mexico, Colombia, Nicaragua, Jamaica, Haiti and Dominican Republic. Table 3 also includes continental shelf areas, but the data are incomplete and do not separate continental shelf area of the Wider Caribbean from Pacific or Atlantic Oceans.

In terms of forest cover, South America Caribbean is the sub-region with highest percentage and absolute amount of forest cover. The opposite extremes are found in the Insular Caribbean, while Central America occupies an intermediate position. Data for the Gulf States of the US and Mexico were not available.

Although the importance of the tropics for biodiversity conservation is unquestioned, there remains much to be done in regards to inventory of the region's biodiversity. Even when considering Biogeographic Provinces (Udvardy 1976) the diversity of the region is impressive, with 19 tropical and 3 temperate terrestrial ecosystems represented:

- NEARTIC: Austroriparian, Eastern Forest, Grasslands
- MESOAMERICA: Campechan, Sinaloan, Yucatecan, Guerreran, Central American, Panamanian,
- INSULAR CARIBBEAN: Bahamas-Bermudas, Cuban, Greater Antillean, Lesser Antillean
- SOUTH AMERICA: Colombian Coastal, Guyanan, Venezuelan Dry Forest, Venezuelan Deciduous Forest, Los Llanos, Campos Limpos, Northern Andean, Colombian Montane

All are represented by one or more protected areas, but generally the lack of detail in the Udvardy scheme limits its value for analysing biodiversity patterns at smaller scales. While a number of more detailed systems have been developed and applied in the region (Life Zones, Macro Vegetation Types) the lack of uniformity hinders regional comparisons.

The Wider Caribbean has a high level of biodiversity, even for tropical areas. ICBP (1992) used endemic bird distribution to identify priority areas for conservation throughout the world. Globally, 2,609 landbirds (27% of all species) were identified as having restricted breeding ranges located in 221 Endemic Bird Areas (EBA). The Wider Caribbean Region holds 25, or slightly more than 10% of all EBAs, and is home to 510 (20%) of the Restricted Range Species (RRS). Individually, Mexico and Colombia were rated 4th and 5th in terms of EBAs, while Venezuela was ranked 7th in terms of RRS.

TABLE 3. FOREST AND MARINE ENVIRONMENTS

Sub-regions, Countries and Territories	Land Area (1,000 ha)	Forest Cover (1990)			Coastline km	Continental Shelf (1000 km ²)
		(1,000 ha)	% of Total	Deforestation Rate		

Insular Caribbean						
ANGUILLA (UK)	10	n.d.	0%	n.d.	56	n.d.
ANTIGUA & BARBUDA	44	10	23%	n.d.	178	n.d.
ARUBA (N)	19				76	
BAHAMAS	1,393	186	13%	1.9%	3,542	85.70
BARBADOS	43		0%		97	0.30
BRITISH VIRGIN ISLANDS (UK)	15		0%		250	
CAYMAN ISLANDS (UK)	26		0%		160	n.d.
CUBA	10,982	1,715	16%	0.9%	3,735	n.d.
DOMINICA	75	44	59%	0.6%	153	n.d.
DOMINICAN REPUBLIC	4,838	1,077	22%	2.5%	1,576	18.20
GRENADA	34	6	18%	5.0%	117	n.d.
GUADELOUPE (FR)	178	93	52%	0.3%	306	n.d.
HAITI	2,756	23	1%	3.9%	1,771	10.60
JAMAICA	1,083	239	22%	5.3%	1,022	40.10
MARTINIQUE (FR)	110	43	39%	0.4%	290	2.40
MONTSERRAT (UK)	10	n.d.	n.d.	n.d.	49	n.d.
NETHERLANDS ANTILLES	80	n.d.	n.d.	n.d.	390	n.d.
PUERTO RICO	890	321	36%	1.5%	585	

(USA)							
ST. KITTS & NEVIS	26	13	50%	0.0%	130		
ST. LUCIA	62	5	8%	3.8%	140		
ST. VINCENT & GRENADINES	39	11	28%	3.8%	135		
TRINIDAD & TOBAGO	513	155	30%	1.9%	362	29.20	
TURKS & CAICOS ISLANDS (UK)	43				250		
US VIRGIN ISLANDS	35				350		
Subtotal	23,304	3,941	17%	1.7%	15,720		187
Central American Caribbean							
BELIZE	2,280	1,996	88%	0.2%	386	n.d.	
COSTA RICA	5,106	1,428	28%	2.6%	210	16	
GUATEMALA	10,843	4,225	39%	1.6%	120	12	
HONDURAS	11,189	4,605	41%	2.0%	700	54	
NICARAGUA	11,875	6,013	51%	1.7%	550	73	
PANAMA	7,599	3,117	41%	1.7%	1,200	57	
Subtotal	48,892	21,384	44%	1.7%	3,166		212
South American Caribbean							
COLOMBIA	103,870	54,064	52%	0.6%	1080	68	
FRENCH GUIANA (FR)	9,000	7,997	89%	0.0%	378	n.d.	

GUYANA	19,685	18,416	94%	0.1%	459	50
SURINAME	15,600	14,768	95%	0.1%	386	n.d.
VENEZUELA	88,205	45,690	52%	1.2%	2,800	88
Subtotal	236,360	140,935	60%	0.6%	5,103	206
North American Caribbean						
MEXICO	70,093	N.D.		1.2%	2,900	442
USA (Gulf States)	122,409	N.D.		N.D.	3,389	1,808
Subtotal	192,502				6,289	2,250
GRAND TOTAL	501,058	166,260	33%		30,278	2,854

Sources: WRI 1994, Goode's World Atlas 1988.

TABLE 4. ENDEMIC BIRD AREAS

Endemic Bird Areas	Countries	No. of Restricted Range Species
Mexico & US Gulf States		
Sierra Madre Oriental	Mexico & US	2
NE Mexican Gulf Slope	Mexico & US	4
Central Mexican Marshes	Mexico	2
Yucatan Peninsula	Belize, Guatemala, Honduras & Mexico	18
Central Mexican Highlands	Mexico	20
	Subtotal	46
Central America		
Northern CA Highlands	Belize, Guatemala, Honduras, Mexico & Nicaragua	22

Southern CA Caribbean Slope	Costa Rica, Guatemala, Nicaragua, Panama	10
Costa Rican & Panama Highlands	Costa Rica, Nicaragua & Panama	54
Northern Choco & Darien Lowlands	Colombia, Costa Rica & Panama	14
Darien Highlands	Colombia, Panama	15
	Subtotal	115
Insular Caribbean		
Cuba & Bahamas	Bahamas, Cuba, Turks & Caicos	25
Jamaica	Jamaica	34
Hispaniola	Dominican Republic, Haiti	34
Puerto Rico	Puerto Rico	26
Eastern Caribbean	Antigua & Barbuda, Anguilla, Netherlands Antilles, Barbados, Dominica, Grenada, Guadeloupe, St. Kitts & Nevis, St. Lucia, Martinique, Montserrat, St. Vincent & Grenadines, US Virgin Islands	38
	Subtotal	157
South America		
Guyanas	French Guiana, Guyana, Suriname	14
Tepuís	Guyana, Venezuela	42
Cordillera de Caripe and Paria Peninsula	Venezuela	13
Northern Venezuelan Mts.	Venezuela	18
Venezuelan Llanos	Colombia, Venezuela	2

Merida Mountains	Venezuela	27
Guajiran Lowlands	Colombia, Venezuela	11
Santa Marta Mountains	Colombia	21
Nechí Lowlands	Colombia	12
Eastern Andes of Colombia	Colombia, Venezuela	32
	Subtotal	192
	Grand Total	510

SOURCE: ICBP 1992. Putting Biodiversity on the map.

Within the Wider Caribbean, the South American sub-region has the highest numbers of Endemic Bird Areas (EBAs) and restricted range species (RRS) (10 areas and 192 species). The remaining sub-regions all count with 5 EBAs each, but the Insular Caribbean leads with 157 RRS, followed by Central America (115) and Mexico (46). No EBAs or RRS are centred in the continental US. In contrast, nearly all the Caribbean islands are included within EBAs. The Costa Rica-Panama Highlands are also notable, with 54 RRS. In addition to confirming the region's importance for biodiversity conservation, the study also highlights the need for regional co-operation as 70% of the EBAs span 2 or more countries.

Although the species diversity of the tropics is undisputed, taxonomic studies are far from complete, especially in relatively little studied, highly diverse, inaccessible ecosystems (soil invertebrates & microbes, deep sea, tropical forests). Researchers estimate that 10 million species inhabit the globe, while only 1.4 million have been identified (WRI 1994). Available information on species diversity for most of countries of the region has been tabulated by various organisations (TNC, Conservation International, WCMC). Summary data by sub-region is presented below.

As is typical for the tropics, the area's species biodiversity is much higher than would be expected based on land area (3% of world total) alone. Figures for Mesoamerica indicate that this sub-region contains 13% of all mammal species, 14% of all bird species, 20% of all reptile species and 13% of amphibian species world-wide. Countries with high diversity such as Mexico and Colombia present similar figures.

While species numbers are much lower for the insular Caribbean, the majority of the islands have high levels of endemism, especially in the larger islands (see Table 5).

2.3. International Agreements and Programmes

Countries within the Wider Caribbean participate in a number of international, regional and sub-regional agreements, programmes and associations. While participation does not resolve the multiple planning and management problems facing protected areas managers, or even guarantee compliance with acquired obligations, it does facilitate the exchange of experiences between neighbouring countries, and brings international attention to policy and management issues.

TABLE 5. SPECIES DIVERSITY

	Higher Plants			Mammals			Birds			Reptiles			Amphibians		
	All Spp	Endemics	Threatened	All Spp	Endemics	Threatened	All Spp	Endemics	Threatened	All Spp	Endemics	Threatened	All Spp	Endemics	Threatened
Sub-regional Figures															
Insular Caribbean	n.d	n.d	n.d	147	47	19	668	163	110	463	376	53	156	138	1
% of World Total				3%			7%		11%	10%		31%	4%		2%
Guyanas Region	n.d	n.d	n.d	330	20	40	1353	58	154	285	76	30	230	115	0
% of World Total				8%			14%		15%	6%		18%	6%		0%
Mesoamerica	n.d	n.d	n.d	559	365	45	1384	570	156	933	791	41	503	421	6
% of World Total				13%			14%		15%	20%		24%	13%		11%
World Total	270,000	n.d.	6,173	4,327	n.d.	n.d.	9,672	n.d.	1,029	4,771	n.d.	169	4,014	n.d.	57
Insular Caribbean															
BAHAMAS	1,217	112-118	25	12	2	2	88	3	4	39	19	12	2	0	0
BARBADOS	572	X	1	6	0	1	24	0	1						
CUBA	6,514	3,224-3,233	851	31	15	11	159	22	15	100	72	17	39	36	0
DOMINICA	1,325	X	62	12	1	0	59	2	3						
DOMINICAN REPUBLIC	5,667	1,800	51	20	0	1	125	0	5						
HAITI	5,242	1,445-1,800	13	20	0	1	x	0	4						
JAMAICA	3,308	889-923	371	22	3	5	159	25	2	38	26	12	20	18	0
MARTINIQUE (FR)	1,287	24-36	12	9	1	0	53	1	3						
MONTSERRAT (UK)															
NETHERLANDS ANTILLES(N)					9	0	2	171	0	8					
LESSER ANTILLES					37	11	4	193	22	29					
PUERTO RICO				17	0	2	220	14	29	46	32	9	25	19	0
TRINIDAD &	2,420	215-236	7	100	1	1	258	1	3	76	1	15	14	1	0

TOBAGO															
Central America															
BELIZE	2,894	150	48	125	0	8	528	0	4	107	1	12	26	0	0
COSTA RICA	12,119	600-1,300	478	205	8	10	848	7	14	218	26	18	151	33	2
GUATEMALA	8,681	1,171	326	184	4	10	480	0	10	204	14	18	98	26	0
HONDURAS	5,680	148	65	173	1	7	x	1	11	161	9	13	55	8	0
NICARAGUA	7,590	30-50	101	x	2	8	x	0	7	162	5	17	59	2	0
PANAMA	9,915	1,222	588	218	12	13	922	8	14	212	16	19	155	19	1
South America															
COLOMBIA	51,220	1,500	393	359	26	25	1,721	59	69	383	103	36	367	131	1
FRENCH GUIANA				142	2	28	628	1	86	136	2	24	89	2	0
GUYANA	6,409	x	73	193	0	12	x	0	9	137	4	19	105	11	0
SURINAME	5,018	x	72	187	2	11	x	0	6	131	1	19	99	6	0
VENEZUELA	21,073	8,000	112	288	11	19	1,308	45	34	246	55	26	182	76	0
North American															
MEXICO	26,071	10-15,000	495	439	137	25	961	88	35	704	370	34	272	171	4
USA (Lower 48 States)	19,473	4,036	2,279	346	94	27	650	70	43	263	n.d.	n.d.	197	n.d.	n.d.
Median	22,772	10,000	1,387	393	116	26	806	79	39	484			235		

Sources: WRI 1994, Mann 1986.
n.a. - not available

Presently, no overall studies have been prepared to evaluate the relative impact of international agreements and programmes in the region. Available information (WRI 1994, UNEP-SPAW 1995) has been tabulated and permits the comparison of overall, sub-regional, and national participation in conservation agreements and programmes (Table 6). Descriptions of each follows:

2.3.1 INTERNATIONAL CONVENTIONS AND TREATIES

1. Amazon Co-operation Treaty (ATC, 1978). This treaty has been signed by 8 countries sharing the Amazon Basin. The treaty aims to establish regulations for the sustainable management of natural resources and multi-national projects throughout the Amazon watershed. In 1989 a special environment committee was formed by the treaty signatories, and since 1990 a network on protected areas have been active.
2. Convention on Biological Diversity (CBD, 1992). The convention was signed in Nairobi shortly before the UN Summit Conference in Brasilia and entered into force in 1993 with the adherence of 163 countries. It commits participating countries to protect biological resources and includes provisions for biotechnology, access to and ownership of genetic material, knowledge, innovations and practices of indigenous

and local communities, and compensation to developing countries for the extraction of genetic resources.

3. Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983). The convention and the associated protocol on marine pollution entered into force in 1986 and constitute the legal framework for the Caribbean Environment Programme (see below). It promotes sustainable development through the management of coastal and marine resources. It includes provisions for pollution control, Environmental Impact Assessments, education, training, public awareness, and biodiversity conservation. A protocol on biodiversity was subsequently developed (see SPAW below) and another one on Land Based Sources and Activities of Marine Pollution is currently under development (UNEP 1983).

Protocol Concerning Specially Protected Areas and Wildlife (SPAW, 1990) The protocol was signed by 13 Contracting Parties to the Cartagena Convention. In 1991, three annexes were approved identifying fauna and flora requiring strict protection (Annexes I & II) and other species requiring protection under sustainable management guidelines. The Protocol advocates an ecosystem management approach and also lists groups of species requiring protection (e.g. coral reefs). The Protocol calls for the development of common guidelines for protected areas and species management, establishment of buffer zones and for national species recovery plans. It also established a Scientific and Technical Advisory Committee to guide practical implementation. Guidelines and criteria for the identification, selection, establishment and management of protected areas have been developed, as well as guidelines for revenue generation by protected areas (UNEP 1995b, 1995c). A training programme for trainers and protected areas personnel was developed (UNEP 1995d). Common guidelines for priority species management (namely manatees, sea turtles, migratory birds) were also developed (UNEP 1995e, 1995f).

4. Central American Biodiversity Convention (CABD, 1992). The convention commits signatories to develop sustainable development strategies, which give priority to biodiversity conservation and the establishment of protected areas. The Central America Commission on Environment and Development (CCAD) is charged with implementing the convention and updating and promoting the Central American Tropical Forestry and Protected Areas Action Plans. The convention

also mandates the establishment of a Central American Protected Areas Council, which has functioned on an interim basis since 1992.

5. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973). This convention entered into force in 1975. CITES protects endangered species from over-exploitation by controlling trade in live or dead animals, and animal parts through a permit system.
6. United Nations Convention on the Law of the Sea (LOS, 1982). The convention went into effect in 1994. It establishes a comprehensive regime for the seas and oceans, establishes rules for environmental standards, and enforcement provisions, and develops international rules and national legislation to prevent and control marine pollution.
7. Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972). This convention entered into force in 1983. It promotes the development of international agreements to protect species that migrate across international boundaries.
8. Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971). The convention entered into force in 1975. It is designed to stem the progressive encroachment, degradation, and loss of wetlands. Signatories recognise the ecological functions, and economic, cultural, scientific and recreational values of wetlands, and agree to respect their international responsibilities in managing wetlands and will nominate at least 1 area to the international register of significant areas. By 1993, 590 Ramsar Sites had been designated, covering 36 million ha.
9. Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940). This treaty provides basic definitions for protected area management categories.
10. Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972) The convention came into force in December 1975. Areas of outstanding universal value are designated as World Heritage Sites. It aims to foster international co-operation in the safeguarding of these sites, which contain unique natural or cultural resources. In 1994, 100 natural areas had been listed covering 100 million ha.

2.3.2 REGIONAL PROGRAMMES AND ASSOCIATIONS

12. Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972) is a regional non-profit research, training and educational institute

specialised in natural resource management and sustainable agriculture. It carries out co-operative projects with 10 member countries. Programmes in training and post graduate education are open to participants from throughout Latin America.

13. Caribbean Conservation Association (CCA, 1967) is a regional non-governmental organisation dedicated to evaluating conservation needs and co-ordinating activities throughout the Caribbean. Management of marine protected areas is one of the current programmes of the CCA.
14. Caribbean Environment Programme (CEP, 1981) is one of the Regional Seas Programmes supported by UNEP. It was established by 36 states and territories of the Wider Caribbean for the protection of the marine and coastal environment and the promotion of balanced and sustainable development through regional co-operation.

Programmatic areas include the development of action plans and guidelines covering integrated coastal management, species conservation and recovery, protected areas management, legislation and policy development, marine pollution assessment and control, environmental education, training and public awareness, information systems management, information exchange and networking.

Regional Programme on Specially Protected Areas & Wildlife (SPAW, 1990). This part of the CEP has been developed to support the implementation of the SPAW Protocol. The programme includes the development of regional management guidelines and national recovery plans for marine turtles, preparation of environmental education materials for species conservation and regional and national management plans for manatees, development of protected areas training programme, modules and manuals, and the documentation of case studies on marine and coastal protected areas, income generation through protected areas management, and management of migratory birds on island environments. Programmatic actions are co-ordinated with a network of associated organisations, such as FAO, CANARI, CCA, IUCN, WIDECAST, and a number of governmental and academic institutions (UNEP 1995a).

15. Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW) is a programme supported by a joint FAO-UNEP project seeks to improve co-ordination in protected areas management throughout Latin America and the Caribbean. Activities include the publication of a bulletin covering network activities, organisation of workshops and seminars on diverse

aspects of protected areas management, publication of technical reports, and facilitation of horizontal technical assistance.

16. UNESCO's Man and the Biosphere Programme (MAB, 1972). Biosphere Reserves are designated to protect a range of objectives which include research, monitoring, training and demonstration projects, as well as on-site conservation of representative ecosystems and biodiversity. The programme was initiated in 1972, and by 1993 included 312 reserves world-wide with an extension of 171 million ha.
17. Tropical Forestry Action Plan (TFAP, 1985) is a global strategy designed by FAO, UNEP, the World Bank and WRI in co-operation with 40 bilateral donors, international organisations and non-governmental organisations. It provides a framework for concerted national and international action plans to manage, protect and restore forest resources in the tropics. The global strategy has been further developed as a series of regional and national forestry actions plans.

Table 6 illustrates participation in 18 international, regional or sub-regional environmental agreements or programmes. Weighted average participation for the entire Wider Caribbean is 65%. Highest levels of participation (75-100%) are found for programmes and agreements such the CEP and SPAW Programmes, CBD, CITES, Cartagena and World Heritage Conventions. At the sub-regional level participation is also high for the Amazon Co-operation Treaty and the Central American Biodiversity Treaties. Apparently, a significant number of countries could seek additional support through participation in the FAO-UNEP Protected Areas Network, the MAB programme and the Tropical Forestry Action Plan.

Central America registers the highest participation rate (79%), followed by South and North America (65-73%). Participation rates for the Insular Caribbean are lowest (57%). At the individual level, 75% of the states and territories participate in 50% or more of the programmes and agreements. Highest individual participation rates are registered for Panama, Guatemala and Costa Rica.

3. STATUS OF PROTECTED AREAS SYSTEMS

3.1. Overview

The region's protected areas have been established to conserve representative samples of natural ecosystems, conserve endangered species of flora and fauna, provide watershed protection and ensure water supplies, opportunities for education and research, recreation for local populations, provide sustainable supplies of timber and other renewable resources and to protect traditional land tenure and resource use of indigenous communities. These objectives are being partially achieved, but the lack of institutional capacity together with the assortment of environmental problems that affect the region endanger the future of our protected areas and the benefits they should provide to our societies.

TABLE 6. CONSERVATION AGREEMENTS AND PROGRAMMES

	Participati on Rate	Amaz on Coop.	CBD	Cartage na	CABD	CITES	Law of the Sea	Migr. Spp.	RAMS AR	SPA W Prot.	W. Hemisph ere	WHC	CATIE	CCA	CEP	LAN- NPPA W	MAB	SPA W Prog.	TFA P
Insular Caribbean																			
ANGUILLA (UK)	63%		UK	UK		UK			UK	S		UK		P	P			P	P
ANTIGUA & BARBUDA	50%		CP	CP			CP			S		CP		P	P			P	
ARUBA (N)	75%		N	N		N	N	N	N	N		N		N	P		P	P	
BAHAMAS	31%		CP			CP	CP								P			P	
BARBADOS	44%		CP	CP		CP	CP							P	P			P	
BRITISH VIRGIN ISLANDS (UK)	56%		UK	UK		UK			UK	S		UK		P	P			P	
CAYMAN ISLANDS (UK)	50%		UK	UK		UK			UK	S		UK			P			P	
CUBA	81%		CP	CP		CP	CP			S	CP	CP			P	P	P	P	P
DOMINICA	38%		CP	CP			CP							P	P			P	
DOMINICAN REPUBLIC	81%		S			CP	S	S			CP	CP	M	P	P	P	P	P	P
GRENADA	44%		CP	CP			CP			S				P	P			P	
GUADALOUPE (FR)	69%		FR	FR		FR	S		FR	S		FR		P	P		FR	P	
HAITI	44%		S				S				CP	CP			P	P		P	

JAMAICA	75%		CP	CP		FR	CP	S		S		CP		P	P	P		P	P
MARTINIQUE(FR)	56%		FR	FR		UK	S		FR	S				P	P			P	
MONTERRAT (UK)	50%		UK	UK					UK	S		UK		P	P			P	
NETHERLANDS ANTILLES(N)	75%		N	N		N	N	N	N	N		N		N	P		N	P	
PUERTO RICO(USA)	56%			US		US			US	S		US		P	P		US	P	
ST. KITTS & NEVIS	44%		CP			CP	CP					S		P	P			P	
ST. LUCIA	56%		CP	CP		CP	CP			S		CP		P	P			P	
ST. VINCENT & GRENADINES	44%			CP		CP	CP			CP				P	P			P	
TRINIDAD & TOBAGO	69%		S	CP		CP	CP		CP	S	CP			P	P	P		P	
TURKS & CAICOS ISLANDS (UK)	63%		UK	UK		UK			UK	S		UK		P	P			P	
US VIRGIN ISLANDS (USA)	56%			US		US			US	S		US			P		P	P	
Relative Participation	57%		92%	83%	0%	79%	71%	17%	54%	75%	21%	71%	4%	79%	100%	21%	29%	100%	17%
Central American Caribbean																			
BELIZE	65%		CP	S	P	CP	CP					CP	M	P	P	P		P	
NICARAGUA	71%		S	S	CP	CP	S				CP	CP	M		P	P		P	P
COSTA RICA	82%		CP	CP	CP	CP	CP		CP		CP	CP	M		P	P	P	P	P
HONDURAS	76%		S	S	CP	CP	CP		CP			CP	M		P	P	P	P	P
GUATEMALA	88%		S	CP	CP	CP	S		CP	S	CP	CP	M		P	P	P	P	P
PANAMA	94%		CP	CP	CP	CP	S	CP	CP	S	CP	CP	M		P	P	P	P	P
Relative Participation	79%		100%	100%	100%	100%	100%	17%	67%	33%	67%	100%	100%	17%	100%	100%	67%	100%	83%
South American Caribbean																			
COLOMBIA	71%	CP	CP	CP		CP	S			S		CP			P	P	P	P	P
FRENCH GUIANA (FR)	47%		FR	FR		FR	S		FR	S					P			P	
GUYANA	59%	CP	CP			CP	CP					CP		P	P	P		P	P
SURINAME	65%	CP	S			CP	S	CP	CP		CP				P	P		P	P
VENEZUELA	82%	CP	CP	CP		CP			CP	S	CP	CP	M	P	P	P	P	P	
Relative Participation	79%	80%	100%	60%	0%	100%	80%	20%	60%	60%	40%	60%	20%	40%	100%	80%	40%	100%	60%
North American Caribbean																			
MEXICO	81%		CP	CP		CP	CP		CP	S	CP	CP	M		P	P	P	P	

UNITED STATES	64%		S	CP		CP			CP	S		CP			P		P	P	
Subtotal			2	2	0	2	1	0	2	2	1	2	1	0	2	1	2	2	0
Relative Participation	73%		100%	100%	0%	100%	50%	0%	100%	100%	50%	100%	50%	0%	100%	50%	100%	100%	0%
Extra-Regional States																			
France	71%		CP	S		CP	S	CP	CP	S		CP			P			P	
Netherlands	86%		CP	S		CP	S	CP	CP	CP		CP		P	P		P	P	
United Kingdom	64%		CP	S		CP		CP	CP	S		CP			P			P	
Relative Participation	74%		100%	100%	0%	100%	67%	100%	100%	100%	0%	100%		33%	100%	0%	33%	100%	0%

*P = Participant, S = Signatory, CP = Contracting Party, M = Member Country
Party through other State: Netherlands (N), United Kingdom (UK), France (FR), United States (US)*

Echoing the recommendations made at the IVth World Parks Congress in Caracas (1992), it is clear that the challenges are too great for any one institution to solve single-handedly. Institutions involved with protected areas are usually small, understaffed, and under-trained. Although many difficulties exist, co-operation within the conservation sector, and with other relevant stakeholders is increasing. No magic formulae for success can be offered, but the traditional dedication which has characterised conservationists, the emphasis on increased professionalism, and the development of partnerships with other sectors of society are signs that the protected areas movement is advancing.

According to Dourojeanni (1994), the major problem that faces protected area management in Latin America is the contradiction between the lack of experience at the institutional and individual level versus the extremely complex ecological, social and economic challenges that managers face. Protected area management in the US has had more than 100 years to develop institutions, policies, research ecological and cultural resources, and implement professional park management, and still confronts many serious problems. The rest of the Wider Caribbean Region and Latin America, in general, have only a handful of areas under management for more than 10 years.

The very success they have had in establishing protected areas has been a double edged sword, as the expansion of coverage and responsibilities has usually not been matched by increased funding, staff, or facilities.

As of mid-1994, 1,307 protected areas covering over 116 million ha in the Wider Caribbean Region had been established by national and state governments (Table 7)). Nearly 25% of them contain marine or coastal habitat, especially the insular territories of the region. Protected areas have been established in all 8 national management categories recognised by the IUCN, as well as the international categories of

Biosphere Reserve, World Heritage Sites, and Ramsar Sites. The reviewed information does not allow comparisons on types of habitat protected nor their extension.

Over 40% of the total area corresponds to Resource Reserves, Indian Reservations and Multiple Use Areas. The next largest area corresponds to National Parks, which cover nearly 26 million ha. Nearly 20 million ha have been recognised by UNESCO as Biosphere Reserves, while 3 million ha are classified as World Heritage Sites and 1 million ha as Ramsar Sites.

South America has the greatest number of protected areas (469), as well as the greatest overall extension (88 million ha) and average size (188,000 ha). Central and North America together account for 24 million ha. The extension of protected areas in the Caribbean accounts for just 3% of the regions total, but includes 39% of the areas with marine or coastal resources and 21% of all protected areas. Both here and in country summary tables, totals for different management categories don't close due to adjustments made for double counting of multiple category areas (i.e. Everglades National Park, Biosphere Reserve & Ramsar Site).

TABLE 7. WIDER CARIBBEAN PROTECTED AREAS SUMMARY

	Insular Caribbean		Central American Caribbean		South American Caribbean		North American Caribbean		Wider Caribbean Region	
CATEGORY I: Biological Reserves & Wilderness Areas										
Areas	15	27 %	11	20 %	2	4%	27	49 %	55	4%
MCZ	9	53 %	4	24 %	0	0%	4	24 %	17	6%
Ha	48,576	2%	524,887	18 %	1,947,000	66 %	427,439	14 %	2,947,902	3%
CATEGORY II: National Parks										
Areas	49	21 %	51	21 %	75	31 %	64	27 %	239	18%
MCZ	31	42 %	17	23 %	18	25 %	7	10 %	73	24%

Ha	946,068	4%	3,278,216	13%	19,822,831	77%	1,795,345	7%	25,842,460	22%
CATEGORY III: National Monuments										
Areas	7	25%	7	25%	10	36%	4	14%	28	2%
MCZ	4	44%	1	11%	3	33%	1	11%	9	3%
Ha	10,798	1%	32,245	3%	1,120,328	94%	23,383	2%	1,186,754	1%
CATEGORY IV: Wildlife Sanctuaries										
Areas	104	31%	123	37%	22	7%	86	26%	335	26%
MCA	47	42%	28	25%	7	6%	29	26%	111	36%
Ha	693,268	14%	1,500,267	30%	903,243	18%	1,988,109	39%	5,084,887	4%
CATEGORY V: Protected Landscapes										
Areas	26	16%	7	4%	88	53%	44	27%	165	13%
MCZ	18	55%	4	12%	0	0%	11	33%	33	11%
Ha	686,847	4%	88,049	1%	14,029,980	82%	2,211,975	13%	17,016,851	15%
CATEGORIES VI-VIII: Resource Reserves, Indian Reservations & Multiple Use Areas										
Areas	66	14%	117	25%	265	56%	23	5%	471	36%
MCZ	4	8%	23	47%	17	35%	5	10%	49	16%
Ha	820,521	2%	6,306,715	13%	39,544,847	80%	2,470,052	5%	49,142,135	42%

CATEGORY IX: Biosphere Reserves											
Areas	8	21 %	6	16 %	7	18 %	17	45 %	38	3%	
MCZ	3	23 %	2	15 %	3	23 %	5	38 %	13	4%	
Ha	407,573	2%	3,014,95 5	15 %	12,004,0 06	61 %	4,305,77 3	22 %	19,732,30 7	17%	
CATEGORY X: World Heritage Site (Natural)											
Areas	0	0%	5	63 %	0	0%	3	38 %	8	1%	
MCZ	0	0%	2	40 %	0	0%	3	60 %	5	2%	
Ha	0	0%	1,927,90 0	63 %	0	0%	1,116,41 3	37 %	3,044,313	3%	
RAMSAR SITES											
Areas	9	45 %	5	63 %	2		4		20	2%	
MCZ	6	43 %	3	21 %	2	14 %	3	21 %	14	5%	
Ha	65,944	7%	159,406	16 %	21,968	2%	761,221	75 %	1,008,539	1%	
Regional Subtotals (sums adjusted for multiple category areas)											
Areas	270	21 %	320	24 %	469	36 %	248	19 %	1,307	100 %	
MCZ	121	39 %	79	26 %	48	16 %	59	19 %	307	100 %	
Ha	3,647,7 86	3%	12,895,6 44	11 %	88,224,2 35	76 %	11,257,8 68	10 %	116,025,5 33	100 %	

KEY: Areas = Number of Protected Areas; MZA = No. Areas with Marine or Coastal Zones; Ha = Extension in hectares

3.2. Marine and Coastal Conservation

The need to improve management and conservation of marine and coastal resources first became apparent in the 50's and 60's. Over the years numerous recommendations and action plans have been announced, but the situation is still unsatisfactory. Major threats include pollution, species and resource depletion, conflicting uses and habitat destruction.

Near shore environments are usually the most intensively used marine areas, and at the same time most suitable for the development of marine protected areas (MPA's). Integration with land use practices and terrestrial conservation should be the ideal. Large multiple use MPA's covering complete ecosystems are a mechanism for sustainable management of coastal marine areas (IUCN 1992).

Guidelines for establishing MPA's have been developed and discussed (Kelleher & Kenchington 1991). They analyse the Selection of Areas, Legal Aspects, Guidelines for Planning and the application of the Biosphere Reserve concept in marine environments. Suggested selection parameters include naturalness, biogeographic importance, ecological importance, economic importance, social importance, scientific, international or national significance, and feasibility. Common guidelines and criteria for the identification, selection, establishment, and management of protected areas for the Wider Caribbean have also been developed under the SPAW Regional Programme of CEP (see above).

At the local and regional level, comprehensive coastal zone management is seen as being the only viable mechanism to guarantee conservation of marine environments and biodiversity while at the same time optimising economic and social development. The Caribbean Environment Programme of UNEP has developed comprehensive guidelines for Integrated Coastal Area Management (ICAM) for the Wider Caribbean and assist governments of the region with their implementation (UNEP 1996). The Great Barrier Reef Marine Park Authority in Australia is mentioned as an example where fishing, recreation, tourism and biodiversity conservation function on a sustainable basis within this type of integrated management.

The OAS (1988) conducted a study of MPA's in the Caribbean and Gulf of Mexico, covering 135 areas. Key findings included:

- 1) Accelerated growth in establishment of MPAs over past 20 years.

2) Management capacity lags far behind establishment, and the resulting resource degradation is widespread.

3) Geomorphically, 45% of the areas were classified as coastal, 28% as marine, 15% as insular and 12% as upland areas with a coastal sub-component.

While protection was considered complete in 18 MPAs in southern Florida, similar levels of protection were found in only 15% of the 95 MPA's in the rest of the Caribbean. Fifty-one percent of the remaining areas were classified as partially protected, while 32% were classified as unprotected.

MPA's were found to provide or host a range of values and uses: wildlife habitat (78 areas), recreational values (68), fishing income (54), research activities (53) and protect endangered species (16). These often overlapping uses can be in conflict if not adequately planned for and managed (e.g. depletion of local fisheries vs. tourism and biodiversity conservation).

The 307 protected areas with marine or coastal resources registered in this report represent an increase of nearly 230% in relation to the 135 documented in the 1988 OAS inventory. Even discounting the 41 areas located in the Gulf of Mexico that were not included in 1988 the increase in coverage is an impressive 200%.

The impacts of human settlements, over fishing, hunting, and chemical and thermal pollution were the top 3 problems for MPA's. Other problems included tourism and mechanical damage to reefs, solid waste, sedimentation and nutrient loading. Only 3% of the areas had problems with aggressive introduced species.

While no other region wide studies have been carried out to update the OAS report, these issues are illustrated by case studies from Bonaire Marine Park (BMP) in the Netherlands Antilles and Corales de Rosario National Park in Colombia. The Bonaire Marine Park was analysed (Dixon *et al* 1992) in terms of economic impact and ecological sustainability. Conclusions from the study include:

- Marine parks can protect biodiversity and permit direct non-consumptive use when management planning and controls are effective.
- Large scale damage is usually preceded by localised degradation, which can be used as an early warning indicator.
- The costs of establishment and park management (US\$670,000) are small in relation to gross benefits (US\$32.1 million) associated with and dependent upon the park.

- User fees are logical means to finance management activities but are resisted by stakeholders. Marginal pricing could be an effective means to reduce congestion and degradation of popular sites.

- Incentives should be designed and implemented to ensure that a larger share of economic benefits remain in local markets.

- Current use of BMP (200,000 dives/year) may be close to the actual carrying capacity of the area, and the 10% annual growth in diving could soon lead to resource degradation. Improvements in management and diver education might raise the carrying capacity 50-100% over current levels.

Grip (1993) evaluated the current situation in Corales de Rosario National Park (20,000 ha) in Colombia and proposed overall actions to reduce resource degradation and increase management effectiveness. Major environmental issues identified were:

- 1) Illegal presence of permanent and recreational housing on the islands,
- 2) Coastal pollution from Cartagena and other coastal cities,
- 3) Potential for unrestrained tourism development in Zona Franca on Baru Island, and
- 4) Destructive practices used by local and non-resident fishermen.

Economic and administrative problems identified were:

1. Co-ordination between the central and regional offices of INDERENA are insufficient,
2. The actual limits are inadequate given the inter-relations between terrestrial and aquatic ecosystems and activities, no zoning plan has been developed to regulate activities within the park.
3. Inadequate staffing and operational resources, transfer of park generated funds to other areas, and
4. Travel agencies, hotels and restaurants benefit from presence of park, but do not contribute to management.

The major recommendations for resolving the situation included:

- Develop a viable zoning plan identifying areas for strict conservation, recuperation, transportation corridors, recreation and an outer buffer zone.

- Involve local and regional officials, park visitors, cruise ship owners, pilots, pleasure boat owners and the aquarium owner in a revision of entrance fee collection procedures and policies. Differential fees for foreigners and nationals should be considered.
- Increased funding should be assigned by INDERENA (now the Ministry of Environment) for park management to provide more personnel and equipment.
- A three year action plan should be developed, and administrative and protection functions should be strengthened.
- The regional INDERENA office should be strengthened to support resolution of management problems in the park, and to guarantee increased park income via the implementation of a new fee policy.

The following sections contain the country profiles for the 37 countries and territories of the Wider Caribbean Region, which are grouped in 4 sub-regions: Insular Caribbean, North, Central, and South American Caribbean. Information on sub-regions, unless otherwise indicated is based on the regional reports presented at the World Parks Congress in 1992. The original text for the country profiles came from the 1992 WCMC publication "Protected Areas of the World, Vol. 4", and has been updated with information provided by SPAW Programme representatives and additional secondary references..

Insular Caribbean 24 Countries and territories: Anguilla (UK), Antigua & Barbuda, Aruba (Neth), Bahamas, Barbados, British Virgin Islands (UK), Cayman Islands (UK), Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe (Fra), Haiti, Jamaica, Martinique (Fra), Montserrat (UK), Netherlands Antilles (Neth), Puerto Rico (USA.), St. Kitts & Nevis, St. Lucia, St. Vincent & Grenadines, Trinidad & Tobago, Turks & Caicos Islands (UK) and the US Virgin Islands (USA.).

Central America 6 countries: Panama, Costa Rica, Nicaragua, Honduras, Guatemala and Belize.

South America 5 countries: Colombia, Venezuela, Guyana, French Guiana (Fra) & Suriname

North America 2 Countries, 20 states: Mexico (Campeche, Chiapas, Distrito Federal, Hidalgo, Mexico, Nuevo Leon, Oaxaca, Puebla, Querétaro, Quintana Roo, San Luis Potosi, Tabasco, Tamaulipas, Veracruz, Yucatan) and USA (Texas, Louisiana, Alabama, Mississippi and Florida).

3.3. Insular Caribbean

(Source: Putney 1992)

The potential economic, ecological and social contribution of protected areas in the islands is very high, but their current level of development is at best incipient. Which is leading to a reduced importance at the national level. This is true for terrestrial areas and perhaps even more so for marine and coastal areas.

Management schemes involving co-management and joint financing are very common in the sub-region, but protected areas management remains isolated from other sectors. This is probably due in part to the limited capacity of the institutions involved in protected areas management including national government agencies of the US, UK, Netherlands and France, government agencies of independent countries, quasi-governmental agencies (Trust Funds), NGOs, local communities, private enterprises, and multi-lateral assistance agencies.

Island areas are often limited in space, and this is especially the case in the Caribbean. The population growth and economic development have led to the alteration of most of the natural areas on the islands, and the development of intense and complex relations between local populations and terrestrial and marine ecosystems.

The limited operational capacity of small institutions has frustrated many co-operative efforts in the region. The most viable strategy in this context is to promote effective information flow and the establishment of regional co-ordinating units. At the local level, more emphasis is needed on management implementation and evaluation. Operational and Conceptual plans have proven more effective than detailed management plans.

Although system plans have been or are being developed for 8 countries or territories in the region, only the British Virgin Islands and Jamaica's plans have been officially approved. Gaps in the current protected areas systems should not be judged not only upon biogeographical criteria, but also upon local conservation priorities such as watershed protection, forest management, recreation opportunities and tourism development.

Participation in international programmes and agreements is high (>70%) for more than half of the initiatives surveyed, including the CBD, Cartagena Convention and its SPAW Protocol, CITES, UN Law of the Sea, and World Heritage Conventions. All 37 states and territories participate in the CEP and SPAW programmes, but participation drops significantly for the Ramsar and Western Hemisphere

Conventions, and the FAO-UNEP Protected Areas Network, the Tropical Forestry Action Plan and the MAB programme.

Individual countries with lower rates of participation (<45%) include Bahamas, Barbados, Dominica, Grenada, Haiti, St. Kitts and Nevis, and St. Vincent & the Grenadines. High levels of participation (75% or greater) are registered by Aruba, Cuba, Dominican Republic, Jamaica, and the Netherlands Antilles.

A number of NGO and bi-lateral programmes are specifically aimed at the Caribbean, and include the Caribbean Conservation Association, Caribbean Programmes of WWF-USA, The Nature Conservancy, the Protected Areas Programme of the Caribbean Natural Resources Institute (CANARI) and the Eastern Caribbean Programme of the OAS. Putney (ibid.) stated that current programmes are inadequate due to irregular support and short term funding, lack of co-ordination between the numerous project executors and donors, and inefficiencies due to the limited capacity of each project and the frequent duplication of efforts, especially assessments and strategy development.

Cuba and the Dominican Republic together account for more than 80% of the area (3 million ha) included in protected areas. They are also significant in terms of areas with marine or coastal zones, and absolute number of protected areas. Smaller territories such as Cayman Islands, Dominica, Guadeloupe and Turks and Caicos Islands have significant portions of their territory classified as protected areas, although the percentages are somewhat misleading due to the inclusion of extensive marine areas, e.g. Turks & Caicos (Table 8).

3.4. Central America Caribbean

(Sources: Ugalde & Godoy 1992, Barzetti 1992)

The coverage of national systems has increased significantly over the past 10 years and now includes nearly 13 million ha, or 26% of the sub-region's landmass (Table 9). The selection of new areas has sought to protect watersheds, biodiversity, local recreation use, natural wonders and archaeological sites. Mountainous areas (with extreme limitations for agricultural or forestry development) have been favoured over coastal and lowland areas with greater commercial potential. Under represented ecosystems include dry and semi-arid zones, altiplanos and samples of nearctic vegetation.

Coastal marine resources are protected, but most often as part of areas where the protection of terrestrial resources is the primary objective. Even so, major areas such as the Belize Barrier Reef, the Bay Islands in Honduras, Miskitos Keys in Nicaragua,

Tortuguero in Costa Rica, Isla Bastimentos and the Kuna Yala coast in Panama have been established and are receiving at least some protection.

Three-fourths of Central America's protected areas (60% of the area) are classified as Wildlife Sanctuaries, Resource Reserves, Indian Reserves or Multiple Use Areas, categories where management experience is limited. National Parks and Biological Reserves, categories with greater management experience, account for 20% of the of the areas and nearly 30% of the extension. Sixty-eight percent of the areas are 10,000 ha or less. A large proportion of coverage is contributed by large Biosphere Reserves such as the Rio Platano, Darien, Maya and La Amistad.

TABLE 8. INSULAR CARIBBEAN PROTECTED AREAS SUMMARY

	No. of Protected Areas		Areas with Marine or Coastal Zones		Extension ha		Percentage of National Territory
	No.	%	No.	%	ha	%	
Anguilla (UK)	0	0%	0	0%	0	0.0%	0%
Antigua & Barbuda	3	1%	3	2%	6,628	0.2%	15%
Aruba (N)	1	0%	1	1%	70	0.0%	0%
Bahamas	6	2%	6	5%	123,589	3.4%	9%
Barbados	1	0%	1	1%	250	0.0%	1%
British Virgin Islands (UK)	6	2%	4	3%	1,553	0.0%	10%
Cayman Islands (UK)	13	5%	12	9%	8,137	0.2%	31%
Cuba	65	23%	35	27%	1,957,178	53.7%	18%
Dominica	5	2%	1	1%	16,945	0.5%	23%
Dominican Republic	18	6%	9	7%	1,048,409	28.7%	22%
Grenada	1	0%	0	0%	618	0.0%	2%
Guadeloupe (FR)	3	1%	2	2%	87,700	2.4%	49%

Haiti	3	1%	0	0%	9,700	0.3%	0%
Jamaica	47	17%	1	1%	129,232	3.5%	12%
Martinique (FR)	2	1%	0	0%	70,667	1.9%	64%
Montserrat (UK)	1	0%	1	1%	6	0.0%	0%
Netherlands Antilles (N)	9	3%	5	4%	17,646	0.5%	22%
Puerto Rico (US)	29	10%	8	6%	46,618	1.3%	5%
St. Kitts & Nevis	1	0%	1	1%	2,610	0.1%	10%
St. Lucia	15	5%	3	2%	9,493	0.3%	15%
St. Vincent & Grenadines	2	1%	2	2%	8,284	0.2%	21%
Trinidad & Tobago	12	4%	7	5%	24,748	0.7%	5%
Turks & Caicos Islands (UK)	21	8%	16	12%	71,082	1.9%	165%
US Virgin Islands (US)	4	1%	4	3%	6,623	0.2%	19%
SUBTOTAL	279	100%	131	100%	3,647,786	100.0%	16%

1 This table was taken from the IUCN/WCMC Protected Areas of the World, Vol.4 (1992) and might not include the most up-to-date information for all countries.

TABLE 9. CENTRAL AMERICAN CARIBBEAN PROTECTED AREAS SUMMARY

	No. of Protected Areas		Areas with Marine or Coastal Zones		Extension Ha		Percentage of National Territory
BELIZE	24	8%	7	9%	797,736	6%	35%
COSTA RICA	108	34%	30	38%	2,251,457	17%	44%

GUATEMALA	29	9%	3	4%	1,781,794	14%	16%
HONDURAS	56	18%	12	15%	2,488,830	19%	22%
NICARAGUA	73	23%	15	19%	2,659,418	21%	22%
PANAMA	30	9%	12	15%	2,916,409	23%	38%
Subtotal	320	100%	79	100%	12,895,644	100%	26%

At the national level, the coverage of protected areas (1.8 - 3 million ha) is similar throughout the region, with the exception of Belize (0.8 million ha). In terms of national territory included within protected areas, Costa Rica (44%) and Panama (38%) lead the region. Costa Rica also leads in the number of areas with marine or coastal zones, while Panama has the most extensive coverage of national parks (1.3 million ha).

A recent analysis (Mack 1994) of protected areas policy in Central America concluded that while significant advances have been made in regional co-operation and integration, the rhetoric of government leaders is far removed from the realities of management.

"In some cases, governments and conservationists in the region have succeeded in the creation and consolidation of protected areas without concerted efforts to involve local populations in the planning or, at least initially, the management of the areas. These cases, however, are almost uniformly those where the government has owned or purchased the lands within the area and managed them as its own, rather than attempting to regulate the use of private or indigenous lands. In addition, they often involved sparsely settled lands little suited for agriculture where settlers, if they existed, were often eager to sell. In other cases, however, the declaration of such protected areas usually amidst or near consolidated communities has caused significant conflicts with local populations and lingering distrust of both conservation efforts and the motives of the central government."

Major issues to be resolved in the region include the lack of system and area management plans, personnel and training needs, deficient national land use policies, population growth and resource demand, identification of appropriate methods to promote community participation, and the high degree of dependence upon international technical and financial assistance (Ugalde & Godoy 1992).

Overall participation rates for international agreements and programmes are high. Exceptions include the Migratory Species Convention, Caribbean Conservation Association and the SPAW Protocol, although for the latter, all countries of the sub-region participate in the SPAW Programme. Individually, Panama and Guatemala

participate in the greatest number of programmes, followed by Costa Rica, Honduras, Nicaragua, and Belize.

Efforts at regional integration and co-operation have accelerated following the pacification of Nicaragua and El Salvador. The Presidents of the region signed the Central American Convention on Environment and Development and the Convention on Biodiversity and Priority Protected Areas in Central America, each of which calls for the creation of regional councils. In a very recent development, the Presidents of the nations of the region have agreed to form the Central American Alliance for Sustainable Development, recognising the rational use of natural resources as a basic principle for guiding the formulation of development strategies for all of the countries of the region, and establishing short term goals to be met by each (Mack 1994).

3.5. South American Caribbean

Five of the 13 South American Countries have coastal areas in the Caribbean or adjacent waters of the Atlantic. Over 88 million ha (37% of the total land area) has been classified as protected areas. Nearly one-third of the area was established to conserve biodiversity resources in Biological Reserves, National Parks and Wildlife Sanctuaries. Most of the sub-region's population is located close to the coast, with the exception of the centrally located population centres of Colombia.

While Venezuela and Colombia have extensive protected areas systems, French Guiana and Guyana have only established one area each.. Suriname has established 14 areas totalling nearly one million ha (Table 10). Both Venezuela and Colombia register very high coverage at the national level, nearly 50 million ha are classified in Categories V-VIII, but management effectiveness is frequently non-existent (Table 7, and country Summary Tables).

Proposals have been made to establish new areas in all 5 countries of the sub-region. The use of differing vegetation classification systems and non-standard management categories makes comparison of ecosystem coverage difficult.

TABLE 10. SOUTH AMERICAN CARIBBEAN PROTECTED AREAS SUMMARY

	No. of Protected Areas		Areas with Marine or Coastal Zones		Extension ha		Percentage of National Territory
Colombia	345	74%	27	54%	50,125,998	57%	48%
French Guiana (FR)	1	0%	0	0%	108,000	0%	1%

Guyana	1	0%	0	0%	58,559	0%	0%
Suriname	14	3%	4	8%	904,290	1%	6%
Venezuela	108	23%	17	34%	37,0027,388	42%	42%
SUBTOTAL	469	100%	50	100%	88,224,235	100%	37%

Seven areas, totalling 12 million ha have been approved as Biosphere Reserves. No World Heritage Natural Sites have been approved, and Ramsar Sites are limited to 22 thousand ha. Other categories with little application include Biological Reserves, National Monuments and Wildlife Sanctuaries.

Conservation priorities (Barzetti 1993, IUCN 1992) in the sub-region include:

- Establishment and development of national protected areas policies integrated with sustainable development strategies.
- Analysis of biogeographical and ecological coverage of protected areas in each country, performing biological inventories, and identifying priority areas for protection.
- Increased co-operation in the development of conservation activities.

The countries of the region have a high participation in environmental agreements and programmes. Only the Migratory Species and Western Hemisphere Conventions have less than 40% participation rates. A similar situation exists with regards to regional programmes, where the MAB programme and the Caribbean Conservation Association are the only programmes with less than 80% participation rates. French Guiana has the lowest participation rate in the area, and is the only country not participating in the Amazon Co-operation Treaty.

3.6. North American Caribbean

Sources: (Barzetti 1993, IUCN 1992)

This sub-region borders the Gulf of Mexico and the Caribbean slope of Mexico. Where possible, data are presented at this level, but in other cases national figures are reported. The sub-region contains 20% of the region's protected areas and areas with marine or coastal zones (Table 11). While two-thirds of the areas with marine or coastal zones are located in the US, 90% of the total area protected is in Mexican territory.

Many US sites are considered world class tourist attractions because of their natural beauty, but Mexico is considered one of the world's major hot spots for biodiversity conservation, and has an extensive network of cultural sites.

TABLE 11. NORTH AMERICAN CARIBBEAN PROTECTED AREAS SUMMARY

	No. of Protected Areas		Areas with Marine or Coastal Zones		Extension ha		Percentage of National Territory
MEXICO	110	45%	20	34%	8,816,807	90%	13%
USA	133	55%	39	66%	970,964	10%	1%
Subtotal	243	100%	59	100%	9,787,771	100%	5%

US management agencies often find personnel and facilities stretched to the breaking point by mass tourism. Mexican natural areas often lack even basic services, and are not as important a destination as cultural sites for tourism. In both countries management agencies are being faced with problems not faced previously, and for which progressive policies and increased training are necessary.

In spite of the longer management history and less diverse biota, the lack of systematic scientific data on wildlife populations is considered a major problem facing protected areas in the US. Biodiversity conservation is a new objective, in both Mexico and the US, and managers often find more questions than answers.

4. CONCLUSIONS AND RECOMMENDATIONS

The Caracas Action Plan (IUCN 1992) identifies 4 major objectives for protected area development over the next 10 years. With minor adjustments, these objectives are equally valid for the Wider Caribbean Region. These objectives, and the proposed actions are listed below.

OBJECTIVE 1: Integrate Protected Areas into larger Planning Frameworks

- Develop and implement national protected area system plans
- Integrate Protected Area System Plans into economic development plans
- Plan protected areas as part of their surrounding landscapes
- Develop techniques for assessing and quantifying benefits of protected areas

OBJECTIVE 2: Expand Support for Protected Areas

- Identify the key interests of affected parties
- Recognise priority concerns for local communities
- Stimulate informed advocacy

OBJECTIVE 3: Strengthen the capacity to manage protected areas

- Expand training opportunities at all levels
- Improve management of protected areas
- Develop means of increasing financing and generating revenues
- Improve the application of science to management
- Give attention to the special requirements for managing marine protected areas

Special recommendations for the Insular Caribbean included:

- Development of a training programme to provide for regular and comprehensive training in English, French and Spanish.
- The training programme should be recognised and approved by national institutions and included in personnel evaluations.
- Courses should be designed to respond to the special institutional and biophysical characteristics of insular areas.
- Courses should be practical and focus on the analysis of case studies within the region.

OBJECTIVE 4: Expand the international co-operation in the financing, development and management of protected areas

- Clarify the roles and functions of institutions at all levels
- Develop international and regional action plans to support implementation of the priorities established in national protected area systems plans
- Reinvigorate existing frameworks for international co-operation

The successful execution of the action plan will require an unprecedented degree of co-operation between local communities, conservation and development NGOs, resource users, universities and government institutions. Internationally, the need for financial and technical support is obvious, not through the direct transfer of management techniques and organisational schemes but rather through institutional development aimed at increasing local capacity to develop viable protected area systems and broaden the participation of all sectors.

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ANGUILLA (UK)

Area: 91 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	0	0	0

(1) Information available is incomplete (see text below.)

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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. While the other 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 had not yet been enacted in 1992.

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.

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.

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International Participation

Conventions & Treaties

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Administration

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 for the environment side has not yet been developed and the budget comes under the Department of Public Health and 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.

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.

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Biodiversity

Anguilla is a low coral island, formed from limestone and marls developed on old volcanic rocks. It shares a common submarine shelf with St. Martin and 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 17 km long reef along the south-east 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 classified 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).

Management

In 1989 the government put forward a proposal to funding agencies for a comprehensive marine parks programme. The objectives of this were: 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 funded by the US National Parks Service and WWF-UK. Work on the establishment of marine parks is being funded by WWF-UK. Established MPAs do not receive effective management.

IUCN (1992) notes that 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.

van't Hof (1993) reported that marine protected areas had been established, but that effective management was still lacking. Resource use impacts include reef damage from anchoring, species loss from over-fishing. Organisational problems include lack of public support (especially from the fishing community) for conservation efforts and political interference.

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).

Tourism has developed rapidly during the 1980's. At the beginning of the decade, Anguilla had only a few thousand visitors annually. The figure reached an estimated 70-80,0 in 1990. 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 and the construction of housing are contributing to the current "building boom". This results in environmental problems such as the extraction of sand leading to beach erosion.

Contacts

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ANTIGUA AND BARBUDA

Area 440 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	3	3	6,628
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	3	3	6,628

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 (Annex I). No marine reserves have been created under this Act (CCA 1991).

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).

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); which are mangrove, cactus scrub, dry woodland, and moist forest. Much of the dry woodland that existed in the English Harbour and Falmouth areas prior to 1960 has been reduced to cactus scrub, however 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 number of proposals for additional protected areas are presented in CCA (1991). Currently, preparations for the creation of a marine protected area on the north east coast, North East Coast Management Area (NECMA). Its location is around Parham Harbour and has been started with the support of the Organisation of American States (OAS). Within this area there is provision for a more intensely managed Bird Island Marine reserve and Wildlife sanctuary .

International Participation

Conventions & Treaties

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Biological Diversity (CBD, 1992)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

Administration

Two different offices are involved with the protected areas system, the National Parks Authority (Ministry of External Affairs, Economic Development, Tourism and Energy) and the Fisheries Division (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 a staff of 35, 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 Canadian International Development Agency (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 when combined 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 that are important as fish habitats and nurseries.

Biodiversity

Antigua is a hilly coral limestone island in the Lesser Antilles, attaining 402 m 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 (38 m maximum elevation) with a markedly uniform coastline. It is one of the driest West Indian islands, with a mean annual rainfall of only 984 mm. 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 with extensive tracts of native dry forests. The low topography and minimal rainfall has led to soils that are poorly developed, with the result that 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, savannah 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, 5,600 ha were considered to be under woodland cover and 10,000 ha under scrub vegetation, while another more recent estimate indicated some 9,600 ha 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).

Management

Antigua and Barbuda's three national parks all contain marine or coastal zones. The total protected areas coverage is 6,628 ha, 15% of the total land area (Annex II). Currently, only one area, Nelson's Dockyard National Park is actively managed. However, management is focused on regulating and supporting business activities

within the park. The park's biological, historical, cultural and historical components are not properly protected, preserved or managed. The National Parks Authority received assistance from CIDA to establish Nelson's Dockyard National Park, particularly with respect to strengthening the institutional capability of the Authority. CIDA is due to fund the upgrading of the park's infrastructure during Phase II of the development activities (CCA 1991).

Two additional 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 co-ordination between protected area organisations (OECS 1986). Further, there is 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).

No effective management capacity exists for Diamond & Palaster Reef Marine Reserves due to lack of institutional structure, personnel and funding for established areas. Impact include reef damage from anchoring, habitat destruction, species loss from souvenir collecting and over fishing, damage from recreation diving, coastal development as well as natural phenomena. Protected areas are not supported by local fishermen (van't Hof 1993)

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 destruction of mangroves for a 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).

Contacts

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Environmental Awareness Group, Antigua-Barbuda Museum, PO Box 103, Long Street, ST. JOHN'S, Antigua (Tel: 809 462 1469)

Historical Conservation and Environmental Commission, Ministry of Economic Development, Tourism, and Energy, Queen Elizabeth Highway, ST. JOHN'S, Antigua. Telephone: (809) 462-1014, (809) 462-0533 Fax: (809) 462-2836

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ANNEX I: LEGAL INSTRUMENTS Definitions of protected area designations, as legislated, together with authorities responsible for their administration.

Title: Forestry Ordinance (Cap. 99)**Date:** 1941**Brief description:** not available

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**Brief description:** not available

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

Title: National Park Act No.11**Date:** 1984 (amended 1986)**Brief description:** Concerning the creation of national parks. Establishes a National Parks Authority with its function to preserve, protect, manage and develop the natural physical and ecological resources and the historical and cultural heritage.**Administrative authority:** National Park Authority**Designation:***National Park:* Does not provide a

definition for the term "national park" and makes no provision for other categories of protected areas.**Source:** CCA (1991)

Title: Marine Areas (Preservation and Enhancement) Act No.5**Date:** 1972

Brief description: not available

Administrative authority: Fisheries Department**Designation:***Marine Park*: No information

Source: UNEP/IUCN (1988)

ANNEX II: ANTIGUA AND BARBUDA PROTECTED AREAS LIST

Name of Area	IUCN & National Mngmnt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Nelson's Dockyard	II	NP	YES	4,128	1984
Palaster Reef	II	NP	YES	500	1973
Salt Fish Tail Reef (Diamond Reef)	II	NP	YES	2,000	1973
SUBTOTAL	3		3	6,628	

ARUBA (NETHERLANDS)

Area 193 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	1	1	70
Total	1	1	70

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.

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). 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).

International Participation

Conventions & Treaties

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean (SPAW, 1990)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

Since 1963 administration and management of protected areas was 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).

Biodiversity

Aruba lies on the continental shelf of South America, less than 50 km from the Peninsula de Paraguand on the Venezuelan mainland. It is a small island, less than 32 km in length. Most of the island is relatively hilly, with the steepest slopes being on the north coast and the highest elevation reaching some 188 m. The long south-west 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 the reefs are not highly developed, with the exception of a small area on the south-east point (ECNAMP 1980, UNEP/IUCN 1988). Much of the vegetation has been modified by Man, especially in the south-western 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).

Management

Aruba's only protected area is the Hetspaans Lagoen Ramsar Site. No information concerning management activities was available for review.

Contacts

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ANNEX I: ARUBAN PROTECTED AREAS LIST

Name of area

IUCN & National Mngmnt. Categories Presence of Marine or Coastal Zones Area

ha Year Established Hetspaans Lagoen IIRYES701980

R = Reserve

BAHAMAS

Area 11,406 sq. km.

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Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	4	4	121,576
Category III	0	0	0
Category IV	2	2	2,013
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	6	6	123,589

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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 5 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 to write a general management plan which will be reviewed by council every three years.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Administration

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 includes government representatives, external conservation bodies, and Trust members. The Council appoints an Executive Committee which convenes at least once a month to co-ordinate 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 Trust is responsible for the protected areas system although it has no absolute authority within wild bird reserves.

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.

Biodiversity

There are about 2750 islands, cays and rocks totalling 11,400 sq. km. of exposed surface. The islands and cays are low-lying, with an average elevation of only 10 m. Many of them have low hills which may reach 30-60 m in height. The dominant vegetation is low, dense, and thorny. Almost every island contains some wetland habitat, with the great majority comprising shallow brackish to saline lagoons, mangrove swamps, coastal flats and inter-tidal mudflats (Scott and Carbonell 1986). The Islands stand together with many coral reefs on two shallow submarine banks with the only deep water between the islands lying outside the barrier reef off the east coast of Andros, which is the largest of the islands.

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 751,262 ha (incomplete data 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 practices for activities in all terrestrial and marine environments. A detailed cost assessment is provided for these and all other objectives.

Main pressure on existing protected areas comes from illegal hunting and fishing as it is the case for the two largest areas Inagua National Park and Exuma Cays Land-and-Sea Park. Additionally, most protected areas face an overuse from tourism and a lack of efficient management (OAS 1988)

Management

Bahamas has established six protected areas covering over 120,000 ha, which represents 9% of the land area of the island. Four of the 6 protected areas contain marine or coastal zones. No information was reviewed concerning management of these areas or implementation of the proposals for system expansion.

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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

Title: The Wild Birds Protection (Reserves) Order

Date: 27 January 1951 (Commencement); subsequent Orders: 1954 (twice), 1955, 1956 (twice), 1958 (twice), 1961, 1962 and 1965.

Brief description: Makes provision for the establishment of wild bird reserves.

Administrative authority: Ministry of Agriculture

Designation:

Wild Bird Reserve: Either private or crown land may be declared as a reserve. Activities prohibited include wilful killing or capture of any wild bird in the reserve.

ANNEX II: BAHAMAS PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Conception Island	II	NP	YES	809	1973
Exuma Cays Land and Sea Park	II	NP	YES	45,584	1958
Inagua	II	NP	YES	74,333	1965
Pelican Cays Land and Sea Park	II	NP	YES	850	1981
Subtotal	4		4	121,576	
Union Creek (within Inagua NP)	IV	MN R		1,813	1965
Lighbourn Creek (Waterloo)	IV	WB R		200	not available
Subtotal	2		0	2,013	

NP = NATIONAL PARK

MNR = MANAGED NATURE RESERVE

WBR = WILD BIRD SANCTUARY

BARBADOS

Area 430 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	1	1	250
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	1	1	250

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

In the National Development Plan 1983, the Physical Development Plan 1983, amended 1986, and the Barbados report to the United Nations Conference on Environment and Development (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 (St. Hill, 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 as a relatively unspoiled 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.

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 which was 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 (St. Hill, pers. comm., 1992).

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

Administration

The National Conservation Commission is the statutory body responsible for management of the natural environment. Its functions range from conservation of natural and cultural features to the management of public recreation areas, which includes advice to the Minister on these issues. The Commission was created in 1982 through an amalgamation of the Parks and Beaches Commission (established in 1970) with the Caves Authority (established 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 co-ordinate 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 World Conservation Union (IUCN) and the Caribbean Conservation Association (CCA) (St. Hill, pers. comm., 1992). A Coastal Conservation Project Unit has been responsible for Coastal Zone Management and advising the planning authority has been operating as a project for last 10 years. It has been absorbed into the Ministry of Environment.

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 half mile cleft in the limestone cap which supports both native 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 Caribbean Natural Resources Institute (CANARI), formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), is a not-for-profit 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).

Biodiversity

Barbados is a small, relatively flat island, with a maximum elevation of 330 m, although a ridge runs in a north-south direction slightly below this altitude for several kilometres. The island is part of the Lesser Antilles and is located in the North

Equatorial Current, 475 km north of South America, within the Atlantic Antillean sub-province (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.

Management

The Barbados Marine Reserve, located off Holetown on the west coast of Barbados, is the country's only established protected area. It covers a wide range of marine habitats including two distinct reef types, large sandy bays and deep silty environments. Major threats to the reserve are caused by polluted outflows from Holetown River, by high tourist pressure, and by the lack of regulations enforcement (UNEP/IUCN 1988). Generalised problems with the management of natural resources are discussed by Wilson (1984) and include beach erosion, threat of oil spillage and land development.

van't Hof (1993) reported that management capacity in the Reserve had suffered serious decline due to an inadequate organisational structure and the lack of funding and training. Additional impacts are caused by inadequate anchoring of dive boats and species loss due to over fishing. Conflicts between the fishing community, tour operators, and park visitors over resource use have not been resolved.

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, which is 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 scheduled to be completed by mid-1992 (Wilson, pers. comm., 1992).

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ANNEX I: LEGAL INSTRUMENTS

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)

ANNEX II: BARBADOS PROTECTED AREA LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Barbados Marine Reserve	II	MR	YES	250	1980

BELIZE

Area 22,965 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	2	0	41,985
Category II	3	2	111,943
Category III	1	1	2,340
Category IV	3	0	123,870
Category V	0	0	0
Categories VI-VIII	15	4	517,598
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	24	7	797,736

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

A country National Forestry Action Plan was drawn up in 1989 under the auspices of the Tropical Forestry Action Plan and 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. This is to be done through legislative changes, institutional strengthening, and changes in management techniques.

The plan proposes several measures to counter the current deterioration of forests, including the establishment of an Office of Conservation within the Forest Department which has been established (Matola, pers. comm., 1992; 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 (Zisman, pers. comm., 1992).

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 (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 85,000 ha have already been set aside for conservation, with 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.

The first piece of legislation concerning forest resource regulation and protection was the Forest Ordinance, 1927, which was revised in 1958. This provides for the establishment and management of forest reserves within which timber extraction is strictly regulated (Hartshorn and Green 1985, USAID 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 felling of minor importance.

The Crown Land Ordinance, 1924, revised in 1958, enabled the relevant Minister to categorise sites on an *ad hoc* basis, which led to the designation of a number of sites and are sometimes known as crown reserves. These included a number of bird sanctuaries (Annex I) which have not been designated 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 (USAID 1988). Definitions are given for four categories of protected area (Annex I) 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 (Annex I). 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 moratorium on commercial wildlife harvesting was extended and was due to expire in 1992 (USAID 1982, Rosado, pers. comm., 1991).

International Activities

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Central American Biodiversity Convention (CABD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

Administration

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 (USAID 1988).

BAS was 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 were 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 85,000 ha for conservation purposes. Another NGO, Coral Cay Conservation, has worked closely with the Coastal Zone Unit of the Fisheries Department through comprehensive surveys of marine resources and the preparation of a draft management plan for the proposed South Water Cay marine reserve. (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 (USAID 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 (USAID 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. 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 into the Forest Department Annual Report and in the Belize Tropical Forest Action Plan.

A Conservation Division has now been established to manage some or all of the protected areas (Matola, pers. comm., 1992; 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, Rosado, pers. comm., 1991).

Biodiversity

Belize is the second smallest and the least populated country in Central America. It 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 the land area was used for agriculture. A maximum of 16% of the land area is considered suitable for mechanised agriculture without large financial and technical investments (Hartshorn *et al* 1984).

Belize 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 15-40 km offshore, along the second largest barrier reef in the world, which is almost continuous for some 257 km. The country lies within the subtropics and has a history of devastating effects of cyclones (Hartshorn *et al* 1984, USAID 1988).

The country can be subdivided into the broad, low-lying coastal plain in the north, which extends to the south along a narrow 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. The mountain range, which rises to 1,120 m, is largely composed of metamorphosed sediments with granitic intrusions. Coral reefs are highly developed and contain a typical Caribbean fauna (IUCN 1988).

Following the Holdridge (1967) classification system and the work of Hartshorn *et al* (1984), six life (ecological) zones have been described in Belize. These are: 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). 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% (Simonetti, pers. comm., 1992).

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 un-threatened at present. Hence, populations are more stable here than in many other countries (Hartshorn *et al* 1984, WWF-US 1989).

Management

IUCN categories I-IV cover nearly 275,000 ha, including three areas with marine or coastal zones and a marine national park. Forest Reserves total nearly 520,000 ha and include four areas with marine or coastal zones. The combined extension of these protected areas is the equivalent to 35% of the countries landmass.

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, Matola, pers. comm., 1992). Five national parks have been established since 1981. In 1991 there were 20 legally declared conservation areas which covered some 10% of the total area (USAID 1988).

Management is considered relatively effective for the Hol Chan Marine Reserve. Potentially serious impacts are being caused by recreational diving, sewage runoff and coastal development (van't Hof 1993). 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, USAID 1988).

The government is the largest land-owner in the country, and therefore it has a strong influence on conservation. Some 21,323 sq. km. (93% of the total national territory) is

classified by the government as "forest land", of which over 60% 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, with a further 33% described as inaccessible. Despite this 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, USAID 1988).

Tourism is growing exceptionally fast in protected areas and has 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. In 1992, the government of Belize approved in principle a Belize Revenue Generation Strategy for Protected Areas (Salas, pers. comm., 1992).

Several innovative conservation projects have been implemented. For instance, in 1985, following a survey of the black howler monkey range, the 777 ha Community Baboon Sanctuary was established. This involves 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).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 21 ha).

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 over-fishing 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, interpretation 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.

Source: Original legislation

ANNEX II: BELIZE PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
	IUCN	National			
Bladen Branch	I	NR		39,256	1990
Society Hall	I	NR		2,729	1986
Subtotal	2		0	41,985	
Hol Chan	II	NMR	YES	411	1987
Chiquibul	II	NP		107,607	1991
Half Moon Caye	II	NM	YES	3,925	1982
Subtotal	3		2	111,943	
Rio Grande	III	NR	YES	2,340	1968
Subtotal	1		1	2,340	
Cockscomb Basin	IV	WS		102,400	1986
Crooked Tree	IV	WS		1,470	1984
Caracol	IV	AR		20,000	not avail.
Subtotal	3		0	123,870	
Chiquibul	VIII	FR		184,955	1991
Columbia River	VIII	FR		44,789	1954
Commerce Bight	VIII	FR		1,200	1989
Deep River	VIII	FR		31,647	not avail.
Freshwater Creek	VIII	FR		29,593	1960
Grants' Work A	VIII	FR		3,439	1986
Machaca	VIII	FR	YES	2,300	not avail.
Manatee Lagoons	VIII	FR	YES	3,300	not avail.
Mango Creek	VIII	FR	YES	23,224	not avail.
Maya Mountains	VIII	FR		52,124	1984
Mountain Pine Ridge	VIII	FR		51,282	1920
Sibun	VIII	FR		42,966	1987
Silk Grass	VIII	FR		2,641	1920
Sittee River	VIII	FR		37,938	1977
Swasey Bladen	VIII	FR		6,200	1958
Subtotal	15		4	517,598	

AR = Archaeological Reserve MNR = Marine Nature Reserve

NP = National Parks NM = National Monument

NR = Nature Reserves FR = Forest Reserves

WS = Wildlife Sanctuaries

BRITISH VIRGIN ISLANDS (UNITED KINGDOM)

Area 153 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	1	0	107
Category III	1	1	324
Category IV	4	3	1,122
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	6	4	1,553

Policy and Legislation

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, which includes multiple-use management areas, marine parks, and protected areas.

The Protection of Trees and Conservation of Soil Ordinance (Cap. 86) provides for protected forestry and water areas. 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. Horseshoe Reef was declared a protected area under the Fisheries Ordinance in May 1990.

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 Organisation 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

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Administration

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 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 fund-raising 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 a considerable way in strengthening and supporting the National Parks Trust. The funding basis had been made more secure, a Trust Fund had been established, and a director appointed in 1985. Efforts were also 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 was prepared, which identifies the goals, objectives and management requirements of the national parks and protected areas system (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 in the management of Wreck of the Rhone Marine Park, activities have included surveillance and monitoring of 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).

Biodiversity

The British Virgin Islands comprise just over 40 islands, small cays, and rocks. The marine area of the territory is 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. They rise along with the United States Virgin Islands from the Puerto Rican shelf, which lies about 65 m 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 hills fringed by narrow valleys and sparse mangroves. Most of the soils are light, and have limited water-holding capacity, which when 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 the natural vegetation has been modified. Coral reefs surround many of the islands (UNEP/IUCN 1988, Walters 1984).

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, in order to preserve the most important areas of 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.

Management

The six established protected areas cover a total of about 1,500 ha, which represents 10% of the islands landmass. Four of the six include some marine or coastal zones (Annex II). Significant progress has been made in the development of three of the proposed protected areas: South-western Virgin Gorda, Anegada and Horseshoe Reef, and North Sound Virgin Gorda (Cambers 1991). Management of these MPA's is considered effective. Management issues include improvement of revenue generation, staffing and training, and proper use of mooring buoys by yachtsmen (van't Hof 1993).

Anegada has been identified as an internationally important wildlife site containing 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.

The main economic activity is now tourism, which has expanded considerably in recent years (from 1978-1982 income from tourism nearly tripled). Development of the tourist industry has had an impact on natural habitats, by putting particular pressure on coastal wetlands and mangrove communities (Scott and Carbonell 1986). As the tourism industry is based on the marine environment, it was a significant factor leading to the development of protected areas in the islands.

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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:

Protected Forest Provides for protected forestry and water areas. 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.

ANNEX II: BRITISH VIRGIN ISLANDS PROTECTED AREAS

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Virgin Gorda Peak	II	FP		107	1974
Subtotal	1		0	107	
Wreck of the Rhone	III	NM	YES	324	1980
Subtotal	1		1	324	
Cooper Island	IV	BS	YES	138	1959

Flamingo Pond	IV	BS		449	1977
Ginger Island	IV	BS	YES	105	1959
Peter Island	IV	BS	YES	430	1959
Subtotal	4		3	1,122	

BS = Bird Sanctuaries

NM = Natural Monument

FP = Forest Park

CAYMAN ISLANDS (UNITED KINGDOM)

Area 259 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	1	1	1,731
Category II	4	4	1,260
Category III	0	0	0
Category IV	8	7	5,146
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	13	12	8137

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

Marine protected areas have been designated around Grand Cayman under the Marine Conservation (Marine Parks) Regulations, 1986. Protected areas on Cayman Brac and Little Cayman are designated 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 (Annex I).

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 are 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Administration

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 was scheduled for 1992.

The National Trust for the Cayman Islands, a statutory, non-governmental organisation, is involved with land acquisition and management for conservation purposes.

Biodiversity

The three Cayman Islands are flat, low-lying limestone islands with extensive reef systems. The human 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 changed. 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 that 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.

Management

The eight Protected Areas in Cayman Islands cover just over 8,000 ha, equivalent to 31% of the islands land mass. All but one of the areas contains marine or coastal resources.

Three wetland sites have recently been declared animal sanctuaries (Meagre Bay and Colliers Pond on Grand Cayman and the Rookery on Little Cayman). All of these are land based (Ebanks-Petrie, pers. comm., 1992). In 1989 the government gave 257 ha of land, Salina Reserve, to the National Trust. This area is known as the. The Trust is also joint proprietor of 24 ha on Grand Cayman being developed as a botanical garden, with woodlands being preserved in their natural state. In December 1991 ownership of a 40 ha woodland site on Cayman Brac, important as a nesting area for *Amazona leucocephala hesterna*, was transferred to the National Trust by The Nature Conservancy (USA) and is now titled Brac Parrot Reserve. The site will form the basis for a larger reserve on Cayman Brac (Ebanks-Petrie, pers. comm., 1992).

Enforcement of conservation legislation is the responsibility of the police. In cases of marine issues, the marine enforcement officers who are employed to the Natural Resources Unit 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 (Ebanks-Petrie, pers. comm., 1992).

Contacts

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Ministry of Agriculture, Environment, Communications, and Works, Cayman Islands Government, Government Administration Building, Grand Cayman. Telephone (809) 949-7900 Fax: (809) 949-2922

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ANNEX I: LEGAL INSTRUMENTS

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: No information

Designations:

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.

ANNEX II: CAYMAN ISLANDS PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Little Sound (Grand Cayman)	I	EZ	YES	1,731	1986
Subtotal	1		1	1,731	
Bloody Bay Jackson Point	II	MP	YES	161	1986
Dick Sessingers Bay Beach Point	II	MP	YES	143	1986
NW Point West Bay Cemetery	II	MP	YES	155	1986
Victoria House Sand Cay Apartments	II	MP	YES	801	1986
Subtotal	4		4	1,260	
Salina (Grand Cayman)	IV	R	YES	257	1989
Radio Mast Sand Bluff	IV	MP	YES	177	1986
Frank Sound (GCayman)	IV	RP	YES	224	1986
Head of Barkers Flats	IV	RP		365	1986
Mary's Bay East Point	IV	RP	YES	180	1986
North Sound (GCayman)	IV	RP	YES	3,310	1986
South Hole Sound (LCayman)	IV	RP	YES	316	1986
South Sound (GCayman)	IV	RP	YES	317	1986
Subtotal	8		7	5,146	

EZ = Ecological Zone

R = Reserves

MP = Marine Parks

RP = Replenishment Zones

COLOMBIA

Area 1,141,748 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	2	0	1,947,000
Category II	33	8	7,043,790
Category III	0	0	0
Category IV	6	2	57,395
Category V	38	0	342,911
Categories VI-VIII	263	16	39,368,527
Biosphere Reserves	3	1	2,514,375
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	345	27	50,125,998

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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). A comprehensive national conservation strategy has now been formulated which reinforces the legislation and national system. (See below re creation of the Ministry of Environment, 1993).

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).

In 1989 the National Planning Department presented the Colombian Forestry Action Plan (PAFC). A Secretariat (Secretaría Especial) was created within the National Planning Department to implement the PAFC, which identifies 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, Castaño and Sánchez, pers. comm., 1991, 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 (Sánchez, pers. comm., 1992). The Ministry of Agriculture (now the Ministry of Environment) was empowered to define areas which might later be developed as national parks, which includes all permanently snow-covered mountains and their surrounding areas. Over 55 million ha of forest reserves were 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). All protected area responsibilities were transferred to it. Decree No. 133 (1976) restructured INDERENA and expanded its range of responsibilities. Law 99 of 1993 created the Ministry of Environment which took on INDERENA's functions.

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. Through Law 99, 1993 the Decree was updated and created autonomous corporations for each state. Its departments are responsible for executing the policies at the local level.

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 is made for forest reserves. The system of national parks 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 for the six management categories employed in the system (Annex I). Further details of protected area management and prohibitions are given in regulations pertaining to the Code.

Decree No. 622 (1977) regulates all articles of the Code relating to the national parks system. It refers to the natural national parks system and provides specific guidance for administration and management. The regulations state that national parks and other protected areas are compatible with indigenous reserves and *resguardos*. 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. 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.

Provision is made for protected areas to be subdivided into management zones which provide different degrees of protection: these range from intangible to high density use (Annex I). A master plan, giving details of development, management and conservation objectives, must be written for each area.

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 (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 (Romero, pers. comm., 1992). Current environmental legislation and policy providing for the establishment of protected areas is compatible with the system of indigenous areas. In most cases, the indigenous communities use natural resources on a sustainable basis (Castaño 1989, 1992).

International Participation

Conventions & Treaties

Amazon Co-operation Treaty, (ATC, 1978)

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

Since its creation in 1968, INDERENA (and since 1993 the Ministry of Environment) has been responsible for formulating conservation policies and managing natural resources and protected areas. The Ministry of Environment includes several sub-units (internal affairs, legal, forestry and wildlife, etc.) as well as the unit for the National Parks System.

The Unit implements the policies of the Ministry and is responsible for planning, co-ordinating and regulating the programmes of the national system of protected areas. The total number of personnel employed in the national system is about 300, comprising professionals, administrative and technical staff and labourers, including park guards. The responsibilities of INDERENA (now the Ministry) 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

National Parks Unit (INDERENA-DPN 1991, Castaño and Sánchez, pers. comm., 1991).

Forest reserves are managed by INDERENA (now the Ministry) under the 1959 legislation (FAO 1991). The Colombian Institute of Agrarian Reform (INCORA) was responsible for establishing the system of indigenous reserves known as *resguardos*, and for regulating forest resource use in these areas (FAO 1991). Forest reserves now form part of the national system of protected areas.

The Ministry is responsible for natural resource management and policy at the national level, but there are autonomous regional corporations throughout the country which are responsible for resource regulation and policy implementation in their particular regions. Where this occurs, an agreement is reached between the Ministry and the regional corporation to co-ordinate the management of protected areas in the region. Some administrative functions may be delegated to the regional corporation although the Parks Unit remains the ultimate authority (Castaño and Sánchez, pers. comm., 1991, 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 the Ministry (Anon. 1989, Castaño and Sánchez, pers. comm., 1991). Regional corporations carry out other conservation activities in their region involving parts of the national system. Similar agreements may also be reached between the Ministry and NGOs.

There are a number of NGOs working on environmental issues. Among the largest is the Fundación Natura, established in 1985, which signed an agreement with INDERENA to co-operate in the management of some protected areas (INDERENA-DPN 1991). Through an agreement with a private national company, Fundación Natura shares ownership and management of a scientific reserve, and three national parks as well as managing several private reserves (Fundación Natura 1990, Romero, pers. comm., 1991, 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). Fundación Herencia Verde works closely with autonomous regional corporations in buffer zone management, and also in the Chocó (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 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 in Colombia, 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 (Piñeros, pers. comm., 1991).

Biodiversity

Colombia is a country of great geographical contrast, which results in a diversity of ecosystems, species richness, and endemism (Castaño 1989, González *et al* 1989). A number of major waterways (including the Orinoco and the Amazon river systems) are found in the country,. As a result of its varied topography, with altitudes ranging from sea level to 5,755 m, 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, Amazon, Andes, Caribbean and Chocó (Castaño and Sánchez, pers. comm., 1991).

The **Orinoquia province** covers the lowlands of the Orinoco River drainage system, with elevations from 100 m to 500 m. Most of this region is covered by natural savannah 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 2,500 mm and annual temperature of more than 24C. It accounts for around one-third of Colombia's total land area (Castaño and 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 flora and fauna 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 (Castaño and 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 (montane forest to mangroves) (Castaño and 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.). The Santa Marta mountains contain all of the altitudinal zones found in the country (sea level to 5,775 m) and has a biota related to that of the Andes, but with a higher endemic component. This region includes the National Marine Park of Corales del Rosario and the archipelago of San Andres and Providencial Islands

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 Colombia's ecosystems are present 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 (Castaño and Sánchez, pers. comm., 1991).

Management

Colombia's protected area systems of 345 areas covers more than 50 million ha which is equivalent to 48% of the national territory. IUCN management categories I-V account for nearly one-quarter of the areas and cover 8.5 million ha. Marine and coastal resources are present in 8% of the protected areas (Summary Table and Annex II).

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. However, 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, Castaño and 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 and subsequently the Ministry of Environment in

1993, protected area management was unified into one organisation (González *et al* 1989, Castaño and Sánchez, pers. comm., 1991, 1992). Law 99 of 1993 which created the Ministry of Environment also established the National Environmental System.

Colombia has a coherent and co-ordinated national system of protected areas, as defined by the FAO Latin American Network (Red Latinoamericana de Cooperación Técnica en Parques Nacionales, Otras Areas Protegidas, Flora y Fauna Silvestres). The network stipulates that protected areas should be unified by comprehensive legislation, stating national conservation objectives (giving detailed definitions of the management categories used) and that there is co-ordination between the administration of each area so that they may collectively attain national objectives (Ormazábal 1988).

By 1991 the national natural parks system comprised forty-two conservation units, covering 9,016,893 ha or 8.6% of the total land area of Colombia (INDERENA-DPN 1991; Castaño and Sánchez, pers. comm., 1991). The protected area system contains 44% of the country's ecosystems (IUCN/ITTO 1991). There is a high representation of mountainous areas, particularly the Andean region and the Sierra Nevada de Santa Marta (Castaño 1989, Castaño and 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 (Castaño, pers. comm., 1991). The 1977 Regulations state that protected areas and *resguardos* are compatible and can co-ordinate 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, 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).

Grip (1993) evaluated the current situation in Corales de Rosario National Park in Colombia and proposed overall actions to reduce resource degradation and increase management effectiveness in Colombia's only marine park. The issues and recommendations are probably relevant for many of Colombia's 27 protected areas that contain coastal or marine resources.

Major environmental issues identified were:

Coastal pollution from Cartagena and other coastal cities.

Potential for unrestrained tourism development in Zona Franca on Baru Island.

Destructive practices used by local and non-resident fishermen.

Inadequacy of park boundaries and regulation of external impacts given the inter-relations between terrestrial and aquatic ecosystems and activities.

Economic and administrative problems included:

Insufficient co-ordination between the central and regional offices of INDERENA.

Inadequate staffing and operational resources, transfer of park generated funds to other areas.

No zoning plan has been developed to regulate ongoing use of the park.

Travel agencies, hotels and restaurants benefit from presence of park, but do not contribute to management.

Illegal presence of permanent and recreational housing on the islands.

Major recommendations included:

The basic enforcement capacity of the park must be strengthened, sanctions should be increased in relation to the severity of infractions.

Develop a viable zoning plan identifying areas for strict conservation, recuperation, transportation corridors, recreation and an outer buffer zone.

Establish a local advisory committee with representation of local and regional authorities, local communities, and park user groups.

Increased funding from park generated revenues should be retained by INDERENA for park management.

Entrance fees and commercial concessions should be increased substantially.

A three year action plan should be developed and administrative and protection functions should be strengthened.

The regional INDERENA office should be strengthened to support resolution of management problems in the park and to guarantee increased park income via the implementation of new fee policies.

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 (Kelsey, pers. comm., 1992).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 flora or fauna, 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 flora or fauna 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 flora or fauna 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. 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 zones. General prohibitions are given. National natural parks are compatible with indigenous reserves and indigenous communities will not be removed from protected areas. 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) 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 with 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

ANNEX II: COLOMBIAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Nukak	I	NNR		855,000	1989
Puinawúai	I	NNR		1,092,000	1989
Subtotal	2		0	1,947,000	
Amacayacú	II	NNP		293,000	1975
Cahuinarí	II	NNP		575,500	1987
Catatumbo Barí	II	NNP		158,125	1989
Chingaza	II	NNP		50,374	1977
Chiribiquete	II	NNP		1,280,000	1989
Corales del Rosario	II	NNP	YES	19,506	1977
Cordillera de los Picachos	II	NNP		439,000	1989
Cueva de los Guácharos	II	NNP		9,000	1960
El Cocuy	II	NNP		306,000	1977
El Tuparro	II	NNP		548,000	1970
Farallones de Cali	II	NNP		150,000	1968
Isla Gorgona	II	NNP	YES	49,200	1984
Isla de Salamanca	II	NNP	YES	21,000	1969
La Paya	II	NNP		422,000	1984
Las Hermosas	II	NNP		125,000	1977
Las Orquideas	II	NNP		32,000	1974
Los Katíos	II	NNP		72,000	1973
Los Nevados	II	NNP		58,300	1959
Macuira	II	NNP	YES	25,000	1977
Munchique	II	NNP		44,400	1977
Nevado del Huila	II	NNP		158,000	1977
Paramillo	II	NNP		460,000	1977
Pisba	II	NNP		45,000	1977
Puracé	II	NNP		83,000	1968
Sanquianga	II	NNP	YES	80,000	1977
Sierra Nevada de Santa Marta	II	NNP	YES	383,000	1964

Sierra de la Macarena	II	NNP	YES	630,000	1989
Sumapáz	II	NNP		154,000	1977
Tamá	II	NNP		48,000	1977
Tatamá	II	NNP		54,300	1987
Tayrona	II	NNP	YES	15,000	1964
Tinigua	II	NNP		201,785	1989
Utría	II	NNP		54,300	1987
Subtotal	33*		8	7,043,790	
Laguna de Sonso	IV	NR		2,045	1979
Ciénaga Grande de Santa Marta	IV	FFS	YES	23,000	1977
Galeras	IV	FFS		17,600	1985
Iguaque	IV	FFS		6,750	1977
Los Colorados	IV	FFS		1,000	1977
Los Flamencos	IV	FFS	YES	7,000	1977
Subtotal	6		2	57,395	
Bosque Oriental de Bogotá	V	PFR		17,625	1976
Cerro Quinini	V	PFR		1,800	1987
Cuchilla Penas Blancas	V	PFR		1,630	1983
Cuchilla Sucuncuca	V	PFR		1,710	1989
Embalse El Peñol Río Guatapé	V	PFR		13,100	1985
Escarpas Occidental y Malpaso	V	PFR		3,160	1982
Frontera Colombo Panameña	V	PFR		62,375	1977
Lago Sochagota	V	PFR		8,150	1986
Páramo El Atravesado	V	PFR		3,044	1971
Páramo Urrao	V	PFR		4,000	1975
Páramo de Chingaza	V	PFR		20,000	1971
Páramo de Sumapaz	V	PRF		30,000	1971
Predio La Bolsa	V	PFR		2,700	1990
Predio La Planada	V	PFR		1,667	1984
Predio Río Sucio	V	PFR		1,360	1987
Quebrada La Tablona #1	V	PFR		1,420	1981
Quebrada La Tablona #2	V	PFR		2,700	1991

Quebrada Mutatá	V	PRF		1,500	1985
Quebrada Piedras Blancas	V	PFR		11,825	1970
Río Algodonal	V	PFR		8,200	1984
Río Blanco Olivares	V	PFR		4,900	1989
Río Cravo Sur	V	PFR		5,000	1985
Río Las Ceibas	V	PFR		6,370	1983
Río León	V	PFR		29,000	1971
Río Mocoa	V	PFR		34,500	1984
Río Nembí	V	PFR		5,800	1984
Río San Francisco	V	PFR		2,880	1981
Río Satocá	V	PFR		4,200	1989
Río Tame	V	PFR		1,900	1985
Río Tejo	V	PFR		2,500	1984
Ríos Blanco y Negro	V	PFR		11,925	1982
Ríos Chorreras Concepción	V	PFR		4,450	1991
Ríos Escalereite San Cipriano	V	PFR		5,400	1982
Sierra El Peligro	V	PFR		1,650	1988
Zona Musinga Carauta	V	PFR		4,000	1975
Caños La Esperanza, Negro y la Lindosa	V	PFR		5,600	1,982
Laguna La Cocha y Cerro de Patascoy	V	PFR		8,500	1,973
Serranía de Coraza y Montes de Maria	V	PFR		6,370	1,983
Subtotal	38		0	342,911	
Afilador	VII	IR		9,325	na
Alto Río Guainia	VII	IR		477,200	na
Alto y Medio Río Inirida	VII	IR		2,762,500	na
Bajo Río Guainia y Río Negro	VII	IR		759,200	na
Barrancón	VII	IR		2,500	na
Caimán Nuevo	VII	IR	YES	7,500	na
Carraipía	VII	IR		5,115	na
Corocito Yopalito Gualabó	VII	IR		8,257	na
Cuiari Isana	VII	IR		926,500	na

El Unuma	VII	IR		1,273,600	na
La Fuga	VII	IR		8,360	na
La Sal	VII	IR		3,275	na
Luzón	VII	IR		2,500	na
Macucuana	VII	IR		5,700	na
Motilón Barí	VII	IR		83,000	na
Paujii	VII	IR		52,120	na
Río Atabapo	VII	IR		513,720	na
Río Verde	VII	IR	YES	9,200	na
Ríos Muco y Guarrojo	VII	IR		84,000	na
San José de Lipa	VII	IR		18,500	na
San Rafael, Abaribá, Ibibi	VII	IR		61,525	na
Santa Rosa de Sucumbíos	VII	IR		5,129	na
Santa Rosa del Guamuez	VII	IR		3,750	na
Tauretes Agua Blanca	VII	IR		8,000	na
Yarina	VII	IR		9,813	na
Aduche	VII	RG		370,100	na
Agua Negra	VII	RG		2,000	na
Aguanegra	VII	RG		1,474	na
Almidón La Ceiba	VII	RG		40,960	na
Alta y Media Guajira	VII	RG	YES	959,104	na
Alto Río Bojayá	VII	RG		50,160	na
Alto Río Buey	VII	RG		13,151	na
Alto Río Cuta	VII	RG		22,362	na
Alto Río Tagachí	VII	RG		21,260	na
Alto del Rey	VII	RG		1,244	na
Amenanae o Charco del Niño Dios	VII	RG		6,990	na
Arara	VII	RG		12,300	na
Arhuaco de la Sierra Nevada	VII	RG		195,900	na
Arquía	VII	RG		2,343	na
Arrecifal	VII	RG	YES	4,560	na
Atana Pirariami	VII	RG		48,800	na
Avirama	VII	RG		2,518	na

Bachaco Buena Vista	VII	RG		73,280	na
Bajo Río Vichada o Santa Rita	VII	RG		424,320	na
Barranquito Laguna Colorado	VII	RG		19,132	na
Belaicazar	VII	RG		6,000	na
Beté, Auro Beté y Auro del Buey	VII	RG		11,580	na
Buenavista	VII	RG		4,500	na
Burujón o La Unión San Bernardo	VII	RG		6,960	na
Cabeceras o Puerto Pizario	VII	RG		2,920	na
Caimanero de Jampapa	VII	RG		1,742	na
Calenturas	VII	RG		3,066	na
Calle Santa Rosa	VII	RG	YES	21,320	na
Campoalegre y Ripialito	VII	RG		7,815	na
Cañamoho	VII	RG		1,036	na
Caño Bachaco	VII	RG		6,074	na
Caño Bocón Brazo Amanaven	VII	RG		10,085	na
Caño Cavasi	VII	RG		36,000	na
Caño Guáripa	VII	RG		7,705	na
Caño Jabón	VII	RG		9,040	na
Caño La Hormiga	VII	RG		4,327	na
Caño Mochuelo Hato Corozal	VII	RG		94,600	na
Caño Negro	VII	RG		1,833	na
Caño Ovejas o Betania Corocito	VII	RG		1,720	na
Caño Zama	VII	RG		73,380	na
Caños Cuna Tsepajibo Warracaña	VII	RG		56,000	na
Carpintero Palomas	VII	RG		40,680	na
Carrizal	VII	RG		9,870	na
Chachajo	VII	RG		2,240	na
Chagpién Tordó	VII	RG		22,460	na
Chamí Margen Izquierda R	VII	RG		7,030	na

S Juan					
Chamí Río Garrapatas	VII	RG		15,730	na
Chaparral Barronegro	VII	RG		14,230	na
Chimborazo	VII	RG		2,112	na
Chimurro y Nedo	VII	RG		13,185	na
Chololobo Matatu	VII	RG		6,385	na
Chuscal y Tuguriducito	VII	RG		5,122	na
Coayare El Coco	VII	RG		11,840	na
Cobaría	VII	RG		45,400	na
Coconuco	VII	RG		3,424	na
Colimbs	VII	RG		1,600	na
Comeyafú	VII	RG		19,180	na
Consejo	VII	RG		4,500	na
Coquiona	VII	RG		6,239	na
Córdoba	VII	RG		4,000	na
Corocoro	VII	RG		33,500	na
Coropoya	VII	RG		3,923	na
Cota	VII	RG		1,859	na
Cuaiquer o Awua del Alto Albí	VII	RG		4,760	na
Cuambí Yaslambí	VII	RG		3,000	na
Cuayuyaco	VII	RG		1,260	na
Cumaral Brazo Amanaven	VII	RG		23,355	na
Cumbal	VII	RG		8,000	na
Cusay o la Colorada	VII	RG		1,200	na
Docordó Balsalito	VII	RG		4,140	na
Egua Guariacana	VII	RG		15,390	na
El Doce o Quebrada Borbollón	VII	RG		1,185	na
El Duya, San Juanito y Paravare	VII	RG		21,300	na
El Hacha	VII	RG		6,637	na
El Quince	VII	RG		1,200	na
El Saladillo	VII	RG		1,595	na
El Suspiro o Rincón del Socorro	VII	RG		1,978	na

El Tablero	VII	RG		4,336	na
El Unuma	VII	RG		418,840	na
El Veinte, Playalta y El Noventa	VII	RG		3,334	na
El Venado	VII	RG		34,160	na
El Zaino, Guayabito, Muriaytuy	VII	RG		1,175	na
Gabarra Catalaura	VII	RG		13,300	na
Gaño Claro	VII	RG		1,633	na
Giro Brazo Amanaven	VII	RG		20,310	na
Guacamayas Mamiyare	VII	RG		18,700	na
Guachavez	VII	RG		1,052	na
Guachicono	VII	RG		13,932	na
Guachucal	VII	RG		3,000	na
Guaco Bajo y Guaco Alto	VII	RG		49,660	na
Guaguando	VII	RG		13,260	na
Guambia	VII	RG		18,529	na
Guangüí	VII	RG		24,100	na
Guayabal de Partadó	VII	RG	YES	4,376	na
Honduras	VII	RG		21,121	na
Huila	VII	RG		41,402	na
Iguana	VII	RG		10,900	na
Infí	VII	RG		4,200	na
Inga de Nineras	VII	RG		3,394	na
Ipiales	VII	RG		5,156	na
Iroka	VII	RG		8,600	na
Jagual Río Chintadó	VII	RG		28,175	na
Jambaio	VII	RG		23,476	na
Jirijiri	VII	RG		4,960	na
Juradó	VII	RG	YES	16,700	na
Kananeruba	VII	RG		9,150	na
La Esmeralda	VII	RG		2,762	na
La Llanura	VII	RG		74,000	na
La Montana	VII	RG		20,300	na
La Pascua	VII	RG		19,120	na

La Samaritana	VII	RG		4,185	na
Laguna Anguilla La Macarena	VII	RG		16,130	na
Laguna Curvina Sapuara	VII	RG		3,350	na
Laguna Negra y Cacao	VII	RG		18,480	na
Macuare	VII	RG		24,000	na
Mallama	VII	RG		1,281	na
Matavén Fruta	VII	RG		84,453	na
Mayasquer	VII	RG		3,000	na
Merey La Veraita	VII	RG		3,107	na
Ministas Miralindo	VII	RG		40,200	na
Mirití Paraná	VII	RG		1,162,500	na
Mondo Mondocito	VII	RG		1,232	na
Monochoa	VII	RG		376,800	na
Morocoto Buenavista	VII	RG		49,940	na
Mosoco	VII	RG		12,025	na
Muellanues	VII	RG		2,000	na
Murciélago Altamira	VII	RG		7,960	na
Napipí	VII	RG		21,910	na
Nazareth	VII	RG		1,300	na
Nunuya de Villazul	VII	RG		142,620	na
Opogadó	VII	RG		29,020	na
Panam	VII	RG		4,000	na
Pancitara	VII	RG		9,636	na
Papayo	VII	RG		2,460	na
Parte Oriental del Vaupés	VII	RG		3,354,097	na
Pioya	VII	RG		1,600	na
Pirayo	VII	RG		5,000	na
Polines	VII	RG		2,538	na
Potosí	VII	RG		1,800	na
Predio Putumayo	VII	RG		5,230,552	na
Puadó, Mataré, La Lerma YES Terdó	VII	RG		12,662	na
Pueblo Nuevo Laguna Colorada	VII	RG		44,845	na

Pueblo Nuevo	VII	RG		5,000	na
Puerto Alegre y la Divisa	VII	RG	YES	22,365	na
Puerto Córdoba	VII	RG	YES	39,700	na
Puerto Libre Río Pepe	VII	RG	YES	2,069	na
Puerto Sábalo y los Monos	VII	RG	YES	303,700	na
Puracé	VII	RG		6,203	na
Quichaya	VII	RG		1,500	na
Quizgo	VII	RG		10,000	na
Remanzo Chorro Bocon	VII	RG		73,680	na
Río Bebarama	VII	RG		8,875	na
Río Blanco	VII	RG		5,000	na
Río Curiche	VII	RG	YES	8,965	na
Río Domingodó	VII	RG		24,590	na
Río Ichó y Quebrada Baratudo	VII	RG		5,342	na
Río Jarapetó	VII	RG		5,583	na
Río Mumbú	VII	RG		3,000	na
Río Murindó	VII	RG		18,270	na
Río Neguá	VII	RG		5,463	na
Río Nuquí	VII	RG	YES	9,500	na
Río Orpua	VII	RG	YES	22,290	na
Río Panguí	VII	RG	YES	7,870	na
Río Pichimá	VII	RG		9,024	na
Río Quiparadó	VII	RG		9,860	na
Río Siare o Barranco Lindo	VII	RG		47,320	na
Río Taparai	VII	RG		14,212	na
Ríos Catrú y Dubasa	VII	RG		48,980	na
Ríos Jurubidá, Chorí y Alto Baudó	VII	RG		80,350	na
Ríos Lanas o Capá	VII	RG		6,400	na
Ríos Pato y Jengado	VII	RG		3,162	na
Ríos Tomo Weberi	VII	RG		60,540	na
Ríos Uva y Pogue	VII	RG		47,500	na
Ríos Valley Boroboro	VII	RG		21,020	na
S. Andrés de Sotavento	VII	RG		6,219	na

Salaqui Pavarandó	VII	RG		107,000	na
San Andrés de Pisimbaia	VII	RG		3,365	na
San Antonio del Fragua	VII	RG		1,400	na
San Francisco I	VII	RG		15,064	na
San José	VII	RG		11,037	na
San Luís del Tomo	VII	RG		25,100	na
San Matías o Jai Dukama	VII	RG		1,371	na
San Sebastián	VII	RG		1,300	na
Santa Maria de Pángala	VII	RG		9,500	na
Santa Rosa	VII	RG		1,587	na
Santa Rosalía	VII	RG		5,700	na
Santa Sofia y el Progreso	VII	RG		4,200	na
Santa Teresita del Tuparro	VII	RG		180,000	na
Saracure y Río Cadá	VII	RG		174,000	na
Sejalito San Benito	VII	RG		4,823	na
Sibundoy Parte Alta	VII	RG		3,252	na
Sokorpa	VII	RG		25,000	na
Sta Cecilia Quebrada Rio Choco	VII	RG		5,723	na
Suin	VII	RG		10,533	na
Tacueyo	VII	RG		27,885	na
Tahamí del Andágueda	VII	RG		50,000	na
Tarena	VII	RG		4,888	na
Tigres y Monchique	VII	RG		8,254	na
Tiosilidio	VII	RG		4,560	na
Toez	VII	RG		7,687	na
Togoromá	VII	RG		8,640	na
Toribio	VII	RG		9,018	na
Totoro I	VII	RG		4,161	na
Totoro II	VII	RG		1,906	na
Trapiche Río Pepe	VII	RG		1,008	na
Trupiogancho y la Meseta	VII	RG		2,309	na
Tumbichucué	VII	RG		4,300	na
Tunebo de Angostura	VII	RG		3,282	na
Unión Chocó San Cristóbal	VII	RG		21,400	na

Valdivia	VII	RG		3,985	na
Valle del Sibundol	VII	RG		3,252	na
Vitonco	VII	RG		7,245	na
Wayúu de Lomamoto	VII	RG		1,572	na
Witora	VII	RG		67,200	na
Yaigoje Río Apaporis	VII	RG		518,320	na
Yanguillo	VII	RG		4,230	na
Yuquiva	VII	RG		16,380	na
Yurí Brazo Amaná ven	VII	RG		15,836	na
Medio Río Guainia Serranía Naquen	VII	IR		853,320	na
Agua Clara y Bella Luz del Río Ampora	VII	RG		9,850	na
Barranco Ceiba y Laguna Araguato	VII	RG		24,940	na
Bellavista y Unión Pitalito o Río Siguirisua	VII	RG		29,260	na
Caranacoa Yurí Laguna Morocoto	VII	RG		45,840	na
Chamií Río San Juan Margen Derecha	VII	RG		17,770	na
Kilómetro 6 y 11 Carretera Leticia Tarapacá	VII	RG		7,500	na
Mocagua, Macedonia, El Vergel y Zaragoza	VII	RG		16,750	na
Puerto Naranjo, Penas Rojas, Cuerazo ey El D	VII	RG		3,000	na
Quebrada Cañaveral Río San Jorge	VII	RG		2,815	na
Ariari Guayabero	VIII	SMA		1,022,339	1989
La Macarena Norte	VIII	SMA		467,010	1989
La Macarena Sur	VIII	SMA		33,200	1989
Amazonía	VIII	FR		32,632,92	na
Central	VIII	FR		1,619,800	1959
Pacífico	VIII	FR		7,398,075	1959
Río Magdalena	VIII	FR		2,107,750	1959
Serranía de Los Motilones	VIII	FR		477,978	1959

Sierra Nevada de Santa Marta	VIII	FR		600,000	1959
Sierra del Cocuy	VIII	FR		579,250	1959
Subtotal	263		16	39,368,527	
Cinturón Andino	IX	BR		855,000	1979
El Tuparro	IX	BR		928,125	1979
Sierra Nevada de Santa Marta	IX	BR		731,250	1979
Subtotal	3		1	2,514,375	

NNP = Natural National Park

NR = Natural Reserve

FFS = Fauna and Flora Sanctuary

NNR = Natural National Reserve

SMA = Special Management Area

FR = Forest Reserve

PFR = Protection Forest Reserve

IR = Indigenous Reserves

RG = Resguardo (Indian Reserve)

BR = Biosphere Reserve

*= The National Parks of Colombia now total 46, but it was only possible to provide detailed information on 33.

na= not available

COSTA RICA

Area 50,900 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	5	2	30,769
Category II	12	6	463,132
Category III	0	0	0
Category IV	19	10	132,127
Category V	3	1	5,671
Categories VI-VIII	68	11	1,035,258
Biosphere Reserves	2	0	728,955
World Heritage Sites	1	0	584,500
Ramsar Sites	3	2	30,269
Total (1)	108	30	2,251,457

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

In 1989 the government formulated its Forestry Action Plan to interpret the global designs of TFAP to suit national interests. The 1990 Forestry Action Plan reviewed the current situation of the forest sector, and proposed measures to make forest conservation more effective. These included increasing co-ordination between the numerous institutes involved in forest management, supporting the establishment of a co-ordinated 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 (ECODES), completed in 1989 under the direction of the Ministry of Natural Resources, Energy and Mines (Ministerio de Recursos Naturales, Energía y Minas, MIRENEM), marked a significant advance in governmental policies for natural resource protection (Quesada 1990). The strategy provided a comprehensive review of natural resource management and established national guidelines for sustainable development. These

are: preserving genetic diversity, maintaining essential ecosystems, and ensuring sustainable natural resource use.

The term national park first appeared in legislation in Law No. 197 (1945) which prohibited forest exploitation for 200 m on either side of the Pan-American 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 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) with responsibility for various categories of protected area. Definitions of these categories were to be given in the individual legislation providing for the creation of the each area. National parks and reserves are created by executive decree, and once established their boundaries can be altered only by a Congressional Law. Provision is made for the expropriation of privately owned land for the creation of 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. 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).

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 were transferred to the new ministry upon its creation, and the Wildlife Department was upgraded to Wildlife Directorate at the same level as the DGF and SPN (Ugalde 1992).

In 1990 the Reform 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 (Annex I). Establishment requirements include a preliminary inventory, stated objectives, and a management plan for each area needs to be formulated by the DGF or the SPN.

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 co-ordinated 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 is encouraged (MIRENEM 1991a, Ugalde 1992). However, there is still no single piece of legislation creating an integrated policy for protected areas providing a legal framework for a coherent national system (MIRENEM 1990).

Currently, wildlife resources are regulated under the provisions of Law No. 7317 Wildlife Conservation Law (Ley de Conservación de Fauna Silvestre, 1992). This law also assigns the Wildlife Department under MIRENEM (Dirección de Vida Silvestre, DVS) responsibility for the identification, administration and supervision of wetlands.

The Regulations to the Wildlife Conservation Law, Decree No. 22545, 1992 provide further details of wildlife protection and list prohibited activities and penalties.

Provision is made for the creation of the Co-ordinating Committee for Wildlife Conservation (Comité Coordinador de Conservación de Fauna Silvestre). Which comprises representatives from the various agricultural and environmental institutes including the National Parks Service to supervise and assess activities relating to wildlife conservation.

International Participation

Conventions & Treaties

Central American Biodiversity Convention (CABD, 1992)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Environmental Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

Since its establishment in 1986 the Ministry of Natural Resources, Energy and Mines (MIRENEM) incorporates those public sector organisations that administer natural resources and protected areas. These are the General Forestry Directorate (DGF), and the National Parks Service (SPN), and the Wildlife Directorate (Dirección de Vida Silvestre, DVS) (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, however it is responsible for resource management in all wetlands (Ugalde, pers. comm., 1992).

The DGF, established in 1969, has a broad range of responsibilities for forest resource administration which includes the management of forest reserves (*reservas forestales*), protective zones (*zonas protectoras*) and faunal refuges (Bradley *et al* 1990, 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 biodiversity conservation. Land under these categories must be acquired by the state (Ugalde 1992). There are approximately 600 persons working in protected area management (Ugalde 1992).

The National Forestry Council was created in 1990 and 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, and presidents or representatives from several governmental and private institutions concerned with agrarian and environmental affairs. 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 co-ordinating and directing forest related activities (MIRENEM 1990).

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 co-ordinates management activities with the various indigenous development associations and local groups. It has participated in inter-institutional working groups for the La Amistad Biosphere Reserve which includes the majority of the Indian population and reserves (Bradley *et al* 1990).

There are seven privately owned protected areas that cover 24,357 ha, 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 Tropicales, CCT) which manages Monteverde Cloud Forest Reserve, and the Organisation 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 (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 has been one of the principal institutions responsible for administering funds generated by debt for nature swaps in Costa Rica (Bradley *et al* 1990).

In 1983 the FPN together with The Nature Conservancy developed the Natural Heritage Programme 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). INBio, established in 1988, has greatly strengthened the national biodiversity data base established by the Natural Heritage Programme and has trained a large number of parataxonomists to carry out field collections in protected areas.

Funding for protected areas is provided through the national budgets and funds generated by NGOs and foreign governments. Financial support from the government was greatest during the 1970's, but funds were reduced during the 1980's (Ugalde 1992). In 1987 a debt-for-nature swap was done, from which the protected area system received significant financial support in the form of bi-lateral government co-operation and from international NGOs (Ugalde 1992). Between 1987 and 1990 the national funds assigned to the SPN and the DGF totalled US\$27 million with a further US\$19 million provided by private foundations (Ugalde 1992).

Problems in protected area management arise from a lack of co-ordination between the responsible agencies, 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). Only national parks and biological reserves may be considered adequately protected and receiving effective management (Ugalde 1992). Even within these categories large differences exist in management capacity from one area to another.

The law proposed by MIRENEM in 1991 would have institutionalised the administrative changes that have occurred since 1986. The SPN would be renamed the National Service for Conservation Areas (Servicio Nacional de Areas de Conservación) and would be responsible for the management, planning, and development of the new national system of protected areas (MIRENEM 1991a, Ugalde 1992). Management agreements have been established with local NGOs. Local participation has been encouraged through a number of Regional Councils

(Consejos Regionales) which incorporate local people and enable group decisions to be taken (MIRENEM 1991a).

Biodiversity

Costa Rica lies towards the south-eastern end of the Central American isthmus and has a mountainous topography shaped by volcanic activity with an altitudinal range from sea level to 3,819 m (MIRENEM 1990). Nearly the entire country has a tropical climate with an mean annual rainfall of 3300 mm (Bradley *et al* 1990). The inter-relationship of a broad range 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 coasts of Costa Rica. The Pacific coastline extends for 1,328 km and 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 212 km 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).

The Atlantic and Pacific slopes are divided by three mountain ranges running north-west to south-east across the country. The Cordillera de Guanacaste in the north-west is formed by five volcanic massifs reaching an altitude of 2,020 m. 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). In the centre of the country the Cordillera Vocanica Central reaches altitudes of 3,432 m. The Cordillera de Talamanca extends to and continues beyond the Panama border and includes Mt. Chirripo which is the highest point in the country at 3,819 m.

The Central Valley lies between the Cordillera Central and the Cordillera de Talamanca. This is the most densely populated region in the country. Around 52% of the population lives in the valley in an area that accounts for only 3.83% of the total national territory, and includes the national capital and three provincial capitals

(Bradley *et al* 1990, Quesada 1990). The economy is based on agriculture, although tourism is now the largest single source of foreign exchange earnings. Indiscriminate deforestation for agriculture and timber production has left many areas in a fragile situation, particularly in the upper watersheds (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 over exploitation, and in 1987 the government declared a temporary moratorium on industrial forest activities in order to allow forest recuperation (MIRENEM 1990).

Management

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. By late 1994 protected areas (including Forest Reserves, Protection Zones and Indian Reserves) totalled more than 2 million ha, equivalent to 44% of the national territory.

Although MIRENEM has emphasised Conservation Areas over individual protected areas. There are nine different management categories recognised in Costa Rica. Although not all have legally established objectives and management guidelines. Of the 108 legally established protected areas, 30 contain coastal or marine resources, including a Ballena Marine National Park and the Protected Wetlands (Summary Table and Annex II).

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. Therefore, 28% of the total land area is under protection (MIRENEM 1991b). Estimates of the proportion of forested land within the protected area system vary from 65% to 86% (MIRENEM 1990, Ugalde 1992).

The effectiveness of protected areas is limited by the lack of strategic planning, insufficiently trained personnel, and the extent of privately-owned land within parks and biological reserves (MIRENEM 1990). Land tenure has become an increasingly serious problem in the past few decades.

Since the mid-1960's a combination of population growth and concentration of land ownership has exacerbated the land shortage. 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 upon eviction (Bradley *et al* 1990).

The majority of protected areas are not of sufficient size to fulfil their conservation objectives, and lack adequate infrastructure for basic protection activities and facilities for personnel and visitors (MIRENEM 1990, Ugalde 1992). Protected areas are assigned a low level of national importance.

Natural resources have not been 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 co-ordinate conservation activities, MIRENEM has restructured the entire protected area system in the period 1988-94 to create the National System of Conservation Areas, SINAC (MIRENEM 1991a). This involves regrouping protected areas into conservation areas (*areas de conservación*) as the basic management unit, and will integrate local communities to a greater extent (Bradley *et al* 1990, Ugalde 1992).

A conservation area consists of a grouping of protected wildlands which are contiguous or close to each other. The areas have one or more strictly protected core zones owned by the state surrounded by zones under private ownership where sustainable development and use of natural resources will be promoted. The concept is similar to the UNESCOs MAB Biosphere Reserves (Bradley *et al* 1990, Ugalde 1992).

Nine conservation areas have been established 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).

Development of each of the conservation areas has proceeded with a certain degree of independence due to the institutional policy of downsizing of the central office. The development of each area has been pursued with one or more NGOs which increases

management capacity in the field. Proposals to legally establish this approach have been under study in the national assembly since 1991 (Vásquez, pers. comm., 1994).

The long term consolidation of the system will require the creation of corridors between conservation areas and protection of additional small areas which are not included in the system at present. In addition to purchases of lands for new areas, 7% of the land included in SINAC is still privately owned and must be purchased (MIRENEM 1991b).

In 1982 Costa Rica signed the Basic Convention for Creation of the Park (Convenio Básico de Creación del Parque) a bi-national agreement with Panama for the creation, joint planning, and administration of the La Amistad trans-frontier park. This area was subsequently nominated and approved as a Biosphere Reserve and World Heritage Site. Costa Rica and Nicaragua are also co-operating closely on the development of the bi-national protected areas system along the border between the two countries through the SI-A-PAZ project. A bi-national commission was established in October 1990 and Costa Rica and Nicaragua signed a co-operative agreement on 15 December 1990 for collaboration with frontier protected areas.

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ANNEX I: LEGAL INSTRUMENTS

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

Title: Reform of the Forestry Law, No. 7174

Date: 28 June 1990

Brief description: Replaces the Forestry Law 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 as a high level organisation to assess the activities of the Ministry of Natural Resources, Energy and Mines (MIRENEM) with respect to the protection and utilisation 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 (MIRENEM).

Designations:

National Park (Parque Nacional) An area containing one or more ecosystems that have not been transformed by human activity, or to a minimal extent, in which flora or fauna, 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.

Biological Reserve (Reserva Biológica) 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.

Protective Zone (Zona Protectora) 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 authorisation from the DGF and is subject to regulations given in the legislation.

Forest Reserve (Reserva Foresta) 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 authorisation from the DGF and is subject to regulations given in the legislation.

National Wildlife Refuge (Refugio Nacional de Vida Silvestre) An area comprising forest and land whose primary function is the protection, conservation, augmentation

and management of flora and fauna. Exploitation of natural resources is permitted only with prior authorisation from the DGF and is subject to regulations given in the legislation.

ANNEX II: COSTA RICAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Volcán Poás	I	NP		15,600	1971
Cabo Blanco	I	BR	YES	1,172	1963
Carara	I	BR		4,700	1978
Hitoy Cerere	I	BR		9,154	1978
Islas Guayabo y Negritos	I	BR	YES	143	1973
Subtotal		5	2	30,769	
Arenal	II	NP		2,000	1991
Braulio Carrillo	II	NP		44,099	1978
Chirripó	II	NP		50,150	1975
Corcovado	II	NP	YES	54,568	1975
Guanacaste	II	NP	YES	32,512	1991
Isla del Coco	II	NP	YES	2,400	1978
La Amistad (Talamanca)	II	NP		193,929	1982
Palo Verde	II	NP	YES	13,228	1982
Rincón de la Vieja	II	NP		14,083	1973
Santa Rosa	II	NP	YES	37,217	1971
Tortuguero	II	NP	YES	18,946	1975
RB Monteverde	II	NP			
Subtotal		12	6	463,132	
Ballena	IV	NP	YES	4,200	1990
Isla del Caño	IV	BR	YES	200	1978
Lomas Barbudal	IV	BR		2,279	1986
Barra del Colorado	IV	WR	YES	98,000	1985
Caño Negro	IV	WR		9,969	1983
Gandoca y Manzanillo	IV	WR	YES	9,449	1985
Golfito	IV	WR		1,350	1985

Isla Bolanos	IV	WR	YES	100	1981
Tapantí	IV	WR		6,080	1982
Tamarindo	IV	WR	YES	500	1990
Curu	IV	WR	YES		1983
Ostional	IV	WR	YES		1984
Bosque Nacional Dirιά	IV	WR	YES		1993
Laguna Las Camelias	IV	WR			1994
Mata Redonda	IV	WR			1994
Fernando Castro Cervantes	IV	WR			1994
Corredor Fronterizo	IV	WR	YES		1994
Finca Avellana	IV				1988
Finca La Marta	IV				1993
Subtotal		19	10	132,127	
Barra Honda	V	NP		2,295	1974
Cahuita	V	NP	YES	1,067	1970
Volcán Irazú	V	NP		2,309	1955
Subtotal		3	1	5,671	
Abrojos	VII	AR		1,480	1978
Alto Chirripó	VII	AR		77,973	1976
Alto Pacuare	VII	AR		1,336	not avail.
Awari	VII	AR		1,332	not avail.
Bajo Chirripó	VII	AR		18,783	1976
Barbilla	VII	AR		2,077	1982
Boruca	VII	AR		12,470	1956
Boruca Terraba	VII	AR		31,983	1957
Cabagra	VII	AR		27,860	1956
China Kicha	VII	AR		2,459	not avail.
Chirripó	VII	AR		75,824	1976
Cocles	VII	AR	YES	3,538	not avail.
Conte Burica	VII	AR	YES	11,910	1977
Corina	VII	AR		1,555	not avail.
Coto Brus	VII	AR		7,500	1976
Guatuso	VII	AR		2,743	1976
La Estrella	VII	AR		13,616	not avail.
Matambú	VII	AR		1,710	1976

Nimari Bukiri	VII	AR		7,439	not avail.
Osa	VII	AR		1,700	1985
Rey Curré	VII	AR		10,620	1985
Salitre	VII	AR		11,700	1956
Sibuju Norte	VII	AR		2,195	not avail.
Talamanca Bribri	VII	AR		43,690	1976
Talamanca Cabécar	VII	AR		22,729	1976
Talamanca	VII	AR		62,253	1976
Tayni	VII	AR		13,616	1976
Telire	VII	AR		16,260	1976
Térraba	VII	AR		9,350	1956
Ujarras Salitre Cabagra	VII	AR		56,561	1957
Ujarráz	VII	AR		19,040	1956
Zapatón	VII	AR		2,855	1981
Acuíferos de Guácimo y Pocosí	VIII	PZ		4,270	1987
Arenal	VIII	PZ		18,325	1991
Caraigres	VIII	PZ		4,000	1976
Cerros de Escazú	VIII	PZ		7,060	1976
Cerros de Turrubares	VIII	PZ		2,340	1983
Cerros de la Carpintera	VIII	PZ		2,000	1976
Cuencas del Río Tuis	VIII	PZ		4,095	1986
El Rodeo	VIII	PZ		2,222	1976
Juan Castro Blanco	VIII	PZ		14,258	1968
La Cangreja	VIII	PZ		1,937	1984
La Selva	VIII	PZ		2,815	1982
Las Tablas	VIII	PZ		19,602	1981
Miravelles	VIII	PZ		11,670	1991
Río Grande	VIII	PZ		1,500	1976
Río Pacuare	VIII	PZ		13,060	1991
Río Sombrero Río Navarro	VIII	PZ		6,440	1984
Río Tivives	VIII	PZ	YES	2,368	1986
San Ramón	VIII	PZ		7,800	1991
Tenorio	VIII	PZ		17,650	1991
Tortuguero	VIII	PZ	YES	13,000	1990

Cordillera Volcánica Central	VIII	FR		61,542	1975
Golfo Dulce	VIII	FR	YES	67,287	1978
Grecia	VIII	FR		2,000	1973
Los Santos	VIII	FR		62,000	1975
Manglares	VIII	FR	YES	35,000	1977
Río Macho	VIII	FR		69,604	1964
Volcán Arenal	VIII	FR		5,256	1969
Continental and Insular Wetlands	VIII	PW	YES		1993
Zapandi	VIII	PW			1993
Tamborcito	VIII	PW	YES		1994
Laguna Maquenque	VIII	PW	YES		1994
Laguna Pejperrito	VIII	PW	YES		1994
San Vito	VIII	PW			1994
Corral de Piedra	VIII	PW			1994
Laguna de Paraguas	VIII	PW			1994
Terraba Sierpe	VIII	PW	YES		1994
VII, VIII Subtotal		68	11	1,035,258	
BIOSPHERE RESERVES					
De la Amistad	IX	BR		584,592	1982
Cordillera Volcánica Central	IX	BR		144,363	1988
Subtotal		2	0	728,955	
WORLD HERITAGE SITES					
Cordillera de Talamanca La Amistad	X	WH		584,500	1983
Subtotal		1	0	584,500	
RAMSAR SITES					
Caño Negro	XI	RW		19,800	1992
Tamarindo	XI	RW	YES	500	1990
Palo Verde	XI	RW	YES	9,969	1992
Subtotal		3	2	30,269	

Nationally Used Categories and Symbols:

AR Anthropological Reserve

BR Biological Reserve

BR2 Biosphere Reserve

FR Forest Reserve

NP National Park

PW Protected Wetlands

RW Ramsar Wetland

WH World Heritage Site

WR National Wildlife Refuge

PZ Protective Zone

CUBA

Area 114,524 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	9	5	39,978
Category II	9	4	116,942
Category III	0	0	0
Category IV	19	10	164,814
Category V	19	14	569,986
Categories VI-VIII	5	1	742,348
Biosphere Reserves	4	1	323,100
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	65	35	1,957,178

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

The 1959 Constitution declares that the state should protect national monuments, 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, 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. Cuba has undergone large-scale 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. It detailed policies for environmental and natural resource protection. The project recommended the creation of a number of protected areas in the form of a co-operative system, and marks the beginning of a

concerted effort to establish national parks and other protected areas (Perera and Rosabal 1986).

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 reserves (reservaciones naturales) for scientific research in forested areas that constitute the National Forest Heritage (Patrimonio Nacional Forestal). Scientific knowledge of natural areas was declared essential to formulate guidelines for rational resource use. Four natural reservations are delimited in the resolution, and prohibited activities given (Annex I). 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 remained with the Commission.

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), which is an extensive area containing a high diversity of ecosystems and natural resources. Nine management categories are defined in the area. Law No. 27 provides for the creation of a Governing Commission (Comisión Rector) specifically to manage the Great Sierra Madre 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.

Five categories of protected area comprise the National Network: national parks (*parque nacional*); nature reserves (*reserva natural*); national monuments (*monumento nacional*); fauna refuges (*refugio de fauna*), and "other categories" (*otras*

categorías) (Annex I). 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), with unifying policies on natural resource protection and a comprehensive system. It is composed of sub-systems for the protection of specific resources including the Subsystem for the Protection of Terrestrial Flora and Fauna (Subsistema 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. Co-operation 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.

In 1994, the Ministry of Science, Technology and Environment (CITMA) was created as well as its Agency for the Environment which implements the environmental policies and management of the country. The functions of COMARNA are now assumed by this Agency.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

National conservation policies were formulated and implemented by COMARNA this has now been taken over by the Agency for the Environment, which is vested with overall responsibility for the National System for Environmental Protection and Rational Use of Natural Resources. The Agency co-ordinates activities with 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.

The Agency for the Environment 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 the Agency, assess ecological problems and promote protected area establishment and conservation programmes. The commissions are important in co-ordinating 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, in particular the Subsystem for the Protection of Terrestrial Flora and Fauna. The Ministry of Agriculture (Ministerio de Agricultura, MINAG) is vested with the responsibility for this

subsystem which includes forested land, and for other subsystems such as soils, fisheries, and agriculture.

Management responsibility for the protected area network is assigned to the Agency's National Centre for Protected Areas (CNAP) in coordination with various agencies, as follows:

national parks, fauna and flora 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).

The Agency through CNAP proposes guidelines for the creation of protected areas, and each institute in coordination with CNAP 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 vice minister 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).

CNAP is currently the coordinator of the FAO Latin American Network of Technical Cooperation for National Parks, Protected Areas and Wildlife.

Details of non-governmental organisations working in environmental conservation issues are currently not available.

Biodiversity

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 at 2,000 m (MINAG 1991). The climate is tropical with annual

rainfall around 1380 mm. 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 island (Santana 1991). In 1988 about 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 1800's, 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 one of the lowest annual deforestation rates in Latin America, at only 0.9% (MINAG 1991, Santana 1991, WRI 1994). 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). However, information exists that points to increasing deforestation as a result of expanding agricultural activities, industrial forest exploitation, and domestic use of wood as a fuel substitute. The Plan Turquino, enforced by the government to promote agricultural self-sufficiency among rural population, has caused non-selective felling and shifting cultivation.

Management

The first national park was created in 1930, and by 1959 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). Data in this report indicate that 65 areas have been established covering nearly 2 million ha, 18% of the national territory. Over 50% of these areas include marine or coastal resources.

As of 1991, 5.1% of forested land was covered by national parks, and a further 59.5% was under protection by other designations (Santana 1991). A further 1.6 million ha were 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). The National Network is coordinated and managed by CNAP of the Ministry of the Environment.

Almost all ecosystems are included in the national network, with only 2% not represented at all (Perera 1988, Perera and Rosabal 1986). Despite protection, many wild flora and fauna, and ecosystems are threatened by over-exploitation and habitat modification in protected areas with less stringent controls (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 areas. Around 200,000 people live in Sierra Maestra Great National Park. The project provides incentives for local populations to farm in a sustainable way, so as to reduce environmental degradation and deforestation (Santana 1991).

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 which include 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.

Compliance with resource regulations, through the body of forest guards, affords efficient protection to natural areas. However, co-operation between the administrators 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 are required. The present designations are primarily suitable for terrestrial ecosystems, but modifications are needed to protect marine and coastal habitats (Perera 1988).

Impacts from agricultural activities, pesticide use, commercial forest exploitation, tourism development and projects as the proposed hydropower within the Cuchillas

del Toa Biosphere Reserve are threatening natural resources within the country's protected areas. Due to Cuba's economic crisis these projects are undertaken largely ignoring conservation aspects (Wotzkow 1994).

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ANNEX I: LEGAL INSTRUMENTS

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 prohibited activities. 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 co-ordinate 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 socio-economic development of forest resources. Further details of management categories are not given.

Source: Original legislation

ANNEX II: CUBAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Cabo Corrientes	I	NR	YES	1,578	1963
Cupeyal del Norte	I	NR		10,260	1980
El Veral	I	NR	YES	7,535	1963
Imías	I	NR	YES	2,600	not avail.
Jaguaní	I	NR		4,932	1963
Loma de la Mensura	I	NR		2,400	not avail.
Tacre	I	NR	YES	1,200	not avail.
Alto de Iberia	I	FR		5,673	1987
Cayo Cantiles	I	FR	YES	3,800	1986
Subtotal	9		5	39,978	
Desembarco del Granma	II	NP	YES	25,764	1980
Gran Piedra	II	NP		3,354	1980
La Bayamesa	II	NP		16,500	1980
Pico Cristal	II	NP		15,000	1930
Punta Francés Punta Pederales	II	NP	YES	17,424	1985
Turquino	II	NP		17,464	1959
Viñales	II	NP		13,436	not avail.
Bahía del Naranjo	II	MNP	YES	6,800	not avail.
Cayo Caguama	II	MNP	YES	1,200	not avail.
Subtotal	9		4	116,942	
Los Indios	IV	ER	YES	3,250	not avail.
Mogotes de Jumagua	IV	ER		400	1986
Punta Negra Punta Quemados	IV	ER	YES	3,972	not avail.

Arenas Blancas	IV	MFR		1,500	not avail.
Cayo Caguanes/Cayos de Piedra	IV	MFR	YES	1,500	1966
Cerro Galano	IV	MFR		2,770	not avail.
Cuabal Tres Ceibas	IV	MFR		370	not avail.
El Toldo	IV	MFR		5,638	1987
Lomas de Galindo	IV	MFR	YES	623	not avail.
Monte Ramonal	IV	MFR		2,572	not avail.
Pan de Azúcar	IV	MFR	YES	260	not avail.
Parnaso Los Montes	IV	MFR		9,500	not avail.
Cayos de Ana María	IV	FR	YES	6,900	not avail.
Delta del Cauto	IV	FR	YES	60,000	not avail.
Hatibonico	IV	FR	YES	5,220	1980
Las Salinas	IV	FR	YES	31,800	1936
Ojito de Agua	IV	FR		3,739	1987
Río Máximo	IV	FR		10,000	not avail.
Santo Tomás	IV	FR	YES	14,800	1936
Subtotal	19		10	164,814	
La Isleta Nuevas Grandes	V	IMA	YES	13,000	not avail.
Subarchipiélago de Jardines de la Reina	V	IMA		30,580	not avail.
Subarchipiélago de Sabana Camaguey	V	IMA		178,908	not avail.
Subarchipiélago de los Canarreos	V	IMA	YES	33,110	not avail.
Cayo Romano	V	NP	YES	92,000	1986
Sur Isla de la Juventud	V	NP	YES	80,000	1992
Topes de Collantes	V	NP		12,260	not avail.
Cayo Algodón Grande	V	TNA	YES	3,600	not avail.
Cayo Coco/Cayo Guillermo	V	TNA	YES	32,000	1986
Cayo Gruz	V	TNA	YES	1,400	not avail.
Cayo Guajaba	V	TNA	YES	9,168	not avail.
Cayo Largo Cayo Rosario	V	TNA	YES	18,610	1986
Cayo Paredón Grande	V	TNA	YES	3,500	not avail.
Cayo Sabinal	V	TNA	YES	33,500	not avail.
Cayo Santa María	V	TNA	YES	6,250	not avail.

Covarrubias	V	TNA	YES	10,200	not avail.
Playa Cajuajo Boca del Yumurí	V	TNA	YES	5,500	not avail.
Playa Santa Lucía	V	TNA		1,100	not avail.
Punta del Este	V	TNA		5,300	not avail.
Subtotal	19		14	569,986	
Cubanacán	VIII	IMA		7,164	1986
Escambray	VIII	IMA		187,000	1986
Gran Parque Sierra Maestra	VIII	IMA	YES	527,000	1980
Mil Cumbres	VIII	IMA		16,634	1986
Sierra del Chorrillo	VIII	IMA		4,560	1986
Subtotal	5		1	742,358	
Baconao	IX	BR		84,600	1987
Cuchillas del Toa	IX	BR		127,000	1987
Península de Guanahacabibes	IX	BR	YES	101,500	1987
Sierra del Rosario	IX	BR		10,000	1984
Biosphere Reserves Subtotal	4		1	323,100	

NP = National Parks

MNP = Marine National Parks

ER = Ecological Reserves

NR = Natural Reserves

IMA = Integrated Management Areas

MFR = Managed Flora Reserve

FR = Faunal Refuges Subtotal

NP = Natural Parks

TNA = Touristic Natural Areas

BR = Biosphere Reserves

DOMINICA

Area 790 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	2	1	7,403
Category III	3	0	9,542
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	5	1	16,945

Policy and Legislation

In 1783 the British obtained possession of Dominica. 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).

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. 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 (Annex I). 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). As of 1985, park regulations had not yet been 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 (Annex I).

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 (Annex I). Under this ordinance, one water catchment area on private land was declared a protected forest under the Stuart Hall Catchment Rules No. 11, 1975 (Annex I). The Forest Rules (SRO 17, 1972), made under the Ordinance, specify prohibited activities in forest reserves and gives details on the issuing of licenses and permits for harvesting forest produce, and outlines the powers and responsibilities of the Chief Forest Officer.

In 1987, Dominica adopted the harmonised fisheries legislation (Fisheries Act No. 11) accepted by other East Caribbean islands, which allows for the establishment of marine reserves. 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 (Annex I). 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 without a license.

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, Williams, pers. comm., 1992). This has since been improved through a co-ordinated 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 that 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Administration

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 and has 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).

The CCA in collaboration with CANARI (Caribbean Natural Resources Institute, formerly the Eastern Caribbean Natural Area Management Programme - ECNAMP), are responsible for implementing the Caribbean Heritage Programme, 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 is also involved in the development of Cabrits National Park and a National Parks and Forest System Plan for Dominica (Putney and Renard, n.d.).

The Island Resources Foundation 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 Programme for Sustainable Development, which is focusing on the development of national conservation strategies and environmental impact assessment support services (IRF 1991).

Biodiversity

Dominica is a volcanic island rising to a maximum height of 1,447 m, and is part of the Windward group in the Lesser Antilles, 500 km north of Venezuela and 2,200 km south-east of Florida (Thorsell 1978). The country has a coastline of 153 km, 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. The highlands support rain and cloud forest. The protection of areas of highland serves 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 (and in particular during the last ten years) has widespread forest clearance taken place mainly for agriculture. Half the population are subsistence farmers who clear land for agriculture (Wright 1985). Today, some 52,000 ha, or 68% of total land area, comprise natural forest, woodland and bush (CCA 1991).

Steep topography, high relief, and considerable micro-climatic 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 savannah 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. Rain forests, 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 north-east and north-west. Small stands of mangrove are present along the north-west and north-east 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 (24,490 ha), montane rain

forest (3,640 ha), montane thicket (800 ha), elfin woodland (170 ha), littoral woodland (140 ha), scrub woodland (6,240 ha), secondary rain forest (9,090 ha), semi-evergreen rain forest (7,170 ha) and swamp (30 ha) (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.

Management

Dominica's five protected areas cover over 9,500 ha, nearly 80% of which are included in national parks. Protected Areas cover the equivalent of 23% of the landmass of the island. Only Cabrits National Park contains marine or coastal resources (Summary Table and Annex II).

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. In 1982 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; 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".

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. 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. The Fisheries Division is working on the establishment of a marine reserve in the Soufriere and Scotts Head Bay area.

To date no marine reserves have been designated, although the Cabrits National Park has a significant marine component. Lack of personnel assigned to marine component left Cabrits National Park without operational capacity from 1986 which left the area open to illegal fishing. The organisational structure of the area is also considered inadequate (van't Hof 1993).

Northern Forest Reserve in the north central portion of the island includes large tracts of habitat for the island's two endangered parrots, the imperial parrot *Amazona imperialis* and the red-necked parrot *A. arausiaca*. It 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 (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, e.g. for the protection of watersheds (60% of which are unprotected), or wildlife habitat. An ongoing FAO funded forest management project will, make recommendations for more specific conservation and management measures within the forestry sector (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 the most important environmental issues. Driven by agricultural expansion and timber harvesting, the area under cultivation (26,390 ha) is already greater than that envisaged by the government for the year 2001 (23,700 ha). Estimates of encroachment in forest reserves and national parks range from 20 ha to nearly 2,000 ha.

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. However, much of this pressure could be reduced, 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. 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). 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).

One weakness of protected areas management is lack of co-ordination 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).

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ANNEX I: LEGAL INSTRUMENTS

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. 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; 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 the designation of private land as protected forest for water and soil conservation and other public purposes (e.g. Stewart Hall Water Catchment 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 license 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 license or permit to do so; storing or applying pesticides; and carrying out any planting other than reforestation on slopes of over 20. 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)

ANNEX II: DOMINICA PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Cabrits	II	NP	YES	531	1986
Morne Trois Pitons	II	NP		6,872	1975
Subtotal	2		1	7,403	
Central	VIII	FR		410	1952
Northern	VIII	FR		8,814	1977
Stewart Hall Water Catchment	VIII	PF		318	1975
Subtotal	3		0	9,542	

NP = National Parks

FR = Forest Reserve

PF = Protected Forest

DOMINICAN REPUBLIC

Area 48,442 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	8	5	563,934
Category III	0	0	0
Category IV	6	1	440,140
Category V	4	3	44,335
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	18	9	1,048,409

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

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 20 m either side of a river and around lakes, and for a radius of 150 m 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.

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). Additional to the eight management categories, provided for by Law No. 67, in practice, 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).

Provision is made in article 12 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.

Since the 1970's 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, has not been passed as yet (SEA/DVS 1990).

Without constitutional provision for natural resource protection or other comprehensive policy documents, there are no national guidelines on which to base environmental legislation. As a result, this legislation has often been ambiguous, inconsistent and ineffective. The absence of a national conservation strategy results in a lack of co-ordination between public institutions with interest in natural resources and conflicts often arise (Ramírez, pers. comm., 1992). 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). A thorough revision of the current environmental legislation is required.

International Participation

Conventions & Treaties

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

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, and ensuring compliance with protected area regulations and international wildlife treaties. It is divided into five sections responsible for evaluation and management of wildlands; ornithology; herpetology and mammalogy; hunting control; and administration (Schubert, pers. comm., 1992).

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. The DVS implemented the Study and Management of Wildland Project to inventory biological diversity in the country. As a result of this study, nine new areas were established in 1983 (SEA/DVS 1990).

The National Directorate of Parks (DNP) was established in 1974 as an autonomous government agency directly under the Presidency. It was 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 sub-director, 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 and ensuring their utilisation is conducted in a sustainable manner (SEA/DVS 1990).

A large number of non-governmental 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 for 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 co-ordinates the activities of conservation organisations and formulates guidelines for the environmental protection and education projects of its members (SEA/DVS 1990).

Those NGOs which work in the declaration and management of protected areas are inter alia: Grupo Jaragua, Progressio Foundation (Fundación Progressio), Quita Espuela Foundation (Fundación Quita Espuela), Cibao Ecological Society (Sociedad Ecológica del Cibao, SOECI), 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) (Schubert, pers. comm., 1992).

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).

Biodiversity

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 1,576 km (SEA/DVS 1990). A characteristic feature is its high elevation; a large part of the country is over 1,000 m and the highest mountains in the Caribbean, with altitudes of over 3,000 m, 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: semi-deciduous forest; evergreen humid forest; pine forest; and seashore and riverine habitats (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.

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 5 ha. As a result, peasant farmers work small plots of land and move frequently, particularly to sparsely 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 south-east, remain in their natural state (SEA/DVS 1990). At the beginning of the 1900's, forest covered around 85% of total land area, but by 1986, only 10.1% remained forested (SEA/DVS 1990). Since the 1960's, the government has prohibited deforestation in an effort to protect forest resources (SEA/DVS 1990).

Management

The first national park was established in 1956. By 1983 there were 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). The Dominican Republic's 18 protected areas cover over 1 million ha, the equivalent of 23% of the country's landmass. Half of these areas contain marine or coastal resources (Summary Table and Annex II).

The present system of protected areas does not cover all the major ecosystems in the country. Many being under-represented or absent altogether, in particular montane forest. Marine, mangrove, and fresh water lake ecosystems are well represented in the protected areas system (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.

Eleven management categories are currently in use, only 8 of which are mentioned in the 1974 law providing for the protected areas system. Forest reserves, wildlife refuges and fauna sanctuaries have been established without standardised objectives and regulations, leading to inconsistencies and contradictions. The existing system lacks coherence, protected areas require re-categorisation (SEA/DVS 1990).

Measures to stabilise migratory 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).

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ANNEX I: LEGAL INSTRUMENTS

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) and 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) and 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, flora and fauna 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

ANNEX II: DOMINICAN REPUBLIC PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Del Este	II	NP	YES	42,000	1975
Isla Cabritos	II	NP	YES	2,400	1974
Jaragua	II	NP	YES	137,400	1983
José Armando Bermúdez	II	NP		76,600	1956

José del Carmen Ramírez	II	NP		73,784	1958
Los Haitises	II	NP	YES	20,800	1976
Monte Cristi	II	NP	YES	53,000	1983
Sierra de Bahoruco	II	NP		80,000	1986
Subtotal	8		5	485,984	
Ebano Verde Natural	IV	SR		2,310	1989
Laguna del Rincón	IV	SR		1983	
Lagunas Redonda y Limón	IV	SR	YES	10,100	1983
Loma Quita Espuela	IV	SR		7,250	1992
Valle Nuevo	IV	SR		40,900	1983
Banco de la Plata	IV	CS		374,800	1986
Subtotal	6		1	440,140	
Cabo Francés Viejo	V	NP	YES	125	1974
Parque Submarino La Caleta	V	NP	YES	1,010	1986
Loma Isabel de Torres	V	SR	YES	2,200	1983
El Aceitillar Cabo Rojo	V	SR		41,000	1986
Subtotal	4		3	44,335	

NP = National Parks

SR = Scenic Route

CS = Cetacean Sanctuary

SR = Scientific Reserves

FRENCH GUIANA (FRANCE)

Area 84,000 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	1	0	108,000
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	1	0	108,000

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. On 19 March 1946 its status changed to an overseas department of France. In 1974 it became an administrative region. Therefore, the region is covered by French policy and legislation.

There is currently no specific 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 in Protected Areas of the World, Volume 2 (WCMC 1992). 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, (Annex I). 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, while 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 (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 co-operation of local collectives (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 as there was not yet 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 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Administration

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), which was 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 (de Granville, pers. comm., 1992; 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 under the supervision of the Ministry of Agriculture (Ministère d'Agriculture). 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) (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, while at the same time establishing plantations of fast growing species (Groene 1990, Sarrailh 1990, Valeix and Mauperin 1990).

The Conservatory for the Littoral Zone (Conservatoire du Littoral), which is responsible for "espaces du conservatoire", has proposed to "buy" 13,000 ha of land between the rivers Counamama and Yiyi to create a protected zone (Wood, pers. comm., 1992). The space port at Kourou (CNES Centre National d'Etudes Spatiales) proposes to close access to Malmanoury Creek, which will effectively create a reserve along 40 km 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 (Wood, pers. comm., 1992).

The "Arrêté de Biotope", under which Kaw Reserve is gazetted, is a very weak measure and is little respected. Fires set in the marshes have led to several hundred hectares being burnt (Wood, pers. comm., 1992).

Biodiversity

Located slightly north of the equator, French Guiana is the smallest and least populated territory in South America. The climate is equatorial and has two brief dry seasons. Annual mean precipitation is generally greater than 2000 mm, although in some areas it exceeds 8000 mm. Three ecosystems predominate: littoral, river corridors and rain forest. The littoral region is exceptional in comparison with other countries in northern 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. 200,000 ha) 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). Also an estimated 10% of tree species remain to be described (Sabatier and Prévost 1989). In general, forest exploitation has not occurred more than 50 km 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 (Wood, pers. comm., 1992).

Establishment of further protected areas has been discussed many times since 1967. In 1970, a proposal was made for a 5,000 ha reserve to be established along the estuary of the Cascades and Tonnégrande. This would have been partly a strict protected area and some areas would be 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). Under the auspices of the Ministry of the Environment and ORSTOM, from 1974-1975, an ecological study was made of coastal areas with a view to creating nature reserves. As a result of this study, classification of five protected zones was proposed (Condamin 1974, 1975; de Granville and Sanité 1992). In 1975 soon after this coastal areas project, a series of 15 reserves was proposed comprising inland forested sites as well as the previously proposed five coastal areas.

In 1976, following a visit by the Secretary of State for the Environment, the need to upgrade reserves to national park status was acknowledged. Priority was given to Basse Mana, Sinnamary-Iracouba, Saul and Kaw. Later, the Regional Delegate for the Environment made a case for all of 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 213,665 ha. 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" (Girou, pers. comm., 1992). These comprise the establishment of 16 nature reserves, 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 (de Granville, pers. comm., 1992).

Management

Although various sources (see below) indicate that the French Guianan protected area system is being enlarged, the information available indicates that there is only one area legally established which is the 108,000 ha Monts lucifers et Dekou Dekou State Biological Reserve.

All of France's main national research institutes have projects and stations in Guiana and scientific research there has been widespread and long-standing. 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 Co-operation (Institut Français de Recherche Scientifique pour le Développement en Coopération), recently secured the creation of the first two nature reserves. However, 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 (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).

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). Legislation has been drawn up for Grand Connétable Nature Reserve and awaits signature for passage into Law. 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 (de Granville, pers. comm., 1992).

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, and 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. This will flood 310 km² of dense unbroken rain forest. Although this is in direct contradiction to official government support for forest protection. Three other dam projects are planned. No environmental impact assessments have been made for any of the projects (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. A new road will also link it to the coast.

From 1865-1940 state-sanctioned gold mining was responsible for mercury pouring into the rivers. Fortunately this now seems to be under control. However, mining still remains an indirect problem due to hunting practised by gold miners around their camps. This has led to the 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 is encouraged by a booming population (Hughes 1992, Kempf 1991; 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, and it concluded that hunting was already depleting wildlife to such an extent as to endanger the 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 and 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 (Wood, pers. comm., 1992).

Contacts

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Centre National d'Etudes Spatiales, Centre Spatial Guyanais, BP 6 97310, KOUROU

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ANNEX I: LEGAL INSTRUMENTS

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.

ANNEX II: FRENCH GUIANA PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Monts lucifers et Dekou Dekou	VIII	SBR	1	108,000	n.d.

State Biological Reserve = SBR

GRENADA

Area 344 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	1	0	618
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	1	0	618

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). The legislation makes provision for the establishment of both forest and marine reserves, although 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 protected features. 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, and 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, and two areas in Carriacou (Annex I). 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, Annex I).

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

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Administration

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. 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.

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).

The principal non-governmental 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).

The Caribbean Natural Resources Institute (CANARI), formerly the Eastern Caribbean Natural Area Management Programme (ECNAMP), has been involved in developing management alternatives for the proposed Levera National Park, and is currently collaborating with the Caribbean Conservation Association for a marine parks programme and the "Caribbean Heritage Programme". This 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 CCA and the Government of Grenada for the purpose of executing a Country Environmental Profile. The Ministry of External Affairs, Agriculture, Lands, Forestry, Tourism and Legal Affairs is the

designated government counterpart agency. The Grenada National Trust was designated as the local implementing and co-ordinating agency (CCA/IRF 1991).

Biodiversity

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 greater than 20 (Hudson and Francis 1984). The climate is humid and tropical and supports rain and cloud forest in the interior. Areas classified as "wildlands" (ECNAMF 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 vegetation cover was compiled from interpretation of aerial photography taken in 1982. It indicates the following coverage: montane rain forest (1,688 ha), closed evergreen rain forest (2,278 ha), moist deciduous and semi-deciduous forest (1,752 ha), scrub/cactus vegetation (1,226 ha), mangrove swamp (190 ha) and inland swamp (28 ha) (CCA/IRF 1991). In a separate analysis, FAO (n.d.) indicated that for the year 1989, there were 4,200 ha of forests in Grenada, comprising 4,000 ha of closed broad-leaved forest, and 200 ha 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; representation of natural habitats and ecosystems; distribution of native species of flora and fauna; and protection of watersheds and water courses.

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 has been 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 600 m, 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/semi-evergreen 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 mangrove swamps and the freshwater herbaceous ecosystems at Lake, are generally in a healthy state. Currently, serious problems to the freshwater ecosystem occur at the Grand E'Tang Crater Lake, which has shrunk to almost half its size since 1988. 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. Its representation is adequate.

Management

Although Grenada only has one established protected area (Grand Etang Forest Reserve), the government made the establishment of a national park and protected areas system a priority in the development plan for 1986. A review has now been carried out (National Parks and Wildlife Unit 1988), and 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 4,458 ha 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, which is much valued for diving. Additionally, the areas of old growth 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).

In spite of detailed studies, Moliniere Reef still lacks legal protection. Major problems for eventual MPA management include the small size of the proposed area and the number of conflicting uses in the area together with the impacts caused by diver/snorkeler activities, over-fishing, sewage and agricultural runoff, and coastal development. The lack of support for and participation in management actions by resource users taken together with the an ineffective structure and inadequate revenue generation are the major organisational problems (van't Hof 1993).

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Contacts

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National Trust and Historical Society, c/o Grenada National Museum, Young Street, ST. GEORGE'S Tel: (809) 440-3725

Ministry of Health, Housing and the Environment, The Carenage, ST. GEORGE'S Tel: (809) 440-2429 (809) 440-2962 Fax: (809) 440-4127

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ANNEX I: LEGAL INSTRUMENTS

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 Created 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)

ANNEX II: GRENADA PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Grand Etang	VIII	FR	1	618	1910

Forest Reserve = FR

GUADELOUPE (FRANCE)

Area 1,780 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	1	1	3,700
Category II	1	0	17,300
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	1	0	63,000
World Heritage Sites	0	0	0
Ramsar Sites	1	1	3,700
Total (1)	3	2	87,700

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

Formerly a French colony, Guadeloupe (including the islands of St. Martin and St. Barthélemy) since 1946 has 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. More complete coverage of French law is found in WCMC (1992).

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 (Annex I), 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" (Annex I). 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" (Annex I), 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) (Annex I) of 23 November 1987 provides details of activities prohibited within the reserve.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

Administration

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), which is part of the Ministry of the Environment (Ministère de l'Environnement). National parks have an administrative council with the total membership fixed by decree. The council

decides, in principle, how the park is to be administered, managed and regulated. However, the executive director is 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 the existing 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 was US\$2.7 million.

The Office National des Forêts (ONF), a public industrial and commercial organisation, is responsible for management of all state forests. The ONF co-operates 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 (38,800 ha). 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).

Various other public organisations are involved with protected areas and species. The Regional Directorate for Environment (Direction 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, Silviculture, Guadeloupe herbarium, in co-operation with the National Park); the French Scientific Institute for Development through Co-operation (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), the Soufriere Volcanic Observatory (Observatoire Vulcanologique de la Soufrière).

Biodiversity

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 Barthélemy lie 250 km to the north-west. Only the northern part of St Martin belongs to Guadeloupe. The southern third is Dutch.

Basse-Terre rises to much greater altitude than the other islands, reaching 1467 m at La Soufrière volcano. Most land below 400 m 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 70,000 ha (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 7,500 ha. Six thousand hectares of which occurs at Grand Cul-de-Sac Marin, and is 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).

Management

Guadeloupe's three protected areas all contain marine and coastal resources, and their combined area is equal to 49% of the island's landmass (these figures include the marine extension of these areas). The Biosphere Reserve de l'Archipel de la Guadeloupe encompasses 63,000 ha of land and territorial sea and includes the National Park of Guadeloupe and its surroundings, as well as the Grand Cul-de-Sac Marin Nature Reserve. Guadeloupe National Park consists largely of practically unexploited forests and protects a great number of valuable natural landscapes including the Soufrière volcano.

Protected evergreen rain forest covers 24,500-25,000 ha on the highest land of which 16,500 ha lie within the national park (Chabod, pers. comm., 1991). In addition, there are three proposed nature reserves which would be administered by the park, Pitons du Nord and Beaugendre to the north and west respectively of the national park, and Pigeon, an island to the west of Basse-Terre (Anon. 1991).

The creation of a marine nature reserve and Ramsar site 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

gazettement of the reserve was expected in the near future (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; and subsistence fishing (UNEP/IUCN 1988).

Hurricane Hugo which swept through the Caribbean on 16 and 17 September 1989 caused devastation to Puerto Rico and Guadeloupe, both of which lay directly within its path. Mangroves were damaged seriously by the hurricane. A report on the hurricane, including its ecological impact, is given by Pagney Bénito-Espinal and Bénito-Espinal (1991).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 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 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 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 public access is controlled. 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 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 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 des Vieux Habitants valley are maintained by long time residents. 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

ANNEX II: GUADELOUPE PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Grand Cul de Sac Marin	I	NR	YES	3,700	1987
Guadeloupe	II	NP	YES	17,300	1989
L'Archipel de la Guadeloupe	IX	BR	YES	63,000	1992
Grand Cul de Sac Marin	XI	RW	YES	3,700	not avail.
Subtotal		4	4	87,700	

Natural Reserve = NR

National Park = NP

Biosphere Reserve = BR

Ramsar Wetland = RW

GUATEMALA

Area 108,889 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	1	0	105,700
Category II	6	0	768,400
Category III	5	0	10,975
Category IV	5	0	52,591
Category V	1	1	1,000
Categories VI-VIII	10	2	843,128
Biosphere Reserves	2	0	1,150,000
World Heritage Sites	1	0	57,400
Ramsar Sites	1	0	48,372
Total (1)	29	3	1,781,794

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

The Constitution of Guatemala (Constitución Política de Guatemala) declares it to be 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). However, national policies on forest conservation, management and recuperation have been unclear and inconsistent (Detlefsen *et al* 1991).

In 1991 Guatemala formulated its Forestry Action Plan (Plan de Acción Forestal para Guatemala, PAFG). It interpreted the global designs of TFAP to suit specific national interests (Detlefsen *et al* 1991, Ministerio de Agricultura, Ganadería y Alimentación, pers. comm., 1991). The PAFG includes several recommendations and details of projects to increase the effectiveness of the forestry sector in Guatemala and stresses the importance of protecting forest resources, the conservation of forest ecosystems,

reduction of deforestation and promotion of reforestation activities among its objectives (Ministerio de Agricultura, Ganadería y Alimentación, pers. comm., 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 was created, the General Forestry Directorate (Dirección General de Bosques, DIGEBOS). It replaced INAFOR which was the previous forestry agency. 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 (Godoy, pers. comm., 1992).

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) are authorised to enforce compliance with forestry regulations.

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. Provision was made for the establishment of conservation units and a unified national system of protected areas. Environmental impact studies for industrial projects become obligatory, although these have been rarely carried out in practice (Godoy, pers. comm., 1992).

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. The law also created 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. An Executive Secretariat (Secretaría Ejecutiva) executes the policies and objectives of CONAP.

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 along with those areas already legally established.

A total of 44 new sites was declared under special protection (protección especial). They were 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 are managed. The Law of Protected Areas names six different management categories together with objectives and selection criteria (Godoy, pers. comm., 1992).

Also declared protected are: 3 km of both oceans measured out from the high tide mark; 200 m around all lake shores; 100 m on each side of navigable rivers; and 50 m 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 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 (Godoy, pers. comm., 1992).

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 (Annex I). 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 the Maya Biosphere Reserve; and Decree No. 4990 declaring the Sierras de la Minas 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, institutional strengthening and increased co-ordination 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Central American Biodiversity Convention (CABD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

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 Presidency, and is responsible for assessing and co-ordinating 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 organisation 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 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 Co-ordinating 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 co-ordinates 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). Authorisation for activities permitted within protected areas must be issued by CONAP.

The Council of 14 individuals is formed by 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) plus three delegates from non-governmental conservation organisations and one representative from the Committee of Agricultural Associations (Comité de Asociaciones Agrícolas) (Detlefsen *et al* 1991, Godoy 1990).

The policies of CONAP are implemented by an Executive Secretariat (Secretaría Ejecutiva), which comprises three departments: 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. Legally, logging concessions 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 limited government support and capacity 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 Inter-American Foundation for Tropical Investigation (Fundación Interamericana de Investigación Tropical, FIIT) manages another area. The Ecodevelopment 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 persons 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 state owned many lack official boundaries. Most areas have little or no infrastructure and many areas are isolated within their regions. An analysis of the 54 areas legally protected revealed critical problems in their administration and financing, and a lack of managerial capacity to put protection measures into effect (Detlefsen *et al* 1991).

Institutionally, there is a serious lack of communication between CONAP and DIGEBOS. DIGEBOS often grants licenses 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 (Godoy, pers. comm., 1992).

Biodiversity

The topographical variation within Guatemala and its geographical location as a bridge between two continents with coastlines on two oceans, give rise to one of the richest biodiversities in Latin America (Nations *et al* 1988). Guatemala has an altitudinal range from sea level to 4,000 m 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 1940's, 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, which give way to cloud forest at higher altitude. These highland montane forests have around 70% endemism amongst animal species, but they represent some of the most endangered ecosystems in the country (as a result of colonisation, wood timber extraction and agriculture) (Nations *et al* 1988). The interior highlands reach altitudes of 4,000 m and are quite heavily populated. This region has also suffered environmental degradation from agricultural practices.

The Petén and Caribbean lowlands in the north-east 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) and unauthorised logging, hunting, deforestation and settlement.

The total forest cover is around 40% of total land area, and protection forests account for 13% of this coverage (Detlefsen *et al* 1991).

Management

Much land was converted into banana plantations around the turn of the century to satisfy foreign markets. As a result of concentrated land ownership there is a severe shortage of land available for the Guatemalan peasantry. This results in 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 large-scale colonisation programme which relocated around 60,000 people to the northern forest region, and a further 100,000 is proposed (Colchester 1991). Migration

to forest areas often results in inappropriate land use and degradation of forest ecosystems (Detlefsen *et al* 1991).

Guatemala's 29 protected areas cover nearly 1.8 million ha, 16% of the country's landmass. All the largest areas are located in El Peten, which is adjacent to neighbouring Biosphere Reserves in Belize and Mexico.

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 co-ordinate 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. The eventual incorporation of the proposed areas will raise coverage to between 8 and 14%, and encompass nine of the 14 Holdridge life zones (Detlefsen *et al* 1991, Godoy 1990).

Nearly 45% 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 which are 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). As proposed 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 (Godoy and Castro 1990).

Despite significant improvements in protected area coverage and co-ordination, 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 to implement management.

One of the major threats to protected areas is the unsustainable extraction of plant and animal resources by 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 and to allow local populations to benefit from the existence of such areas (Detlefsen *et al* 1991).

In 1987 the governments of Guatemala, Honduras and El Salvador signed an agreement to create a tri-national 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 co-operative 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 bi-national protected area Chiquibul/Maya Mountain between Guatemala and Belize, and a network of protected areas in the Gran Petén region involving co-operation between Guatemala, Mexico and Belize (Ugalde and Godoy 1992).

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ANNEX I: LEGAL INSTRUMENTS

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

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 co-ordinating 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 flora or fauna of scientific importance of 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 flora or fauna 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 core 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.

ANNEX II: GUATEMALAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Laguna del Tigre	II	NP		350,000	1990
Lacandón	II	NP		200,000	1990
Laguna Lachua	II	NP		10,000	1978
Mirador/Dos Lagos/Río Azul	II	NP		147,000	1990
Tikal	II	NP		57,400	1957
Trifinio	II	NP		4,000	1987
Subtotal	6		0	768,400	
Volcán de Pacaya	III	NP		2,000	1963

Aguateca	III	CM		1,709	1987
Ceibal	III	CM		2,100	1984
Dos Pilas	III	CM		3,166	1987
Machaquilla	III	CM		2,000	1974
Subtotal	5		0	10,975	
Sipacate Naranjo	IV	NP		2,000	1969
Chocón Machacas	IV	BI		6,265	1981
Mario Dary Rivera (Quetzal)	IV	BI		1,173	1976
Biotopo El Quetzal	IV	BI		1,153	1977
San Miguel El Zotz	IV	BI		42,000	1989
Subtotal	5		0	52,591	
Bahía de Santo Tomás	V	NP	YES	1,000	1956
Subtotal	1		1		
Atitlán	VIII	NP		54,773	1955
El Rosario	VIII	NP		1,031	1980
Río Dulce	VIII	NP	YES	7,200	1955
Santa Rosalía	VIII	NP		1,000	1956
Monterrico	VIII	BI	YES	2,800	1977
Area de Uso Múltiple R.B.M.	VIII	FR		650,000	1990
Area de Uso Múltiple R.S.M.	VIII	FR		34,000	1990
Franja Transversal del Norte	VIII	FR		1,200	1981
Río Chixoy	VIII	FR		28,000	1980
Río Salama	VIII	FR		63,124	1956
Subtotal	10		2	843,128	
BIOSPHERE RESERVE					
Maya	IX	BR		1,000,000	1990
Sierra de las Minas (Zona Núcleo)	IX	BR		105,700	1990
Subtotal	2		0	1,105,700	
WORLD HERITAGE SITE					
Parque Nacional Tikal	X	WH		57,400	1979

RAMSAR SITE					
Laguna del Tigre	XI	RW		48,372	1990

NP = National Parks

BI = Biotopes

FR = Forest Reserves

CM = Cultural Monuments

BR = Biosphere Reserve

RW = Ramsar Wetland

WH= World Heritage Site

GUYANA

Area 214,970 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	1	0	58,559
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	1	0	58,559

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 the 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 on land and in the sea. In addition, the government will ensure that conservation is treated as an integral part of the planning and implementation of development activities (Griffith, pers. comm., 1992). As a policy, Guyana aims to set aside not more than 10% of its forested areas (4 million ha) as a protected area system (Black, 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),

and interpreted 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 have been taken for their management or conservation (Hussain 1990). Information on the extent of implementation of this plan is currently not available.

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, 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 the 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. The Guyana Forestry Commission Act No. 2, 1979 provided for the establishment of the Guyana Forestry Commission as the organisation responsible for administering forested land within state forest. It replaced 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

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 (Griffith, pers. comm., 1992).

International Participation

Conventions & Treaties

Amazon Co-operation Treaty, (ATC, 1978)

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

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 co-ordination, 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 Forests, 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 which comprises 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, co-ordination and training. The Environmental Division within GAHEF, which currently has a staff of 11, was created in 1988 (Hanif and Ravndal 1988; 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 has 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 (Griffith, pers. comm., 1992), is responsible for maintaining all national parks, 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 teaching and research 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 (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 (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 which is 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 center 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 (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.

Biodiversity

Guyana consists of five main biogeographical regions: coastal plain; sandy rolling lands; tropical savannah; Pre-Cambrian lowlands; and the Pakarima mountain range (GFC/CIDA 1989, Persaud and Stewart 1988).

The coastal plain is a narrow alluvial belt and comprises around 5% of total land area. It runs the length of the coast and extends inland from 15 km to 60 km (Hilty 1982, Persaud and Stewart 1988). The plain lies between 0.5 m and 1.0 m 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 2000 mm to 2500 mm. 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 entire 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 and altitudes vary from 5 m-120 m above sea level, and vegetation types from savannah 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 savannah covers around 11% of total land area, extending in the west from the southern part of the sandy rolling plains to the Rio Branco savannahs of Brazil. The main grasslands are known as the Rupununi savannahs, characterised by intense dry periods (Hanif and Ravndal 1988, Hilty 1982). Two different savannah types may be distinguished within the Rupununi region: the north savannah, associated with a 6,000 m deep rift valley; and the south savannah, associated with the Pre-Cambrian plain, and interspersed with rock formations up to 900 m (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 90-120 m in the north to 180-210 m in the south, with intruding ridges 300-900 m high which form waterfalls when crossed by rivers. 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 500 m in the south of the range to the highest peak Mt. Roraima (2,773 m) in the north. The Pakaraima mountains, Pre-Cambrian lowlands, and tropical savannah 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).

Around 76% of total land area remains forested (Persaud and Stewart 1988, 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, 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).

Management

There is only one legally established protected area, Kaieteur National Park (58,559 ha). A proposal exists to extend the park to 400,000 ha (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, Fuller, pers. comm., 1991).

A new road from Brazil to the Guyana coast, which will pass close to the park was 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 licenses to landless farmers and gold miners in many forests which neighbour the park. It is feared that the park will inevitably be invaded.

Sixty-five Amerindian reservations have been set aside for native communities (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, Black, pers. comm., 1991). 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 1898).

Major threats to forest ecosystems arise from logging, uncontrolled fires, soil erosion and over exploitation of wildlife resources (Hanif and Ravndal 1988). However, more than twice the total land allotted to Amerindians has been conceded to foreign organisations for logging (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 300,000 ha of virgin tropical rain forest has been set aside as the Commonwealth and 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 (Black, pers. comm., 1992).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

Not available

ANNEX II: GUYANA PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Kaieteur	II	NP		58,559	1929

NP= National Park

HAITI

Area 27,750 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	2	0	7,500
Category III	0	0	0
Category IV	0	0	0
Category V	1	0	2,200
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	3	0	9,700

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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 establishment of national forest reserves on public land by executive decree. 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 controlled 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'Haïti) (Anon. 1989).

A draft National Conservation Strategy (NCS) was drawn up in April 1987. Among the recommendations formulated were the following:

- 1) creation of an independent government agency responsible for conservation policies and programmes;
- 2) 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;
- 8) watershed protection;
- 9) increase of forest reserves; and
- 10) development of national parks.

Unfortunately, following the publication of the NCS the Planning Ministry was abolished and 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

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 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 USAID. 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 USAID 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 USAID in Haiti (Dod and Judd 1986, Franz and Cordier 1986, Gali & 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 included:

- a) the decree creating the parks failed to assign final responsibility for the administration of the parks to a single government agency. Resulting in 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, which was 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);
- d) 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 addition to already inadequate funding, the United States government had withdrawn all its USAID financial support of MARNE and ISPAN 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 co-operation 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. USAID 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.

Aside from the interruption of international support, 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. 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 (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.

Since 1983 Florida State Museum has worked with USAID 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 Haïti" (Woods and Harris 1986).

A University of Florida Extension project, in collaboration with the Haitian government, was still operating in 1992 to establish a biosphere reserve in Pic Macaya National Park (Paryski, pers. comm., 1992). The project had four main activities:

- i) planning the management of the park and surrounding land as biosphere reserve;
- ii) assisting the 1,750 inhabitants to increase agricultural production and their household income using ecologically appropriate means;
- iii) rehabilitating critical zones;
- iv) 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 (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 decapitalization 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. However, the project did 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. (Paryski, pers. comm., 1992).

The World Bank had designed a US\$40million 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'etat; the project is currently suspended pending a resolution of the current political crisis (Paryski, pers. comm., 1992).

USAID 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. USAID has now suspended its assistance to the project (Paryski, pers. comm., 1992).

The UNDP has initiated a proactive environmental programme and a co-ordination committee for environmental and conservation programmes of the various multi-lateral and bi-lateral donor organisations (Paryski, pers. comm., 1992).

The general public is now aware of the disastrous consequences of continuing and progressive environmental degradation, but 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).

Biodiversity

Haiti comprises the western 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 2,000 m. 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 BC, but only accelerated in the 1700's 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/IUCN 1988).

Kurlansky (1988) estimated 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/IUCN 1988).

Management

The protected areas system currently comprises ten national nature parks, which cover 9,795 ha 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 re-designated as national nature parks, while 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 progressive measures to preserve the remaining biological diversity. Those that directly involve protected areas are:

- 1) establishment of communal forests;
- 2) strict enforcement of environmental and conservation;
- 3) establishment of rural environmental education programmes in areas near conservation zones.

They further proposed 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.

Contacts

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ANNEX I: LEGAL INSTRUMENTS

Not available

ANNEX II: HAITI PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
La Visite	II	NP		2,000	1983
Pic Macaya	II	NP		5,500	1983
La Citadelle, Sans Souci, Ramiers	V	NP		2,200	1968
Subtotal	3			9,700	

NP= National Park

HONDURAS

Area 112,088 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	14	4	594,865
Category III	0	0	0
Category IV	31	5	155,984
Category V	0	0	0
Categories VI-VIII	9	2	1,237,981
Biosphere Reserves	1	1	500,000
World Heritage Sites	1	1	500,000
Ramsar Sites	0	0	0
Total (1)	55	12	2,488,830

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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 state is obliged to conserve the environment and is responsible for imposing regulations on natural resource use. It is also empowered to create protected areas.

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.

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 250 m on either side of any water source and for 150 m 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.

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 (Annex I).

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.

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 and includes 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 (Trinidad, pers. comm., 1992). Details of this recent decree are not currently available.

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. In each area a permanent protected zone (zona protegida a perpetuidad) was established, within which agricultural development is not permitted, and buffer zones in which pre-existing agricultural activities were to be regulated. All these areas were to be administered by the Ministry of Natural Resources through RENARE in co-ordination with various other institutions and local authorities.

The 1992 Law for the Modernisation and Development of the Agricultural Sector (Decree 31-92 Ley para la modernización y desarrollo del sector agrícola) eliminated COHDEFORs role in forest harvesting, processing and commercialisation, and reaffirmed the institutions mandate in protected areas, forest land and wildlife administration.

Within COHDEFOR, the Department of Protected Areas and Wildlife (DAPVS) was organised to carryout the institutional responsibilities for managing or delegating management of protected areas and the cultural and natural resources they contain, promotion of co-ordinating mechanisms at the national and international level; and promotion of the sustainable use of natural resources among communities in and around protected areas. More precise definitions for protected areas categories are provided (COHDEFOR 1993b).

The General Environment Law (Ley General del Ambiente) was passed in 1993. The Law provided for the creation of the Ministry of Environment (Secretaria de Estado en el Despacho del Ambiente). Articles 28 & 37 affirm the Ministries responsibility

for developing policies and guidelines for protected area administration together with other ministries and decentralised institutions and municipalities.

The Regulations for the Environment Law, February 1994 (Reglamento General de la Ley del Ambiente) indicate that proposals to protect wildlands should be prepared in co-ordination with the National Forestry Administration (COHDEFOR).

Yates (1987) noted that problems existed due to the marked lack of environmental legislation and inconsistency among the existing legislative acts applying to natural resources. This situation has improved in past years, but effectiveness is still less than desired.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Central American Biodiversity Convention (CABD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

Current legislation states that the Ministry of the Environment (Secretaría del Estado del Despacho de Ambiente) 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 co-ordination with national development plans (Trinidad, pers. comm., 1992). In practice, natural resources have been managed by the various governmental sectors with interest in a particular resource or area, and responsibility is divided accordingly.

The past lack of effectiveness demonstrated by the central government motivated the involvement of a number of local governmental and non-governmental institutions in protected areas management. While this situation was positive in that a large number of institutions participate. It has made co-ordination and communication more difficult. Now that COHDEFOR takes sole responsibility for protected areas, the situation may improve (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 co-ordinating 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, Trinidad, pers. comm., 1992). As part of a plan to develop projects to strengthen current protection measures, seven priority protected areas in five different forestry regions (Muñoz 1991) were identified for immediate support.

Professional and technical staff of the Department of Protected Areas and Wildlife (DAPVS) totalled 19, with the majority assigned to the protected areas section. Outside of the capital each of the 10 forestry regions is assigned a protected areas co-ordinator. The department also had a small number of park guards on the payroll.

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 (Durón, pers. comm., 1992).

There are a number of non-governmental organisations (NGOs) working in conservation partially due to the opening the government has made towards civil

society, and the past ineffectiveness of the centralised agencies in responding to local needs and conservation priorities. Over the past eight years their numbers and variety of activities have expanded greatly. NGOs now active in planning, managing or supporting protected areas include: FUCSA, GRAPLA, Aldea Global, PROANSATE, BICA, PRODAI, FUCELA, ASECOVE, FHPF, AMITIGRA, FUCAGUA, MOPAWI, CODDEFFAGOLF and ECOLAGO.

As the number of institutional players has increased, so has international support for protected areas management in Honduras. Active programmes include: ACDI, IDB, CATIE, COSUDE, Caribbean Conservation Corporation, EC, GTZ, IUCN, OAS, ODA, UNDP, USAID, US Peace Corps, USFWS, Wildlife Conservation Society, WWF and others.

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).

Biodiversity

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 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. Cattle ranching has been the primary economic activity in the region from colonial times (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 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 civilisation (Campanella *et al* 1982, Herlihy and Herlihy n.d.).

Management

The size of most areas is legally undefined due to the lack of precise boundaries in the authorising legislation. Estimates of coverage range up to 3 million ha. Available data indicate that Honduran protected areas cover 2,488,830 ha, approximately 22% of the national territory (Medina, pers. comm., 1994; Midence, pers. comm., 1992). Gaps that need to be filled includes the coverage of coastal marine areas, the wetlands of Caratasca, and La Laguna de Guaymoreto which are proposed as wildlife refuges (IUCN 1993, Medina, in litt., 1994).

As of 1993 the proposed system included 44 areas decreed by the national assembly, 24 areas established by presidential decree, and a further 36 proposed areas. Only 17 of these areas had their limits defined either on paper or on the ground. COHDEFOR reported a direct institutional presence in 11 areas. Management activities in the remaining areas, if present, are carried out by local government or NGOs (COHDEFOR 1993b).

The development of a functional protected areas system is 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, and the establishment of the Department of Protected Areas in COHDEFOR. The effective implementation of this legislation will undoubtedly be difficult, but the prospects are much brighter now than they have been in the recent past.

In 1987 the governments of Honduras, Guatemala and El Salvador signed an agreement to create the tri-national 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 co-operative 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 (Barborak, pers. comm., 1992, Ugalde and Godoy 1992).

Río Plátano Biosphere Reserve was established in 1980 in this region to protect both natural resources and local populations of Miskito, Pech, and Garífuna 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.).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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; and 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 species richness. Access to the area and exploitation of natural resources are strictly regulated.

Monumento Natural (Natural Monument) Those natural formations 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 tourism is permitted only on co-operative 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 any of the above categories, the function of which has not yet been determined.

Title: Manual de Normas Tecnicas-Administrativa para el manejo y administracion de las Areas Protegidas de Honduras.

Date: 1993

Brief Description: Provides terms of reference for the organisation and operation of the Department of Protected Areas and Wildlife within COHDEFOR. Defines the makeup and functions of the Honduran Protected Areas System (SINAPH), describes the management categories included, describes the administrative structure, objectives and functioning of the Department of Protected Areas and Wildlife, defines mechanisms for the creation and/or modification of established areas, and the management of individual areas.

Administrative Authority: Department of Protected Areas & Wildlife (DAPVS), COHDEFOR.

Designations:

Biological Reserve (Reserva Biológica) A pristine area containing ecosystems, flora, or fauna of scientific value. The principal function is to protect, conserve, and maintain natural processes and phenomena in an unaltered state for research purposes. These are areas that because of their importance are administered by the DAPVS. Their administration can be ceded to other organisations public or private by means of formal agreements that guarantee the achievement of the area's objectives.

National Park Extensive areas that contain outstanding natural features of national interest. Their function is to conserve natural or scenic zones, perpetuate representative samples of the countries principal ecosystems, provide opportunities for research, and environmental education. These are areas that because of their importance are administered by the DAPVS. Their administration can be ceded to other organisations public or private by means of formal agreements that guarantee the achievement of the area's objectives.

Cultural Monuments Areas that contain one or more cultural features of national importance. Their function is to protect these features, and if compatible provide research, educational and recreational opportunities. As stipulated by Decree No. 81-84 these areas will be administered by the Honduran Institute of Anthropology and History.

Natural Monuments Contain one main natural feature of national interest that deserves protection because of it's uniqueness or because it is in danger of extinction. Their principal function is to protect and preserve natural features and genetic material, provide recreational, educational and research opportunities when compatible with their primary objective. Because of their reduced size, their administration should be assumed by local municipal governments via agreements with COHDEFOR.

Wildlife Refuge Areas where protection is essential to avoid the extinction of specific species of wildlife. Their principal function is to guarantee the perpetuation of wildlife species, populations or habitats, and to provide research and recreational opportunities when compatible with the primary objective. The controlled harvest of certain resources is permissible. These are areas that because of their importance are administered by the DAPVS. Their administration can be ceded to other organisations public or private by means of formal agreements that guarantee the achievement of the area's objectives.

Anthropological Reserves Forested areas, usually extensive, with little impact from modern technology, and inhabited by ethnic groups living in dispersed patterns whose impact upon the ecosystems they live in does not cause environmental degradation. Their principal function is to protect the ecosystems and lifestyles of the low density populations that are found therein. These areas should be managed directly by indigenous organisations with technical assistance provided by DAPVS or other organisations when required.

Water Production Areas Areas generally forested, with steep slopes and broken terrain, and have great importance as water catchments. Their principal function is to maintain and improve the quantity and quality water for human consumption. Due to their functions and general characteristics, these areas should be managed by local governments with technical support provided by the Watershed Management Section of DAPVS.

National Forests Relatively extensive areas, generally forested, whose principal function is production of timber, water resources, wildlife, forage and recreational opportunities based upon the principals of sustainable resource management. Management responsibility is assigned to the Forest Department of COHDEFOR.

Private Natural Reserves Natural areas in private property, with variable size, administered privately whose objectives are compatible with those defined for the Honduran System of Protected Areas (SINAPH). The DAPVS together with the Honduran Tourism Institute should stimulate the creation of this type of area and develop legal backing for their operation.

Biosphere Reserves (UNESCO MAB) Areas with representative coverage of major biomes, singular natural features, patterns of balanced land and resource use, or modified ecosystems capable of being restored. Their principal function is the conservation of genetic resources and ecosystem integrity, permitting natural evolutionary processes and the construction of research and monitoring sites.

World Heritage Sites (UNESCO WHS) Areas with natural or cultural features of global importance. Based upon the existence of areas that demonstrate evolutionary periods, geological processes, unique features or natural communities, or with great artistic, scientific, cultural, technological value, or otherwise representing ancient events.

Transfrontier Protected Areas Agreements and treaties concerning conservation measures of these areas will be promoted with neighbouring countries.

ANNEX II: HONDURAS PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Azul Meambar	II	NP		52,779	1987
Celaque	II	NP		27,000	1987
Cerro Azul	II	NP		15,000	1987
Cusuco	II	NP		18,000	1987
Islas de la Bahía	II	NP	YES	29,416	not available
La Tigra	II	NP		32,916	1980
La Muralla	II	NP		42,625	1987,92
Montaña de Comayagua	II	NP		44,453	1987
Montaña de Yoro	II	NP		38,298	1987
Pico Bonito	II	NP		157,088	1987
Pico Pijol	II	NP		28,169	1987
Punta Sal		NP	YES	78,000	not available
Santa Barbara	II	NP		13,000	1987
Sierra de Agalta	II	NP		65,500	1987
Swan Islands Marine Park	II	NP	YES		1991
Trifinio	II	NP		5,400	1987
Subtotal	14		4	594,865	
El Cedro	IV	BR			1987
El Chiflador	IV	BR		1,000	1987
El Chile	IV	BR		12,000	1987
El Pital	IV	BR		3,800	1987
Guajiquiro	IV	BR		7,000	1987
Guisayote	IV	BR		7,000	1987
Las Trancas	IV	BR			1987

Jardín Botánico de Lancetilla	IV	PA		1,253	1978	
Misoco	IV	BR		4,600	not available	
Mogola	IV	BR			1987	
Montaña de San Pablo	IV	BR			1987	
Montaña el Pacayal	IV	BR			1987	
Montecillos	IV	BR		12,500	1987	
Opalaca	IV	BR		14,500	1987	
Sabanetas	IV	BR			1987	
San Pedro	IV	BR			1987	
Volcán-Pacayitta	IV	BR		9,700	1987	
Yerba Buena	IV	BR		3,600	1987	
Yuscarán	IV	BR		2,300	1987	
Subtotal	19		0	79,253		
Bahia de Chismuyo	IV	WR	YES			
Capiro-Calentura	IV	WR			4,942	1991
Corralitos	IV	WR		5,500	1987	
Cuero y Salado	IV	WR	YES	13,225	1988	
El Armado	IV	WR		3,500	1987	
Erapuca	IV	WR		6,864	1987	
Lagunas de Invierno	IV	WR	YES		1992	
Mixcure	IV	WR		8,000	1987	
Montaña Verde	IV	WR		8,300	not available	
Puca	IV	WR		4,900	1987	
Punta Izopo	IV	WR	YES	11,500	not available	
Texiguat	IV	WR	YES	10,000	1987	
Subtotal	12		5	76,731		
Agalteca	VIII	FR		100,000	1966	
Capirio-Calentura	VIII	FR		4,942	1991	
El Cajón	VIII	FR		33,696	not available	
Golfo de Fonseca	VIII	FR	YES	50,000	1958	
Guanaja	VIII	FR	YES	5,400	1969	

Olancho	VIII	FR		1,000,000	1966
Sierra de Omoa	VIII	FR		8,315	not available
Cerro Guanacaure	VIII	MU		1,000	not available
Lago de Yojoa	VIII	MU		34,628	1971
Subtotal	9		2	1,237,981	
Río Plátano Biosphere	IX	BR/WHS	YES	500,000	1980

NP = National Parks

BR = Biological Reserves

WR = Wildlife Refuges

PA = Protected Area

FR = Forest Reserves

MU = Multiple Use Reserves

BR/WHS = Biosphere Reserve & World Heritage Site

JAMAICA

Area 11,400 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	2	1	78,530
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	45	0	50,702
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	47	1	129,232

Policy and Legislation

Jamaica became an independent state with its own constitution within the Commonwealth on 6 August 1962. At present, no overall environmental policy is applied, nor is there a co-ordinated set of policies related to biodiversity conservation or the preservation of ecosystems and ecological processes. Although a Green Paper on a Policy for Jamaica's parks and protected areas system is open for public debate after island-wide public presentations. It is in the final stages of becoming a policy. The Jamaica Environmental Action Plan, while not an environmental policy, outlines the approach the government has towards environmental management in Jamaica.

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 (see comment above). 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 a 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 on the Morant and Pedro Cays. 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.

The Forest Act 1937 (Annex I), 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"). The establishment of protected areas on private lands is also provided for under this Act. In 1984 a new model Forest Act was drafted, but this has not been enacted (Walters et al., 1989).

The Wildlife Protection Act (1945) provides for the establishment of game sanctuaries and game reserves; the Beach Control Law 63 (1955) provides for the declaration of "protected areas" 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 Fishing Industry Act (1975) provides for the establishment of fish sanctuaries. The Jamaica National Heritage Trust Act (1985) provides for the declaration of protected national heritage sites and national monuments by the prime minister, of which a number of small cultural sites have been designated (NRCD and Field 1987).

The passage of the Natural Resources Conservation Authority Act 1991, and the National Parks Regulations (1993) and the Marine Parks Regulations (1992), Blue and John Crow Mountains National Park Order and the Montego Bay Marine Park Order which was done under Phase I of the PARC Project has established the legal declaration of national and marine parks. Protected areas regulations have not as yet been written.

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 Act gives provision for the designation of national parks, protected areas and marine parks. Regulations to the Act are the Natural Resources Conservation (Marine Parks) Regulations which provide system-wide regulations for the establishment, management and operations of marine parks; and the National Parks Regulations which provide system-wide regulations for the establishment, management and operations of terrestrial national parks. These Regulations and orders designated the Montego Bay Marine Park and the Blue and John Crow Mountains National Park, the only existing parks in Jamaica.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

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-1970's. 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, Canoe Valley was never legally declared a national park or protected area. In the late 1980's, activities were focused on the establishment of the Blue and John Crow Mountains National Park and of the Montego Bay Marine Park. These were not implemented until the 1990's.

In 1991 the NRCD was replaced by the Natural Resources Conservation Authority (NRCA), a statutory body currently falling within the portfolio of the Ministry of Housing and the Environment, but was initially within the Ministry Planning, Production & Development then transferred to Ministry of Tourism and Environment then the Ministry of Public Service and the Environment. The establishment of the NRCA allowed for the establishment of national parks and protected area legislation as it was contained in the Act that established it. It was then possible to write the regulations and orders for the parent legislation.

Under the NRCA Act, the authority is responsible for the management of such national parks, marine parks and protected areas as may be prescribed. To date the provisions of the Watershed Protection Act, the Wildlife Protection Act, the Beach Control Act, the Marine Parks Regulation and the National Parks Regulation are the responsibility of the NRCA. A National Park and Protected Areas Unit within the NRCA was created in 1993. The NRCA also has the authority to delegate this function to other institutes and organisations.

The Forestry and Soil Conservation Department (FSCD), within the Ministry of Agriculture, is responsible for administration of the Forest Act. Activities relevant to protected areas include forest protection and conservation and watershed management. The FSCD had responsibility for the development and management of Blue and John Crow Mountains National Park identified under the PARC project until September 1992 when the management was taken over by the NRCA. Expenditure for the FSCD 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 drawn up during the financial year 1989/90 in co-operation 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).

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 was to develop a funding proposal to manage a Montego Bay Marine

Park then a Marine Protected Area under the Beach Control Authority Act which was administered by the Natural Resources Conservation Division the precursor to the NRCA. Attention was also given to the need for improved legislation to protect, develop and manage proposed marine parks.

Following on from the Country Environmental Profile prepared by NRCD and Field (1987) the Government of Jamaica and USAID designed the PARC Project which acted on the recommendations to establish a protected areas system for Jamaica. On 28 August 1989, USAID and the government of Jamaica signed a project agreement resulting in implementation of the Protected Areas Resources Conservation Project (PARC), designed to promote the conservation of biological diversity by integrating it with sustainable development. Phase 1 of the project, which terminated in October 1993, 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 the two pilot areas (Blue and John Crow Mountains National Park and Montego Bay Marine Park), and building the policy, legal, financial and institutional framework for a national system of protected areas. The framework includes:

the establishment of a Conservation Data Centre - Jamaica (CDC-J) at the University of the West Indies to provide planners and managers with a comprehensive base of scientific information.

the preparation of a System Plan for development of a parks and protected areas system for Jamaica.

the establishment of a Jamaica National Parks Trust Fund (JNPTF) by the first debt-for-nature swap in the English speaking Caribbean. The fund is operated as an endowment and is expected to contribute to the financial resources required to run the Jamaican protected area systems.

the drafting and passage into Law of the National Parks and Marine Parks Regulations, and the Orders that would declare the two pilot parks as legally designated Parks.

A long term goal of the PARC project is for the park system to become self-sustaining. The JNPTF is capitalised at about US\$1 million at present, and the Government of Jamaica continues to contribute significantly to the project. USAID funds have been lower than projected because of cut backs in the amount of funds in their bi-lateral programme. Commencing in 1990, the PARC project had an operational budget of US\$2.05 million provided by USAID for a three year period.

Phase II is focused on the establishment of institutional and financial stability and to establish a self-sustaining system of national parks and protected areas by 1997. For a second phase, ending in 1997 an additional US\$3.4 million is provided by USAID.

An evaluation report of the project was prepared in June 1992, which includes recommendations for inclusion in phase II of the programme. The report points out that one of the major components for the successful establishment of the two national parks is the involvement of local advisory committees (LAC). Currently, several LACs, which consist of local residents and interest groups, participate in the management of the national parks. For Phase II of the PARC project it is recommended to continue support and involvement of LACs in the establishment of proposed protected areas (IRF 1992). The report also points out that the establishment of a highly professional cadre of protected area specialists resulted from the project which contributed to its success and bode well for future implementation of the system. It also credited the PIOJ with shrewd Project Management as a major factor in the project's success.

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, not-for-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. The Jamaica Conservation and Development Trust (JCDT), an NGO dedicated to the creation and financing of national parks, was formed in 1987. The JCDT also has two other areas of focus: environmental education, and advocacy on environment and development issues.

The trust has received support from The Nature Conservancy and the Caribbean Conservation Association. The JCDT has been identified by USAID as a suitable non-governmental organisation capable of exerting leadership responsibilities under the PARC project. Specifically they were responsible for the production of a Jamaican National Park System Plan and setting up a National Park Trust Fund. They handled the details of a debt-for-nature swap engineered by The Nature Conservancy, with assistance from the USAID and the Puerto Rico Conservation Trust (IRF 1992). This swap was finalised in 1992 and since March 1993 park staff is paid through the Trust Fund. In the long term it is expected that the maintenance of the entire national parks and protected areas system will be significantly financed by the Trust (PIOJ 1993). The JCDT also completed a second debt-for-nature swap with the Smithsonian Institution which further endowed the Trust Fund and supports research in the Blue and John Crow Mountains National Park.

Many national and local NGOs committed to conservation have developed over the past years. Most of the NGOs are unified by the National Environmental Societies Trust (NEST) which seeks to improve communication and collaboration among its members and to establish an institutional framework within which to encourage actions in defence of the conservation, protection, management and enhancement of the natural environment. The NRCA currently takes into consideration the possibility of delegating the responsibility for the management of protected areas to single NGOs and community groups.

Biodiversity

The landmass of Jamaica, which emerged from the ocean in the mid-Miocene, has never been connected to any other landmass. The central spine of the island is mountainous and reaches 2,256 m at Blue Mountain Peak. It is surrounded by a flatter coastal strip, which is narrow in 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 750 mm to more than 7000 mm 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 67,000 ha (6%) of the country was covered in undisturbed natural forest. It was ranked as the country with the greatest deforestation rate by the World Resources Institute in 1995. 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 savannahs (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). The southern island shelf extends out to about 12 nautical miles and is much larger than the shelf in the north.

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).

Management

With the exception of the two parks established and managed under PARC Phase I, management of protected areas is hampered by inadequate legislation, and a lack of enforcement. Staff shortages in relevant agencies are acute. Fines for violators of the several acts following successful prosecution are minimal.

Protected Areas cover nearly 130,000 ha (12% of the landmass of Jamaica), of which more than 50% are national parks (Summary Table and Annex II). 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 1950's, 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 Protected Area in 1966, followed by Bogue 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 re-designed Montego Bay Marine Park in 1991 (originally set up in 1974 as a small protected area). Blue and John Crow Mountains National Park, which covers an area of 77,000 hectares, was established in 1993. The Park contains seven distinct forest types and has one of the highest levels of endemism in higher plants (50%) in this hemisphere.

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 programs.

NRCD and Field (1987) identify thirteen potential national park sites, enumerate the 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.

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) 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.

Under the PARC project, the JCDT prepared the latest plan for a system of protected areas. The plan was approved by the NRCA in 1992 and has formed the basis of the Green Paper on Parks and Protected Areas policy . Out of 130 proposed sites 15 areas, considered as highly valuable, were selected for the inclusion in the plan. Preparation has started for the establishment of the Black River area and the Cockpit Country as national parks under Phase II of the PARC Project. The system plan includes suggestions for a mechanism for the implementation, management and financing of the proposed sites (PIOJ 1993).

Management constraints include cash flow problems at the Forest Department. Park staff were trained and the rangers are legally gazetted as policemen. van't Hof (1993) reported that management of Montego Bay Marine Park is considered effective, but conflicts between NRCA and Local Advisory Committee concerning management responsibility remain unresolved despite its policy of delegation.

Over 1 million tourists visiting Jamaica every year put the natural resources, mainly along the north coast, under enormous pressure. With the establishment of the Montego Bay Marine Park and proposed protected sites in the Negril and Ocho Rios area it has been stated that the selection of protected areas has been made on grounds of proximity to tourism interests without reference to their environmental importance as these areas have experienced heavy impacts from sewage, sedimentation and over-fishing (Goreau *et al* 1990). However, if the goal is to link the protection of biodiversity to sustainable development initiatives it is likely that these areas will have higher priority in terms of implementation as tourism plays a large part in the island's economy. This has been the norm in the Caribbean (CCA 1996).

The PARC project aims with the new system plan to protect the island's biodiversity and to encourage ecotourism 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.

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ANNEX I: LEGAL INSTRUMENTS

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: Natural Resources Conservation Authority

Designations:

Watershed Provides for the control of land use within designated watersheds (which cover more than 100,000 ha).

Source: Allen (1990)

Title: The Wild Life Protection Act

Date: 1945 (Amended 1991)

Brief description: Enabling legislation for the designation of game sanctuary or game reserves.

Administrative authority: Natural Resources Conservation Authority

Designations:

game sanctuary or game reserve

Source: Allen (1990), Original legislation.

Title: The Beach Control Law No. 63

Date: 1956

Brief description: Enabling legislation for the designation of "protected areas".

Administrative authority: Natural Resources Conservation Authority

Designations:

Marine park To control exploitation and development affecting the area.

Source: Allen (1990)

Title: The Fishing 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 affecting 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 Jamaica 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: NRC and Field (1987); Smith, pers. comm. (1991)

Title: Natural Resources Conservation Authority Act

Date: 1991

Brief description: Provides for the management, conservation and protection of the natural resources and establishes a Natural Resources Conservation Authority

Administrative authority: Natural Resources Conservation Authority

Designations:

National Park Not available at present.

Marine Park Not available at present.

Protected Area Any area of land or water for the preservation of any object (whether animate or inanimate) or unusual combination of elements of the natural environment that is of aesthetic, educational, historical or scientific interest.

ANNEX II: JAMAICAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Blue and John Crow Mountains National Park	II	NP		77,000	1993
Subtotal		1		77,000	
Montego Bay Marine Park	II	MP	YES	1,530	1991
Subtotal		1	1	1,530	
Bogue Estate	VIII	GR		243	1963
Ballintoy Block "A"	VIII	FR		245	1950
Ballintoy Block "C"	VIII	FR		440	1950
Bath Mt. Block "A"	VIII	FR		121	1950
Baulk Pen Block "B"	VIII	FR		107	1950
Bogue	VIII	FR		112	1955

Bottom Hampden	VIII	FR		118	1950
Bull Head	VIII	FR		220	1950
Cedar Valley	VIII	FR		243	1950
Chatsworth Block "A"	VIII	FR		314	1950
Chepstowe Reserve	VIII	FR		150	1950
Cockpit Country	VIII	FR		22,327	1950
Cockpit Country - Peru Mt.	VIII	FR		270	1955
Cooks Bottom	VIII	FR		197	1955
Discovery	VIII	FR		149	1950
Fergis Ramsay	VIII	FR		120	1950
Fyffe and Rankine	VIII	FR		966	1950
Haycock Hill	VIII	FR		147	1950
Hyde Block "C"	VIII	FR		433	1950
Hyde Hall Mountain	VIII	FR		662	1950
Jericho Block "A"	VIII	FR		113	1950
Jericho Block "E"	VIII	FR		138	1950
Kellits - Camperdown	VIII	FR		1,498	1950
Lovers Leap	VIII	FR		175	1950
Lychfield Matheson's Run	VIII	FR		4,485	1950
Mt. Diablo Block "A"	VIII	FR		853	1950
Mt. Diablo Block "B"	VIII	FR		231	1950
Mt. Diablo Block "C"	VIII	FR		261	1950
New Forest Reserve	VIII	FR		161	1950
Norris Block "A"	VIII	FR		115	1950
Orchard	VIII	FR		142	1950
Peak Bay Block "A"	VIII	FR		303	1950
Peak Bay Block "B"	VIII	FR		153	1950
Pennants Forest Reserve	VIII	FR		169	1950
Petersville	VIII	FR		170	1950
Rockfort	VIII	FR		733	1950
Ruthven	VIII	FR		191	1950
Hellshire Hills	VIII	FR		4,856	1950
Shuna	VIII	FR		458	1950
Stephney John's Vale	VIII	FR		6,713	1950
Teak Pen Block "A"	VIII	FR		533	1950

Teak Pen Block "B"	VIII	FR		150	1950
Troy Block "A"	VIII	FR		244	1955
Troy Block "B"	VIII	FR		100	1955
Troy Block "C"	VIII	FR		173	1955

NP = National Park

MP = Marine Park

GR = Game Reserve

FR= Forest Reserve

MARTINIQUE (FRANCE)

Area 1,100 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	1	0	517
Category II	0	0	0
Category III	0	0	0
Category IV	0	0	0
Category V	1	0	70,150
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	2	0	70,667

Policy and Legislation

From 1635, Martinique was a French colony until its status changed to an overseas department of France in 1946. In 1974 it became an administrative region. The territory is covered by French legislation some of which is applicable specifically to Martinique.

Several pieces of legislation relate to Martinique's protected areas system. Decree No. 67-158 of 1 March 1967 relates to regional natural parks (Décret relatif aux parc naturel régionaux, see Annex I). 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, Annex I). This law provides definitions of nature reserves (réserves naturelles), (Annex I). 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 the 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. A further category of protected area, natural zone of ecological, fauna 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 1975 and subsequent Ministerial Act of 24 August 1976. The concept of regional natural parks was advanced in the early 1960's, 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

Administration

The French governmental body responsible for the establishment of parks and reserves and wildlife management is the Department of Nature Protection (Direction de la Protection de la Nature), which is part of the Ministry of the Environment (Ministère de l'Environnement). Within Martinique the National Forest Office (Office Nationale des Forêts, ONF) is responsible for administration and management of all national and public forests, and part of the littoral zone (Nosel, pers. comm., 1992).

The Martinique regional nature park 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. Caravelle Peninsula Reserve is maintained by the nature park authorities for its nature conservation interest and is protected by a local warden system (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 (Nosel, pers. comm., 1992).

Biodiversity

Martinique, one of the Lesser Antilles Islands, 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. 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 there is montane thicket, palm brake, and elfin woodland.

'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 (2,200 ha). 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).

Management

The protected area system comprises principally Martinique Regional Natural Park, which covers two-thirds of the island, La Caravelle Nature Reserve, and several other, much smaller, reserves. The Natural Park consists of a number of separate zoned areas, totalling 70,150 ha, including forest areas in the north, areas around Baie de Fort-de-France and small areas on the south-east coasts including La Caravelle Nature Reserve which has been particularly well developed. La Caravelle Nature Reserve only covers terrestrial area so far; an extension including the marine area has been proposed (UNEP/IUCN 1988).

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).

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ANNEX I: LEGAL INSTRUMENTS

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. **Date:** 1 March 1967, 24 October 1975, 25 April 1988 **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. **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:** Department 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.

ANNEX II: MARTINIQUE PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Caravelle	I	NR	YES	517	1976
Martinique	V	RNP		70,150	1976
Total	2		1	70,667	

NR = Nature Reserve RNP = Regional Nature Park

MEXICO

(Eastern Slope)

Area 700,930 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	8	3	357,508
Category II	46	3	765,510
Category III	2	0	4,180
Category IV	16	5	1,298,364
Category V	7	1	1,748,640
Categories VI-VIII	23	5	2,470,052
Biosphere Reserves	13	4	3,329,478
World Heritage Sites	2	2	530,546
Ramsar Sites	1	1	47,480
Total (1)	110	20	8,816,807

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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).

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).

In 1944, further regulations to the 1942 Forestry Law were published which provided some measures for wildlife protection. The current Forestry Law was promulgated in 1960, and it provided for the establishment of national parks for public use within suitable forested areas.

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) as part of the National Programme for Ecology. 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).

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, Annex I). 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).

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 (Halffter 1992, Jardel *et al* 1992, Aguirre, pers. comm., 1992). Subsequently SEDUE was replaced by the Ministry of Social Development (SEDESOL), and since 1995 the environmental functions have been assumed by a new Ministry (Secretariat) on Environment, Natural Resources and Fisheries (SEMARN y P).

In 1992 the Federal Public Administration Law (Ley Organica de Administracion Publica Federal) was modified assigning responsibilities for protected area management as follows:

National Ecology Institute: administration of SINAP,

Ministry of Agriculture and Hydraulic Resources: National Parks and Forest Reserves,

Ministry of Social Development (SEDESOL): Biosphere Reserves, Special Biosphere Reserves, Natural Monuments, and Wildlife Protection Areas,

Ministry of Fisheries and Marine Affairs: National Marine Parks.

International Participation

Conventions & Treaties

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

United Nations Convention on the Law of the Sea (LOS, 1982)

Programmes and Associations

Latin American Network for Technical Co-operation in National Parks, other protected areas and wildlife (FAO-UNEP Protected Area Network)

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

Administration

Until 1976, protected area management was the responsibility of various bodies within the forestry sector. From 1976 to 1982, five government agencies were responsible for protected area management.

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) 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).

In May 1992, SEDUE was dissolved and its functions taken over by the new Ministry for Social Development (SEDESOL) (Pérez-Gil and Jaramillo 1992, Ezcurra Real 1993). The National Ecology Institute within, SEDESOL, was responsible for overall supervision of SINAP. These SEDESOL functions are now the responsibility of SEMARN y P. The institute manages 30 areas through state level offices. A similar arrangement is used within the Ministry of Agriculture and Hydraulic Resources.

The effectiveness of the management of protected areas under the responsibility of government agencies has suffered from excessive bureaucratic centralisation, frequent organisational changes, lack of funds, and trained personnel. As a result, other national institutes such as universities and research centres have begun to manage a number of biological research centres and several NGOs have become involved in establishing and managing protected areas (IUCN 1993).

Management

There are serious discrepancies concerning the number and coverage of protected areas in Mexico. While WCMC (1992) listed 86 areas and 14 categories, SEDESOL data for 1993 recorded 76 areas in 6 categories. Additionally, state governments and the Ministry of Agriculture protect another 8 million ha of natural areas. The listing compiled for this report (Mateo, pers. comm., 1994) includes 104 areas covering over 8.8 million ha. Twenty of these areas reportedly contain coastal or marine resources.

The differences are thought to result from the lack of political support given protected areas until recently, inter-institutional squabbling, together with the long history of establishment of areas by numerous institutions without reference to established terminology and uniform criteria (Perez Gil & Jaramillo, cited by Varzetti 1993).

Twenty percent of national territory is include within some type of protected area. Although these protected areas have not functioned in practice (Jardel 1990). 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 form settlements in and around protected areas; and lack of public awareness (Alcérreca *et al* 1988, SEDUE, n.d.a). The following are the principal threats: deforestation, poaching, rubbish dumping, plant poaching, mineral exploitation, over-grazing and erosion. The expansion of agriculture has 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).

By the early 1980's, 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).

Although a few proposals for management plans have been prepared for some individual protected areas, neither is their implementation guaranteed nor are they part of any long-term strategic plan for a national system. These management plans have been a result of justifying the establishment of new areas or to support on-going efforts in existing areas (IUCN 1993).

van't Hof (1993) reports that management in Cancun & Isla de Mujeres National Park is relatively effective. Impacts from recreational activities as well as poaching need to be resolved. Increased training and co-operation with fishermen are required.

Biodiversity

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 500 m, and more than half above 1,000 m (WCMC 1988). Volcanic activity is considerable and has formed much of the topography.

The coastline extends for nearly 10,000 km (6,760 km on the Pacific and 2,900 km 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).

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 worlds 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, 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).

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 (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. 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 (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 (Jardel, pers. comm., 1992).

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ANNEX I: LEGAL INSTRUMENTS

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 10,000 ha 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 critical 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 beauty and flora and fauna of national importance, which the public may better enjoy by being placed under official surveillance.

Source: Original legislation

ANNEX II: MEXICAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
	I	NBR			
El Triunfo	I	NBR		119,177	1990
Isla Cedros	I	FR		1,000	1978
Lagunar Ojo de Liebre Complex	I	CS		40,000	1972, 80
Cerro de la Silla	I	NM		6,045	1991
Isla Contoy	I	SBR	YES	176	1961
Isla Guadalupe	I	SBR	YES	25,000	1922
Islas del Golfo de California	I	SBR	YES	150,000	1978
Mariposa Monarca	I	SBR		16,110	1980
Subtotal	8		3	357,508	
Benito Juarez	II	NP		2,737	1937
Bosencheve	II	NP		15,000	1940
Cañón del Río Blanco	II	NP		55,690	1938
Cañón del Sumidero	II	NP		21,789	1980
Cascada de Bassaseachic	II	NP		5,803	1981

Cerro de la Estrella	II	NP		1,100	1938
Cofre de Perote	II	NP		11,700	1937
Constitución de 1857	II	NP		5,009	1962
Cumbres de Majalca	II	NP		4,772	1939
Cumbres de Monterrey	II	NP		246,500	1939
El Chico	II	NP		2,739	1982
El Cimatario	II	NP		2,447	1982
El Gogorrón	II	NP		25,000	1936
El Potosí	II	NP		2,000	1936
El Tepozteco	II	NP		24,000	1957
El Veladero	II	NP		3,160	1980
Insurgente Jose María Morelos y Pavon	II	NP		1,813	1939
Insurgente Miguel Hidalgo y Costilla	II	NP		1,751	1936
Isla Isabela	II	NP	YES	194	1980
Iztaccihuatl Popocatepetl	II	NP		25,679	1935, 48
La Malinche	II	NP		45,700	1938
Lagunas de Chacahua	II	NP	YES	14,187	1937
Lagunas de Montebello	II	NP		6,022	1959
Lagunas de Zempoala	II	NP		4,669	1936, 47
Los Mármoles	II	NP		23,150	1936
Nevado de Colima	II	NP		22,200	1936, 40
Nevado de Toluca	II	NP		51,000	1936
Pico de Orizaba	II	NP		19,750	1937
Pico de Tancitaro	II	NP		29,316	1940
Sierra de San Pedro Mártir	II	NP		63,000	1947
Zoquiapán y Anexas	II	NP		19,418	1937
Balneario Los Novillos	II	NP		42	1940
Cumbres del Ajusco, DF	II	NP		920	1936
El Teyepac, DF	II	NP		303	1937
Tula, Hidalgo	II	NP		99	1981
Desierto del Carmen o de Nixcongo	II	NP		529	1942
Molino de Flores, Netzahualcoyotl	II	NP		55	1937

Los Remedios	II	NP		400	1938
El Sacramento	II	NP		45	1939
Cerro de Garnica	II	NP		968	1936
Lago de Camécuaro	II	NP		9	1941
Rayón	II	NP		34	1952
El Sabinal	II	NP		8	1938
Tulum	II	NP	YES	664	1981
Dzilbilchaltun	II	NP		539	1987
Omiltemi	II	P		3,600	not avail.
Subtotal	46		3	765,510	
Grutas de Cacahuamilpa	III	NP		1,600	1936
Cascadas de Agua Azul	III	SBR		2,580	1980
Subtotal	2		0	4,180	
La Blanquilla	IV	MR	YES	66,868	1975
Alacranes Reef	IV	MR	YES	333	1994
Veracruz Reef System Faunal Reserve	IV	MR	YES	52,238	1992
La Mojonera	IV	RE		9,201	1981
La Primavera	IV	RE		30,500	1980
Sierra de Alvarez	IV	RE		16,900	1981
Sierra del Pinacate	IV	RE		28,660	1979
Valle de los Cirios	IV	NM		3,500,000	1980
La Encrucijada	IV	NTB		30,000	1972
Selva El Ocote	IV	SBR		48,140	1982
Río Celestún	IV	SBR	YES	59,130	1979
Ría Lagartos	IV	SBR	YES	47,840	1979
Corredor Biológico Chichinautzin	IV	PA		37,302	1988
Chan-Kin	IV	PA		12,184	1992
Laguna de los Términos	IV	PA		705,016	1994
Yum Balam	IV	PA		154,052	1994
Subtotal	16		5	1,298,364	
Palenque	V	NP		1,772	1981
Calakmul	V	NP		732,189	1989
El Pinacate y el Gran	V	NP		714,556	1993

Desierto de Altar					
El Vizcaíno	V	NP	YES	2,546	1988
Mapimí	V	NP		123,000	1977, 79
Michilía	V	NP		35,000	1979
Sierra de Manantlán	V	NP		139,577	1987
Subtotal	7		1	1,748,640	
Isla Tiburón	VII	SBR	YES	120,800	1963
Sierra de Santa Martha	VII	SBR	YES	20,000	1980
Volcán de San Martín	VII	SBR		1,500	1979
Bavispe	VIII	FR		198,164	1939
Centenario	VIII	FR		3,000	1949
El Gavilán	VIII	FR		9,682	1923
Mesa del Pitorreal	VIII	FR		4,900	1923
Papigochic	VIII	FR		172,480	1939
Porción Boscosa de San Luís Polotsí	VIII	FR		29,885	1923
San José de los Molinos	VIII	FR		2,995	1942
Sierra de Juarez	VIII	FR		140,000	1951
Sierra de Los Ajos, Buenos Aires y Purica	VIII	FR		21,494	1936
Sierra de Pedro Mártir	VIII	FR		74,000	1951
Sierras de Hansen y San Pedro Mártir y Mesa Pinal	VIII	FR		1,249,000	1923
Tequiquipan	VIII	FR		32,000	1935
Terrenos de Puebla y México	VIII	FR		18,215	1926
La Laguna San Ignacio	VIII	CS	YES	0	1979
Bonampak	VIII	CS		4,357	1992
Yaxchilan	VIII	CS		2,621	1992
Isla Rasa	VIII	SBR	YES	7	1964
Cajón del Diablo	VIII	SBR	YES	0	1937
Campo Verde	VIII	FR		0	not avail.
Tutuaca	VIII	FR		364,952	1937
Subtotal	23		5	2,470,052	
BIOSPHERE RESERVES					
El Cielo	IX	BR		144,530	1986

Montes Azules	IX	BR		331,200	1979
Reserva de Mapimí	IX	BR		123,000	1977
Reserva de la Michilía	IX	BR		35,000	1979
Sian Ka'an	IX	BR	YES	528,148	1986
Sierra de Manantlán	IX	BR		139,577	1988
Lacantun, Chiapas	IX	BR		6,833	1992
Pantanos de Centla	IX	BR	YES	302,706	1993
Alto Golfo de California y Delta del Rio Colorado	IX	BR	YES	934,756	1993
Chamela-Cuixmala	IX	BR		13,142	1993
Archipiélago de Revillagigedo	IX	BR	YES	636,685	1994
Sierra La Laguna	IX	BR		112,437	1994
Sierra del Abra Tanchipa	IX	BR		21,464	1994
Subtotal	13		4	3,329,478	
RAMSAR SITES					
Ría Lagartos, Yucatán	XI	RW	YES	47,480	1986
Subtotal	1		1	47,480	
WORLD HERITAGE SITES					
Sian Ka'an	X	WH	YES	528,000	1987
El Vizcaíno	X	WH	YES	2,546	1988
Subtotal	2		2	530,546	

Management category abbreviations

BR BIOSPHERE RESERVES NM NATURAL MONUMENT

CS CETACEAN SANCTUARY NP NATIONAL PARKS

FR FOREST RESERVES P PARK

MR MARINE RESERVE NBR BIOSPHERE RESERVES (NATIONAL)

NTB NATURAL AND TYPICAL BIOTOPE RE REFUGES

RW RAMSAR WETLANDS SBR SPECIAL BIOSPHERE RESERVES

WH WORLD HERITAGE SITE

PA WILDLIFE AND AQUATIC FAUNA PROTECTION AREAS

MONTSERRAT (UNITED KINGDOM)

Area 104 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	1	1	6
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	1	1	6

Policy and Legislation

Montserrat is a dependent territory of the United Kingdom. The island's constitution came into force in 1960 and was 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 450 m in altitude 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 was under final review in 1992.

Foxes Bay Bird Sanctuary, owned by the Montserrat Company, is on lease to the Montserrat National Trust and was 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

Administration

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 co-ordinator and secretary.

Biodiversity

Montserrat is a small volcanic island with two main areas of highland reaching altitudes greater than 740 m. 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 1750 mm 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).

Management

Presently, Montserrat has only one protected area, the 6 ha Foxs Bay Bird Sanctuary. 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 co-ordinated 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 810 ha), 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).

Contacts

Montserrat National Trust (Co-ordinator, National Parks), Parliament Street,
PLYMOUTH Tel: (809) 491-3086

Ministry of Agriculture, Trade, Lands and Housing, The Groves, PLYMOUTH Tel:
(809) 491-3648 Fax: (809) 491-2367

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ANNEX I: LEGAL INSTRUMENTS

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.

ANNEX II: MONTSERRAT PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Foxs Bay	IV	BS	YES	6	1979
Subtotal	1		1	6	

BS = Bird Sanctuary

ETHERLANDS ANTILLES (NETHERLANDS)

Area 800 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	2	1	7,760
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	3	3	8,036
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	5	2	1,940
Total (1)	9	5	17,646

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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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 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 Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Protocol Concerning Specially Protected Areas and Wildlife for the Wider Caribbean (SPAW, 1990)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

Administration

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 Antillean (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.

Biodiversity

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 900 km 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 50-100 m from the coast to a 8-12 m deep drop-off, and a steep slope from the drop-off to a depth of 50-60 m. 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 80 m, 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 870 m peak of Mt. Scenery, with a nearly continuous steeply sloping, eroding shore. Depths exceeding 500 m are found within 1 km of the shore, yet approximately 2 km from the shore two sea mounts rise to a depth of only 30 m. 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).

Management

The 9 established protected areas cover more than 17,500 ha, 22% of the land mass of the Netherlands Antilles. Nearly 2,000 ha have been included in Ramsar Wetlands, while 5 additional areas have been established as marine parks, totalling 8,000 ha.

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 co-operation 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.

The situation at Bonaire Marine Park also appears favourable. Diving is reportedly growing 10% annually; 17,000 divers visited the island in 1991. Planning, research and initial management were supported by 3 year, US\$319,000 project, leading to the development of resource and visitor monitoring , mooring system, and field research station.

Following a marked decline in management capacity due to inadequate funding and institutional support, local legislation was revised, establishing an annual US\$10 diving fee and making the area self-supporting. The economics of the area are very positive; while annual operations and capital expenditures are under US\$700,000, government tax income totals US \$8.7 million, park fees US\$190,000 and private sector revenues US\$23.4 million. (Dixon *et al* 1993).

Co-operative management with dive companies and divers has reduced impacts, but even so appreciable impact has been detected (diver surveys and photo-analysis around mooring sites). Coral diversity is lowest at mooring sites with heaviest use, and decreases farther away from moorings. Threshold level for degradation appears between 4,000-6,000 dives per year. Many of the individual dive sites, and the park itself may be approaching their carrying capacity. Further use could cause significant degradation. However, adequate diver education and control of pollution could feasibly permit sustainable use at twice 1992 levels.

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 unspoiled 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.

Dixon *et al* (1993) report that the funding strategy for Saba Marine Park includes user fees, souvenir sales and donations. In 1988 US\$10,000 was generated by these sources. There are 35 dive sites within Saba Marine Park. Total diving related expenditures in the local economy were estimated at US\$1-1.5 million, and in 1992 the area became economically self-supporting. Five thousand divers were expected by 1994 .

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 (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.

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ANNEX I: LEGAL INSTRUMENTS

not available

ANNEX II: NETHERLANDS ANTILLES PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Christoffel (Curacao)	II	NP		1,860	1978
Washington Slagbaai (Bonaire)	II	NP	YES	5,900	1969
Subtotal	2		1	7,760	
Bonaire	VIII	MP	YES	6,000	1979

Saba	VIII	MP	YES	1,000	1987
Curacao	VIII	MP	YES	1,036	1983
Subtotal	3		3	8,036	
Washington Slaagbaai	IV	R	YES	90	1980
Gotomeer	IV	R		150	1980
Lac	IV	R		700	1980
Pekelmeer	IV	R		400	1980
Klein Bonaire Island	IV	R	YES	600	1980
Subtotal	5		2	1,940	

NP = NATIONAL PARKS

MP = MARINE PARKS

R = RAMSAR SITES

NICARAGUA

Area 139,000 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	2	2	345,000
Category II	3	0	25,327
Category III	1	0	18,930
Category IV	62	11	1,032,661
Category V	0	0	0
Categories VI-VIII	5	2	1,237,500
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	73	15	2,659,418

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

Prior to 1979, Nicaragua had no national conservation objectives or policies, nor any institutional framework to implement or support environmental protection (Anon. 1989, Hartshorn and Green 1985). During the Sandinista administration (1980-90) the institutional framework for protected areas was greatly strengthened, management was initiated, and a national system plan was being worked on. During the last years of the decade, implementation of area management and the system plan was drastically reduced due to major institutional changes (compactación) and budget cuts. Since 1990, management and planning efforts have resumed (Nietschmann 1990).

Until recently, natural resource legislation was oriented 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, without a 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. Natural resources were declared part of the national heritage, available to all Nicaraguans, to allow the development of the country and to improve the quality of life (Anon. 1989). IRENA became the Ministry of Environment and Natural Resources (Ministerio del Ambiente y Recursos Naturales, MARENA) in 1993.

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), now known as Wildlands and Wildlife Service within IRENA. The Wildlands and Wildlife Service 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 16 protected areas in the Pacific region: Decree No. 1194 of 3 February provided for the establishment of Zapatera National Park ; Decree No. 1294 of 12 August provided for Chacocente Wildlife Refuge; 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 formalized 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 was 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 Cayos Miskitos 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 Bosawas 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 disorganized colonization 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).

Since 1990, initially IRENA and currently MARENA, has produced a national plan for strengthening and consolidating Nicaragua's protected area system (Nietschmann 1990). 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). 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).

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Central American Biodiversity Convention (CABD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Cooperation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

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 1980's, 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). IRENA was changed to the Ministerio del Ambiente y Recursos Naturales (MARENA) in 1993.

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 was 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 tourist purposes (Anon. 1989, Comisión IRENA-CROP, n.d.).

Following the regionalization policy initiated after 1979, protected area administration at the local level was the responsibility of regional delegations of IRENA and currently MARENA. MARENA'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 MARENA, 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 organization, 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. 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.

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).

Biodiversity

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 neighboring 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 (Nietschmann, pers. comm., 1992).

Management

MARENA's operational capacity continues to be very limited. Although Nicaragua has established 73 protected areas which cover more than 2.6 million ha (22% of the

national territory), only three of these have a permanent staff provided by the Ministry. In 1993 the Wildlands and Wildlife Service had a total of 11 guards. Only one protected area, Volcan Masaya National Park, is public property, and very few of the areas are delimited in the field (Mack 1994, Espinoza, pers. comm., 1994).

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% of total land area. 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% of national territory and including a previously established national park. In 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).

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).

MARENA 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).

Major threats to the protected area system include lack of on-site protection and management in most areas; the growing colonization threat, particularly to wildlands

in the eastern half of the country, by former Sandinista soldiers and Contra guerrillas 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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ANNEX I: LEGAL INSTRUMENTS

Not available

ANNEX II: NICARAGUAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Río Indio Maíz	I	BR	YES	295,000	1990
Cayos Miskitos	I	BR	YES	50,000	1991

Subtotal	2		2	345,000	
Archipiélago Zapatera	II	NP		5,227	1983
Saslaya	II	NP		15,000	1971
Volcán Masaya	II	NP		5,100	1978
Subtotal	3		0	25,327	
Archipiélago de Solentiname	III	NNR		18,930	1990
Subtotal	1		0	18,930	
Alamikamba	IV	NNR		2,100	1991
Apante	IV	NNR		1,230	1991
Cabo Viejo	IV	NNR	YES	5,800	1991
Castillo de la Inmaculada	IV	NNR		1,500	1990
Cayos Miskitos	IV	BR	YES	502,654	1991
Cerro Bana Cruz	IV	NNR		19,700	1991
Cerro Cola Blanca	IV	NNR		22,200	1991
Cerro Cumaica - Cerro Alegre	IV	NNR		5,000	1991
Cerro Datanil - El Diablo	IV	NNR		2,216	1991
Cerro El Arenal	IV	NNR		575	1991
Cerro Kilambe	IV	NNR		10,128	1991
Cerro Kushkawas	IV	NNR		4,760	1991
Cerro Mobachito - La Vieja	IV	NNR		940	1991
Cerro Musun	IV	NNR		4,142	1991
Cerro Pancasan	IV	NNR		330	1991
Cerro Quiabuc (Las Brisas)	IV	NNR		3,630	1991
Cerro Tisey - Estanzuela	IV	NNR		6,400	1991
Cerro Tomabu	IV	NNR		850	1991
Cerros Bana Cruz	IV	NNR		10,130	1991
Cordillera de Yolaina	IV	NNR		40,000	1991
Cordillera Dipplito y Jalapa	IV	NNR		41,200	1991
Delta del Estero Real	IV	NNR	YES	55,000	1983
El Chocoyero - El Brujo	IV	NNR		184	1993
Estero Padre Ramos	IV	NNR	YES	8,800	1990
Fila Cerro Frio - La Cumplida	IV	NNR		1,761	1991

Fila Masigüe	IV	NNR		4,500	1991
Guabule	IV	NNR		1,100	1991
Isla Juan Venado	IV	NNR	YES	4,800	1983
Kilgna	IV	NNR		1,000	1991
Laguna Bismuna - Raya	IV	NNR	YES	11,800	1991
Laguna de Apoyo	IV	NNR		2,100	1991
Laguna de Asosca	IV	NR		140	1991
Laguna de Mecatepe	IV	NR		1,200	1983
Laguna de Nejapa	IV	NR		220	1991
Laguna de Pahara	IV	NNR	YES	10,200	1991
Laguna de Tiscapa	IV	NR		40	1991
Laguna de Tisma	IV	NNR		7,000	1983
Laguna Kukalaya	IV	NNR	YES	3,500	1991
Laguna Layasica	IV	NNR	YES	1,800	1991
Laguna Tala - Sulamas	IV	NNR		31,400	1991
Laguna Yulu Karate	IV	NNR		25,300	1991
Lianos de Karawats	IV	NNR		2,000	1991
Limbalka	IV	NNR		1,800	1991
Los Guatuzos	IV	WR		43,750	1990
Los Maribios (Complejo San Cristobal, Telica, Rota, Pilas, El Hoyo)	IV	NR		34,400	1983
Macizos de las Peñas Blancas	IV	NNR		11,308	1991
Makantaka	IV	NNR		2,000	1991
Mesas de Monopotente	IV	NNR		7,500	1991
Península Chiltepe	IV	NNR		1,800	1983
Río Escalante Chococente	IV	WR	YES	4,800	1983
Rio Manaree	IV	NR		1,100	1983
Volcán Mombacho	IV	NNR		2,847	1983
Salto Rio Yasica	IV	NNR		445	1991
Sierra Amerique	IV	NNR		12,073	1991
Sierra Kiragua	IV	NNR		8,067	1991
Tepesomoto-Pataste	IV	NNR		8,700	1991
Volcán Concepción	IV	NR		2,200	1983

Volcán Cosiguina	IV	NNR	YES	12,420	1976
Volcán Maderas	IV	NNR		4,100	1983
Volcán Yall	IV	NNR		3,500	1991
Yucul	IV	NNR		4,826	1990
Yulu	IV	NNR		1,000	1991
Subtotal	62		11	1,027,966	
La Flor	VI	WR	YES	1,500	1983
Bosawas	VI	NRR		730,000	1991
Cerro Wawashan	VI	FR		231,500	1991
Cerro Sitva	VI	FR	YES	266,000	1991
Volcan Momotombe y Momotombito	VI	NNR		8,500	1983
Subtotal	5		2	1,237,500	

NP = National Parks

BR = Biological Reserves

WR = Wildlife Refuge

WA = Wildland Areas

NNRR = National Natural Resource Reserve

NNR = National Natural Reserve

PANAMA

Area 75,517 sq. km.

Summary

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	1	0	1,433
Category II	12	5	1,359,632
Category III	0	0	0
Category IV	4	2	11,458
Category V	3	2	81,378
Categories VI-VIII	11	2	1,427,533
Biosphere Reserves	2	1	786,000
World Heritage Sites	2	1	786,000
Ramsar Sites	3	3	123,179
Total (1)	34	14	3,004,613

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

There is no national conservation policy that 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). The Forestry Action Plan for Panama (Plan de Acción Forestal de Panamá) was developed in 1990 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; co-ordinating 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.

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, tourism, recreational or other reasons (Annex I). 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).

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 has been drafting comprehensive protected areas legislation which would standardise the management of all protected areas as part of an integrated system.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Central American Biodiversity Convention (CABD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

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 1900's (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 territories 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 co-ordination 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 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. The communities of San Blas Comarca have designated 60,000 ha of their 320,000 ha indigenous reserve as a specially protected area, and are also proposed the whole area as a biosphere reserve.

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 PA.NA.M.A.), an umbrella organisation formed by 24 NGOs whose aim is to assist in the development of a protected area system.

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 Guaymí 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.

Biodiversity

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. It also has 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 south-easterly 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 land-use 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 I) are collectively managed as the National Forest Management System (Sistema de Manejo de Bosques Nacionales, INRENARE 1990a, 1990b).

Management

Over 3 million ha are included in Panama's protected areas system, equivalent to nearly 40% of the country's landmass. Fourteen of the 34 areas contain marine or coastal resources, including three Ramsar Sites (Golfo de Montijo, San San & Pond Sak, and the Reserva Natural Punta Patiño). Nearly 50% of the total extension is included in National Parks and Biological Reserves, while most of the remaining area is in Forest Reserves or Indian Reservation.

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. Efforts to plan and create a national protected areas system date back to the 1960's. By the late 1970's, substantive plans and proposals were made for priority parks and reserves and the protected areas system with the assistance of World Conservation Union (IUCN), FAO, and the Tropical Agronomic Centre for Research and Training (CATIE) (IUCN 1976, IUCN 1982, Dalfelt and Morales 1978). Over half the protected areas have been established since the beginning of the 1980's, and most have at least annual operational plans. A national protected areas system plan was produced in the mid-1980's with assistance from USAID (Houseal 1985).

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 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 long-term financial basis for protecting and managing the nation's protected areas, an international debt swap was under negotiation with USAID and The Nature Conservancy to help set up a permanent endowment fund to be managed by Fundación Natura, 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 nature based tourism occurring throughout the Central American region, visitation is expected to increase substantially in the near future. As part of a new USAID funded national conservation project, major investments in basic infrastructure are planned for the protected areas system over the next decade (Candanedo and Barborak 1992).

In 1982 Panama signed the Basic Convention for Creation of the Park (Convenio Básico de Creación del Parque), a bi-national agreement with Costa Rica for the creation, joint planning and administration of the trans-boundary park La Amistad. Assistance for this project comes from the Organisation of American States (OAS) and Conservation International (CI).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 that it is 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, tourism 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)

ANNEX II: PANAMANIAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Isla Maje	I	SR		1,433	1977
Subtotal		1	0	1,433	
Isla Bastimentos	II	NMP	YES	13,226	1988
Barro Colorado	II	NMP		15,400	1977
Altos de Campana	II	NP		4,816	1977
Cerro Hoya	II	NP	YES	32,557	1984

Camino de las Cruces	II	NP		4,000	not avail.
Interoceanico Las Americas	II	NP		40,000	not avail.
Chagres	II	NP		129,000	1984
Coiba	II	NP		270,000	1991
Darién	II	NP	YES	579,000	1980
La Amistad	II	NP		207,000	1988
Portobelo	II	NP	YES	35,929	1976
Sarigua	II	NP	YES	8,000	1984
Soberanía	II	NP		22,104	1980
Volcán Barú	II	NP		14,000	1976
Subtotal		12	5	1,359,632	
Cenegón de Mangle	IV	WR	YES	1,000	1980
Isla de Cañas	IV	WR		8,000	not avail.
Islas Taboga y Uraba	IV	WR	YES	258	1984
Peñón de la Onda	IV	WR		2,200	1984
Subtotal		4	2	11,458	
Metropolitano	V	NP		265	1985
Lago Gatún	V	RA	YES	348	1985
Golfo de Montijo	V	RA	YES	80,765	1990
Subtotal		3	2	81,378	
Comarca Kuna Yala (San Blas)	VII	IR	YES	320,000	1938
Embere Wounan (Ember Orua)	VII	IR		432,600	1983
Canglón	VIII	FR		31,650	1984
Chepigana	VIII	FR	YES	257,219	1960
La Tronosa	VIII	FR		20,579	1977
La Yeguada	VIII	FR		7,090	1960
Montuoso	VIII	FR		10,375	1978
Tapagra	VIII	FR		19,500	not avail.
Alto de Darién	VIII	PF		201,000	1972
Palo Seco	VIII	PF		125,000	1983
La Fortuna	VIII	WPR		2,520	1976
Subtotal		11	2	1,427,533	
Golfo de Montijo		RW	YES	80,765	1990

San San, Pond Sak		RW	YES	16,414	not avail.
Reserva Natural Punta Patiño		RW	YES	26,000	not avail.
Subtotal		3	3	123,179	
Parque Nacional Darién	X	WH	YES	579,000	1981
Parque Internacional La Amistad	X	WH		207,000	1990
Subtotal		2	1	786,000	

NP = National Parks

WR = Wildlife Refuges

NMP = National Marine Park

SR = Scientific Reserve

NM = Natural Monument

NP = Natural Park

FR = Forest Reserves

PF = Protection Forests

IR = Indigenous Reserves

WPR = Water Production Reserve

RA = Recreation Area

BIO = Biosphere Reserve

R W= Ramsar Wetland

WH = World Heritage Sites

PUERTO RICO (USA)

Area 8,897 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	28	8	35,278
Category V	0	0	0
Categories VI-VIII	1	0	11,340
Biosphere Reserves	2	1	15,346
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	30	8	46,618

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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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 (see US profile in this volume) 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. The relevant legislation is summarised below.

National wildlife refuges can be established under an Act of Congress, but can also be transferred to the authority of the FWS by 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).

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, the Regulation on Threatened and Endangered species was developed.

The Regulation on Threatened and Endangered Species, taking its authority from the Wildlife Law, 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 twelve areas providing habitat for seven species have so far been designated (DRN 1985).

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 co-operation between governmental and non-governmental conservation organisations.

International Activities

Conventions & Treaties

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

Administration

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 (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 USFWS is also responsible for the implementation of the Endangered Species Act and the protection of wetlands (Silander, pers. comm., 1991). 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 (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 Programme Division. Jobos Bay NERRS 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 Conservation Trust of Puerto Rico (Fideicomiso de Conservación de Puerto Rico) and the Puerto Rico Conservation Foundation (Fundación Puertorriqueña de Conservación) (Vera, pers. comm., 1992).

The Conservation Trust is dedicated to conservation under a Deed of Constitution between the United States and Puerto Rico in 1970. The Trust has acquired several sites of land to establish nature reserves. Among these sites are the San Cristobal Canyon, the Punta Guaniquilla Reserve, the Cabezas de San Juan headland and lagoons and the Hacienda La Esperanza.

The Nature Conservancy, Conservation International and the Puerto Rico Conservation Foundation provide support to establish the conservation data centre of the Natural Heritage Programme (Vera, pers. comm., 1992). The Natural Heritage Programme, established in 1988, encourages co-ordination 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 co-operation with NGOs and compliance with the objectives of the programme.

Biodiversity

Puerto Rico is a small and fairly mountainous island, with 80% of all level land situated in the coastal plain, where overpopulation and development exists. 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 1100 mm to 2220 mm and temperatures between 18C and 24C. 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 2000 mm to 4000 mm. 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 coast (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 1,000 m, 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 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 600 mm to 1000 mm. 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).

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Management

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 24,000 ha ranging from mangrove forest in coastal regions to high alpine forest at the peaks of the Luquillo Mountains (Little and Woodbury 1980).

No marine sanctuaries have been established in Puerto Rico; the proposed La Parguera National Marine Sanctuary (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). The Jobos National Estuarine Research Reserve was established in 1987 through US federal-Puerto Rican co-operation as part of the National Estuarine Reserve Research System (NERRS), which is a nation-wide network of 16 areas. They are to provide long-term education and research opportunities (NOAA 1987).

Contacts

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 (809) 723-3090 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

Fideicomiso de Conservacion de Puerto Rico (Conservation Trust of Puerto Rico), PO Box 4747, SAN JUAN, Puerto Rico 00905

Fundación Puertorriqueña de Conservación (Puerto Rico Conservation Foundation), Calle O'Neill #11, HATO REY, Puerto Rico 00918 Tel. (809) 763-9875 Fax: (809) 763-9895

Office of the Governor of Puerto Rico, PO Box 82, La Fortaleza, Apdo. 82, San Juan, PR 00901 Tel: (809) 721-7000 Fax: (809) 766-2483

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ANNEX I: LEGAL INSTRUMENTS

Not available

ANNEX II: PUERTO RICAN PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Caja de Muertos	IV	NR	YES	188	not avail.
Laguna Tortuguero	IV	NR		1,000	not avail.
Mona	IV	NR	YES	5,554	not avail.
Cabo Rojo	IV	NWR	YES	238	1974
Culebra	IV	NWR	YES	633	1909

Desecheo	IV	NWR	YES	146	1968
Laguna Cartagena	IV	NWR		324	1989
Boquerón Wildlife Reserve	IV	WR		237	not avail.
Humacao	IV	WR		1,026	1984
Jobas Bay	IV	NERR	YES	1,371	not avail.
Cabezas de San Juan	IV	NA		128	1975
Cañón de San Cristóbal	IV	NA		332	1974
Hacienda La Esperanza	IV	NA		922	1975
Laguna Guaniquilla	IV	NA		157	not avail.
Lands adjacent to the Bioluminescent Bay	IV	CF		131	not avail.
Aguirre	IV	CF		936	1918
Boquerón Commonwealth Forest	IV	CF		803	1918
Cambalache	IV	CF		374	1951
Carite	IV	CF		2,695	1936
Ceiba	IV	CF		143	1918
Guajataca	IV	CF		927	not avail.
Guánica	IV	CF	YES	4,006	1919
Guilarte	IV	CF		1,457	1935
Maricao	IV	CF		4,149	1919
Piñones	IV	CF	YES	630	1918
Río Abajo	IV	CF		2,275	not avail.
Susúa	IV	CF		1,315	1935
Toro Negro	IV	CF		2,733	1934
Vega	IV	CF		448	1951
Subtotal		29	8	35,278	
Caribbean/Luquillo Experimental Forest	VIII	NF		11,340	not avail.
Subtotal		1	0	11,340	
Guánica Commonwealth Forest Reserve	IX	BR	YES	4,006	1976
Luquillo Experimental Forest (CNF)	IX	BR		11,340	1976
Subtotal		2	1	15,346	

BR = Biosphere Reserves

CF = Commonwealth Forests

NF = National Forest

NA = Natural Areas

NERR = National Estuarine Research Reserve

WR = Wildlife Refuges

NWR = National Wildlife Refuges

NR = Natural Reserves

ST. KITTS AND NEVIS

Area 261 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	1	1	2,610
Category III	0	0	0
Category IV	0	0	0
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	1	1	2,610

Policy and Legislation

A recent environmental profile (CCA/IRF 1991) highlights recommendations regarding the development of protected areas. Further, it is recommended that the government give 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 co-ordinating management responsibilities within a national system. Allocation of manpower resources for enforcement and management activities should be made on the basis of priorities established in the plan.

The legal basis resource management is provided by the National Conservation and Environment Protection Act No. 5 (NCEPA), 1987 which covers management and development of natural and historic resources, establishment of protected areas, and the establishment of an advisory 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 and the associated land and marine habitats, to protect selected examples of representative or unique biological communities, to sustain 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.

Part II of the Act describes and provides for the establishment of protected areas, identified as national parks, nature reserves, botanical gardens, marine reserves, protected marine areas, historic sites, scenic sites, or areas of special concern (Annex I). 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. When a proposed protected area includes private land, the Minister of Development can either expropriate 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 (Annex I). Although none has yet been declared (OECS 1986), the Conservation Commission is actively studying proposals to implement the act (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 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 Nevis, where land above 300 m 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).

On St. Kitts, particularly, there is clearly a need for modern forestry legislation due to growing pressures on the land (OECS, 1986).

Part VI, Section 31 of the NCEPA makes provision for the protection of beaches and the coastal zone out to 2 km, 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 artefacts 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 (Archibold, pers. comm., 1991).

International Participation

Conventions and Treaties

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

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Administration

The Ministry of Agriculture, Lands, Housing and Development is the leading agency for the protection and conservation of natural resources (Anon. n.d.). The advisory Conservation Commission carries out the Ministry's functions of selection, management, and administration of protected areas. The Commission is required to prepare management plans for protected areas, which are approved by the Minister and reviewed at least every five years.

The Commission currently consists of eight members; 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 1992 budget for current expenditures was 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 Nevis 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.

Biodiversity

According to Mills (1988), it is generally accepted that about 37% of the land area of St. Kitts (approximately 6,500 ha) 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% (1,900 ha) of the island. The St. Kitts forest cover can be classified as follows: rain and cloud forest (2,300 ha); moist forest (2,100 ha) and dry forest (2,100 ha) (CCA/IRF 1991).

The availability and quality of ground water on St. Kitts is better than on Nevis. Wetlands and ponds cover about 240 ha 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. Both islands have beaches and coral reefs to the south that are relatively unspoiled.

Management

Development of a protected areas systems is still quite limited. Brimstone Hill Fortress was established as the first protected area in 1985, the second being the South-east Peninsula Conservation Area. While a number of potential sites have been identified, they have not been established. A summary of proposed protected areas is given in 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 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.

The SE Peninsula & proposed Sandy Point Marine Protected Areas are being affected by recreational use (anchoring of dive boats, diver impact, souvenir collection), conflicts between dive boat operators and local fishermen, coastal zone development, and sand movement leading to increased sedimentation. The lack of participation and personnel limits effectiveness (van't Hof 1993).

The Caribbean Natural Resources Institute (CANARI), 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).

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).

Contacts

The Ministry of Agriculture, Lands, Housing, and Development, Government Headquarters, PO Box 186, BASSETERRE Tel: (809) 465-2521 Fax: (809) 465-1001

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 I: LEGAL INSTRUMENTS

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 artefacts, 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)

ANNEX II: ST. KITTS & NEVIS PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Brimstone Hill Fortress	n.d.	NP	n.d.	n.d.	1985
Southeast Peninsula Recreation Area	II	RA	YES	2,610	n.d.
Subtotal	2		1	2,610	

NP= National Park

RA= Recreation Area

ST. LUCIA

Area 616 sq. km.

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Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	2	1	1,994
Category V	0	0	0
Categories VI-VIII	11	0	7,467
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	13	1	9,461

Policy and Legislation

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.).

By virtue of the Crown Lands Act Cap. 108, 1946, lands above 180 m are protected. A new ordinance, the Land Conservation Board Ordinance, will address land use. 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 (Annex I).

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 to arrest, charge and prosecute violators of the listed ordinances and regulations (Environmental Profile 1991).

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 (Annex I, 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 co-ordination 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 (Romulus, pers. comm, 1992).

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, over-exploitation, strip and dredge mining.

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 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 (Annex I).

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

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Administration

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 1,600 ha Central Forest Reserve, Crown lands, Queen's Chain (land extending 60 m 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 by-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.

Biodiversity

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 3,117 m (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 (16,752 ha, or 13% of total area), montane thicket (1,501 ha, or 1% of total area), elfin woodland (329 ha, or 1% of total area), secondary forest/mixed agriculture (78,440 ha, or 61% of total area) and dry scrub woodland (30,911 ha, or 24% of total area) (CIDA, n.d.).

Another estimate of cover has been made (Piitz 1983), indicating rain forest/lower montane forest (6,780 ha), montane thicket (608 ha), elfin woodland (133 ha), secondary forest (31,745 ha, comprising 29,378 ha agricultural land and 1,872 ha of open woodlands) and dry scrub woodland (12,510 ha). Some 200 ha 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 the 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, 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).

Management

Currently, protected areas cover just under 9,500 ha. 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. van't Hof (1993) reported that management capacity for MPAs along the Soufriere Coast is non-

existent due to lack of local awareness, participation and support for MPA's established in 1986, and continuing conflicts between user groups. Other issues limiting management effectiveness include personnel and training deficiencies, and an inadequate revenue generation scheme. George (1994) reports that there has been a revision of the Fishery Priority Areas and Management Areas. They have been redefined as they were the original source of conflict.

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-1940's, the government held title to a little over 2,000 ha 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 7,496 ha (11% of total area) included in the system.

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 have developed a Plan for a System of Protected Areas (published in December 1992). The document is a product of an intense and creative participatory process of investigators and consultation involving many communities, agencies and people throughout St. Lucia.

The project has defined nine management categories, including; Forest Reserve, Wildlife Reserve, Marine Reserve, Nature Reserve, National Landmark, Historic Area/Historic Site, National Park, Protected Landscape and National Trail. Most categories encourage appropriate and compatible use of the land and do not preclude human habitation, with the exceptions being Forest, Wildlife, Marine and Nature Reserves. Within these categories twenty-seven management areas were defined (St. Lucia National Trust 1992; Romulus, pers. comm., 1991).

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ANNEX I: LEGAL INSTRUMENTS

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

Title: Saint Lucia National Trust Act

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.

Sources: CIDA (n.d.); CCA/IRF (1991)

Title: The Fisheries Act

Date: 1984

Brief description: Provides, among 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)

ANNEX II: ST. LUCIA PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Pidgeon Island N. Historic Park	II	HP	YES	20	1979
Subtotal	1		1	20	
Savannes Bay Mangrove Area NR	IV	NR	YES	500	1982
Maria Islands Reserve	IV	R	YES	12	1982
Parrot Sanctuary (Central	IV	S		1,494	1980

FoR)					
Subtotal	3		2	2,006	
De Suze Estate	VIII	R		108	1946
Addition to Central "B"	VIII	FR		121	not avail.
Barre de L'Isle North	VIII	FR		231	not avail.
Barre de L'Isle South	VIII	FR		724	not avail.
Castries Waterworks	VIII	FR		1,392	1916
Central "A"	VIII	FR		1,631	not avail.
Central "B"	VIII	FR		1,474	not avail.
Dennergy Waterworks	VIII	FR		145	1946
Marquis Estate Parcel M 1	VIII	FR		134	not avail.
Quillesse	VIII	FR		1,400	1946
Saltibus Grand Magazin	VIII	FR		107	not avail.
Subtotal		11	0	7,467	

NR = NATURE RESERVE

R = RESERVE

S = SANCTUARY

FR = FOREST RESERVE

ST. VINCENT and THE GRENADINES

Area 389 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	0	0	0
Category III	0	0	0
Category IV	2	1	8,284
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total	2	1	8,284

Policy and Legislation

A national park system has been considered, but is 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 long-term 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.

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 330 m in elevation was designated as Crown land to be 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 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 lands 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 (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) (Annex I) 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). It 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. Despite legislation and severe fines only the parrot reserve remains.

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 is 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) (Annex I) 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 and 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 (CCA 1991).

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Protocol Concerning Specially Protected Areas and Wildlife for the Wider Caribbean (SPAW, 1990)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPAW, 1990)

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Administration

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. Responsibility for forest and wildlife reserves in practice rests with

the Forest Division, and 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 non-governmental 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). Another 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.

Biodiversity

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 Soufriere (1,219 m), which last erupted in 1979, while the southern section comprises of the remains of several extinct volcanoes. The Grenadines comprise about 32 islands, three-quarters of these being on the Grenadine platform, about 30-40 m deep. The islands comprise low dry hills, 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. 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. Some isolated stands of rain forest are located between 300 m and 490 m. Almost all land below 330 m is under permanent

cultivation, although many steep slopes above this have also been cleared and planted by shifting agriculturists. Secondary vegetation is a common feature due both to shifting cultivation, and in some areas, to recent volcanic activity.

In 1984, forests covered 13,000 ha 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, UNDP/IUCN 1988).

Management

The existing protected natural areas are a disparate collection of water catchments, wildlife reserves, forest reserves, and marine conservation areas that cover nearly 8,300 ha, 21% of the country's landmass. Included within these is St. Vincent Botanical Garden (part of Government House Grounds Wildlife Reserve), the oldest botanical garden in the Western Hemisphere, established by the military Governor of the Windward Islands in 1765 (CCA 1991)

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. 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). This is due to numerous difficulties, including the sale or granting of leases to Crown land above 330 m; 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.

Tobago Cays Marine Reserve established in 1987 still lacks effective management in spite of extensive planning support provided by OAS. Problems include lack of trained personnel, impacts from divers and snorklers, fishing and sewage and agricultural runoff, coastal development. Organisational problems include inadequate structure, staffing and training and a general lack of public support (van't Hof 1993).

Economic and financial analysis of Tobago Cays estimated that by 1998 annual tourism would increase from 33-37,000 to 82,000 with park management, while without management, visitation would only rise to 42,000 per year. Annual operating and initial establishment costs were estimated at US\$161,000 and 1 million respectively. Rates of return were estimated at 10-14% (Heyman 1988 cited by Dixon 1993).

With the exception of the Tobago Cays Marine Reserve management plan, no other area has been thoroughly analysed (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).

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. 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).

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ANNEX I: LEGAL INSTRUMENTS

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

Title: The Fisheries Act No. 8

Date: 1986

Brief description: Provides amongst other things for the establishment of marine reserves and conservation measures.

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.

Date: 1986

Brief description: Provides amongst other things for definitions of forest reserves.

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

ANNEX II: ST. VINCENT AND THE GRENADINES PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories	Presence of Marine or Coastal Zones	Area ha	Year Established
Tobago Cays Marine Reserve	IV	Yes	3,885	1986
St. Vincent Parrot Reserve	IV		4,399	1987
Subtotal	2	1	8,284	

SURINAME

Area 163,800 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	2	0	86,570
Category III	0	0	0
Category IV	11	3	749,400
Category V	0	0	0
Categories VI-VIII	1	1	68,320
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	1	1	12,000
Total (1)	14	4	904,290

(1) Totals have been adjusted to avoid double counting of areas with multiple management categories.

Policy and Legislation

Provision for the establishment of protected areas is made in various pieces of legislation. Original legislation was passed during the time that the region was a colony of the Netherlands, and has since been updated, both before and after independence. Suriname gained full independence from the Netherlands in 1975. The authority of the Governor of the 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, (Annex I). 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 (Agrarische Wet G.B. No. 53, 1937, updated by G.B. No. 53, 1953), later updated by Decreet L-2 of 15 June 1982, nature parks and multiple-use management areas may be created (Annex I) (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 provided for the establishment of nature reserves by state resolution (Annex I). Five nature preservation resolutions have been passed to date.

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, among other things, special management areas (bijzondere beheersgebieden, Annex I). 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 (Annex I) 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).

International Participation

Conventions & Treaties

Amazon Co-operation Treaty, (ATC, 1978)

Convention on Biological Diversity (CBD, 1992)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

FAO Tropical Forestry Action Plan (TFAP, 1985)

Administration

The Ministry of Natural Resources (Ministerie van Natuurlijke Hulpbronnen) is responsible for policy direction, legislation, issuance of permits, budget allocation and inter-ministerial co-ordination, and for all matters relating to natural resources. Three sections exist within this ministry. The Forest Service and the Bureau of Lands are responsible for protected areas, while 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 it is passed (Held and Reichart 1991).

The Bureau of Lands is responsible for long-term lease areas which include 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.

Biodiversity

Suriname has a typical tropical climate with average temperature of 27C all year, and annual rainfall between 1750 mm and 3000 mm. Four main ecological regions may be distinguished: young coastal plain; old coastal plain; savannah belt; and the interior region (Mittermeier *et al* 1990).

The young coastal plain lies between 0-4 m 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 4 m-11 m above sea level and consisting of clay swamps, sand ridges covered with grass, herbaceous swamps, swamp forests, dry forests and large areas of peat swamps (Mittermeier *et al* 1990). Behind the coastal region lies the savannah belt, between 10 m-100 m, and characterised by white sand ecosystems. The natural vegetation is xerophytic and mesophytic dry and swamp forests, and dry to wet grass and shrub savannahs.

Extending inland from the savannahs on the ancient Guiana Shield, the interior region covers three-quarters of the total area of the country (Mittermeier *et al* 1990).

Altitudes range from sea level to 1,230 m. 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 live in the coastal region where the capital city is located, and about 5% live 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). Nearly 90% of total land area is covered by forest.

Management

Protected areas in Suriname cover over 900,000 ha, 6% of the country's landmass. Four areas include marine or coastal resources, and one, the Coppename River Mouth, has been accepted as a Ramsar Wetland.

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 of protected area management began following Suriname's independence. The need was felt to preserve interesting natural areas in lowland areas where 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).

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.

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).

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).

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.

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 area is selected for designation by the advisory board, the Nature Conservation Commission, created in 1948. The primary management objective of reserves is protection for scientific research purposes. Recreational and educational activities are possible in the more accessible reserves. 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)

Date: 1973

Brief description: Provides for the establishment of special management areas.

Administrative Authority: Planning Bureau

Designations:

Special Management Area (Bijzondere Beheersgebieden)

Source: Baal (1989)

ANNEX II: SURINAME PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Raleighvallen Voltzberg	II	NR		78,170	1966
Brownsberg	II	NP		8,400	1969
Subtotal	2		0	86,570	
Boven Coesewijne	IV	NR		127,000	1986
Brinckheuvel	IV	NR		6,000	1972
Copi	IV	NR		28,000	1986
Coppename Monding	IV	NR	YES	12,000	1966
Eilerts de Haan	IV	NR		220,000	1966
Galibi	IV	NR	YES	4,000	1969
Peruvia	IV	NR		31,000	1986
Sipaliwini	IV	NR		100,000	1972
Tafelberg	IV	NR		140,000	1966
Wane kreek	IV	NR		45,400	1986
Wia wia	IV	NR	YES	36,000	1961
Subtotal	11		3	749,400	
Bigi Pan	VIII	MU	YES	68,320	1987
Subtotal	1		1	68,320	
Coppename Rivermouth		RW		12,000	1985

NR = Nature Reserves

NP = Nature Park

MU = Multiple Use Management Area

RW = Ramsar Wetland

TRINIDAD AND TOBAGO

Area 5,128 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	3	2	2,650
Category II	0	0	0
Category III	0	0	0
Category IV	9	5	22,098
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	1	1	6,234
Total (1)	12	7	24,748

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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.

A policy paper for the establishment and management of a national park network was developed in 1979/1980 in conjunction with the Organisation of American States (OAS). It was concluded that the existing legislation governing protected areas was not adequate to ensure proper protection. The report set out a detailed policy which could be used in the development of future legislation. This policy is relatively comprehensive, covering legislation, government policy, objectives and categories, together with procedures for establishment and management of a national park system. The government has agreed in principle with the proposals, but legislation was not enacted (Bacchus and Vorrán 1990, Thelen and Faizool 1980).

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, which makes provision for the establishment of wildlife sanctuaries (Annex I). The Chief Game Warden, with the approval of the Minister, may modify sanctuary boundaries. 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 (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.

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

United Nations Convention on the Law of the Sea (LOS, 1982)

Convention on the Conservation of Migratory Species of Wild Animals (Migratory Species, 1972)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Programmes and Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas and Wildlife Protocol, (SPAW, 1990)

Latin America Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

Administration

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 nineteen, comprising: an assistant conservator of forests, seven diploma level foresters and eleven forest rangers (Cross, pers. Comm., 1991).

Since inception the Minister has been attempting to set up a National Environmental Authority to co-ordinate environmental management. The Forestry Division within the Ministry is responsible for management of wildlife sanctuaries, forest reserves, and declared prohibited areas through its wildlife section. The Game and Wildlife Section was actually set up in 1950. Forest officers are also designated as wildlife wardens under the Conservation of Wildlife Ordinance, 1958.

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 69,000 ha, and were classified under six different categories. These comprised: thirteen scientific reserves; eight national parks; eight natural landmarks; thirteen nature conservation reserves; six scenic landscapes and thirteen recreation parks. The eight proposed national parks,

Caroni Swamp, Chaguaramas, Madamas, Maracas, Matura, and Nariva Swamp in Trinidad; and in Tobago, Bucco Reef and Eastern Tobago, cover almost half the proposed protected areas system.

The latest proposal for a national parks and protected areas system was made by the National Co-ordinating Committee of FAO's Tropical Forestry Action Plan. Based on the Thelen and Faizool document, a five year development programme for a system of national parks, scenic landscapes and nature conservation reserves, which encompasses thirteen areas, is described (CARICOM/FAO/ODA 1993). In the case of the proposed Matura and Madamas National Parks management plans have been prepared by the Forestry Division and the OAS (Forestry Division/OAS 1990).

Non-governmental organisations (NGOs) have long been involved in nature protection; in the 1970's private reserves included such areas as the Asa Wright Nature Center and Reserve, and two private bird sanctuaries (Daradine 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 (Homer, pers. comm., 1988). The Crusoe Reef Society was set up in 1986 to monitor, conserve, and protect the marine and coastal environment resources of Tobago. In 1986 its work included concentrating on halting the damage to Buccoo Reef Protected Area (Kenny, pers. comm., 1986).

Biodiversity

Situated in the Caribbean Sea, Trinidad is the most southerly of the West Indian Islands, and lies 11.3 km north of the Venezuelan coast of South America. The island of Tobago is mountainous, 80.5 km long and 59.5 km wide, and lies 30.4 km to the north-east 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 restrict 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 the Aripo savannah. Mangroves occur in patches on the coast (Beard 1944, Davis *et al* 1986, Thelen and Faizool 1980).

In 1993, just over 250,000 ha, or approximately 50% of the land surface could still be classified as forest land, although much of this is under severe pressure for alternative uses. In Trinidad and Tobago it is estimated that the annual rate of loss of forest cover is approximately 300-600 ha as a result of squatting and agricultural and forest industrial activities (CARICOM/FAO/ODA 1993).

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 species of amphibians and 55 species of reptiles (Huber and Meganck 1987). A summary of the natural resources has been published by Cooper and Bacon (1981).

Management

Trinidad and Tobago's protected areas cover 24,748 ha, approximately 5% of the country's land area. Seven areas contain marine or coastal resources, including the Nariva Swamp Ramsar Wetland.

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 the 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 warden system (Homer, pers. comm., 1988). In general, management is inadequate, except in Caroni Swamp and Little Tobago Wildlife Sanctuary.

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 16,000 ha (Bacon, pers. comm., 1988; Cross, pers. comm., 1989, 1992). In 1993 Nariva Swamp was declared a prohibited area.

Management effectiveness in the Buccoo/Bon Accord Reef Complex is considered partially effective. Limiting factors include inadequate staffing, need to rectify legislation concerning boundaries and establishment as a marine park, and lack of public support for resource protection. Impacts in the area included diver and snorkler activity, sewage and agricultural runoff, and coastal development (van't Hof 1993).

Environmental concerns include those areas that are extensively mined with the associated loss of top soil, vegetation and fauna. Legislation is inadequate to prevent excavation, forestry, squatting and other potentially environmentally harmful activities (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 (Cross, pers. comm., 1989). In 1987 significant fire damage affected Northern Range Wildlife Sanctuary (Bacon, pers. comm., 1988).

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 Ffrench (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 Ffrench (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 Ffrench (1972), Wildlife Conservation Committee (1972)

ANNEX II: TRINIDAD & TOBAGO PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Buccoo Reef	I	NR	YES	650	1973
Aripo Savannas	I	PA		1,800	1987
Caroni Swamp	I	PA	YES	200	1987
Subtotal	3		2	2,650	
Bush Bush	IV	GS		1,154	1968
Central Range	IV	GS		2,153	1934
Eastern Tobago	IV	GS	YES	100	not available
Little Tobago	IV	GS	YES	101	1928
Maracas	IV	GS		900	not available
Northern Range	IV	GS		936	1935
Nariva Swamp	IV	GS	YES	6,234	1993
Southern Watershed	IV	GS	YES	1,874	1934
Trinity Hill	IV	GS	YES	8,246	1934
Subtotal	9		5	22,098	
Nariva Swamp	XI	RW	YES	6,234	1992
Subtotal	1		1	6,234	

NR = Nature Reserve RW = Ramsar Wetland

GS = Game Sanctuaries PA = Prohibited Areas

TURKS AND CAICOS ISLANDS (UNITED KINGDOM)

Area 500 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	6	4	9,564
Category III	2	2	576
Category IV	11	8	6,766
Category V	1	1	176
Categories VI-VIII	0	0	0
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	1	1	54,000
Total (1)	21	16	71,082

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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 historical interest (Annex I). Forest management 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).

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. The National Park Regulation 1992 details the regulations governing the four categories of protected areas. National parks and nature reserves may be divided into

zones according to activities, mainly recreational, which appear to be compatible within these areas.

In July 1987 the National Parks Committee presented a list of 33 recommended sites to the Executive. The National Parks Order of 7 August 1992 designated eleven national parks, eleven nature reserves, four sanctuaries and seven areas of historical interest. In total, the Executive Council has now approved all of the recommended sites and these are now protected by law. (Note: Details for individual areas not available for report).

International Participation

Conventions & Treaties

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

Administration

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, Heritage and Parks.

The Turks and Caicos National Trust was established as a statutory body in 1992 to help to preserve the biodiversity and cultural heritage of the Islands. The aim is to establish an effective managerial framework for local and international fund-raising, a public awareness and educational programme and a legal framework for conservation of sites. The National Trusts activities are supported by the WWF-UK and The Nature Conservancy (TNC).

Forestry is not well developed in the islands: in the 1980's there was a Department of Agriculture within the Ministry of Development and Commerce. This Department had some role in amenity tree planting, but has since been closed 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 based ODA, bilateral and multi-lateral donors and international environmental groups (Anon. 1990). PRIDE is 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 wise use of the islands' resources.

Biodiversity

The Turks and Caicos are low-lying (under 75 m in altitude) limestone islands with a number of lagoons, salt flats and outlying coral reefs. The Caicos Islands are relatively fertile, and support an understory 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).

Management

Including the marine area of the North, Middle and East Caicos Islands Ramsar Wetland, Turks and Caicos Island's protected areas cover 165% of the country's landmass. The remaining 20 protected areas cover approximately 17,000 ha. Fifteen of these areas also contain coastal and marine resources (Summary Table, Annex I).

Considerable progress has been made in the designation of protected areas. 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.

It is now necessary 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 (Anon. 1990).

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.

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, 1986b) and the island of Grand Turk (Operation Raleigh 1987a, 1987b). 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.

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 done in co-operation with the principal fisheries officer. Cetacean Management in coastal waters is partially effective, but harassment is a continuing problem (van't Hof 1993).

A comprehensive survey of wetlands was undertaken, from July to October 1987, with the funding of the Department of the Environment, ODA and WWF-UK, which administered the survey. 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.

Contacts

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ANNEX I: LEGAL INSTRUMENTS

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 license 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 Historical 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 license granted by the Governor.

Title: The National Parks Regulations

Date: August 1992

Brief Description: Provides for details of prohibitions within each four categories of protected areas and allows for the establishment of zones for specific purposes within a national park and nature reserve.

Administrative Authority: Department of Environment, Heritage and Parks.

Designations: Prohibited activities within all four categories include taking of any flora and fauna, water-skiing, jet skis or hovercraft, dumping of wastes, possession of weapons and erecting any structure without permission. By the establishment of particular zones in national parks and nature reserves, aquatic sports, anchoring, vessels or fishing may be permitted. Definition for every zone is given.

Source: Original legislation

ANNEX II: OF TURKS & CAICOS ISLANDS PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Chalk Sound	II	NP	YES	1,460	1987
East Bay Islands	II	NP	YES	3,541	1987
Leeward Land & Sea National Park and Nature Reserve	II	NP	YES	500	1987
North West Point	II	NP	YES	1,026	1987
Princess Alexandria	II	NP		2,645	not avail.
Lake Catherine	II	NR		392	not avail.
Subtotal	6		4	9,564	
Dick Hill Creek, Bellfield Landing Point	III	NR	YES	394	not avail.
Little Water Cay, Donna Cay and Mangrove Cay	III	NR	YES	182	not avail.
Subtotal	2		2	576	
Admiral Cockburn Land and Sea Park	IV	NP	YES	154	not avail.
Columbus Landfall Marine Park	IV	NP	YES	518	not avail.
Fort George Land & Sea Park	IV	NP	YES	494	1987
Grand Turk Cays Land and Sea Park	IV	NP	YES	156	1987
West Caicos Marine Park	IV	NP	YES	397	not avail.
Admiral Cockburn Nature Reserve	IV	NR		431	not avail.
Bell Sound	IV	NR	YES	1,142	1975
Pigeon Pond and Frenchman's Creek	IV	NR		2,393	not avail.
Pumpkin Bluff Pond	IV	NR		173	not avail.
Vine Point Ocean Hole	IV	NR	YES	757	1987
Big Sandy Cay	IV	S	YES	151	1987
Subtotal	11		8	6,766	

Salt Cay	V	AHI	YES	176	not avail.
Subtotal	1		1	176	
North, Middle and East Caicos Islands		RW	YES	54,000	not avail.
Subtotal	1		1	54,000	

NP = National Parks

NR = Nature Reserve

S = Sanctuary

AHI = Area of Historical Interest

RW = Ramsar Wetland

UNITED STATES OF AMERICA

(Gulf States & Florida)

Area 1,224,090 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	19	1	69,931
Category II	18	4	1,029,835
Category III	2	1	19,203
Category IV	70	24	689,745
Category V	37	10	463,335
Categories VI-VIII	0	0	0
Biosphere Reserves	4	1	976,295
World Heritage Sites	1	1	585,867
Ramsar Sites	3	2	713,741
Total (1)	133	39	970,964

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

Policy and Legislation

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.

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. 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 in the Gulf States and Florida.

Parks conservation in the US began in earnest 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.

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 areas of responsibility have been grouped into 7 protected areas systems: National Park System, National Wilderness Preservation System, National Forest System, National Marine Sanctuary System, National Estuarine Research Reserves System, the National Wildlife Refuge System and the National Wild and Scenic Rivers System, (see below and Annex I). All but the last are represented in the Gulf States region.

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) (Annex I).

National Park System

National parks and other categories of lands within this system are established by individual acts of Congress. 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 sub-categories 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 (Annex I). 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). 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 (Annex I). Four federal agencies (USNPS, USFS, USFWS and USBLM) 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 increases 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 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 (Annex I).

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. 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.

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 (Annex I). No information was available concerning the presence of areas within this system in the Gulf States region.

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.* 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.* (Annex I).

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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 co-ordination areas also form part of the system. 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. 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, describing 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.

Department of Defence Lands

The Organic Act relating to Department of Defence (DoD) land, federal statutes (Title 16, USC) authorises the Secretary of Defence "to carry out a programme of planning for the development, maintenance, and co-ordination of wildlife, fish and game conservation, and rehabilitation in military reservations".

Other Legislation

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.

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

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). Comparable data for state and local protected areas within the Gulf States region were not available at the time this report was prepared.

International Participation

Conventions & Treaties

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Programmes & Associations

UNESCO Man and the Biosphere Programme (MAB, 1972)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas and Wildlife Protocol (SPA, 1990)

Administration

Four of the five principal federal land management agencies are active within the region, and others with minor roles are also present. Only limited information was reviewed concerning state and local protected areas (Waugh and Perez Gil 1992). The distribution of areas within the Gulf States region by agency is shown below, based upon data in this volume.

Management Agency	No. of Protected Areas	PAs with Marine or Coastal Zones	Extension ha
NOAA	4	4	44,010
USNPS	16	7	1,238,314
USFS	16	1	63,014
USFWS	49	17	579,041
Subtotal	85	29	1,924,379

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. As part of its science programme, the NPS maintains ties to research and academic institutions through a network of Co-operative Park Study Units at major universities.

Nationally 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. Appropriations legislation for the fiscal year 1993 has designated some US\$992.4 million for the operation of the national park system, with US\$118.9 million to be derived from the Land and Water Conservation Fund to be granted for

land acquisition and state assistance, and a further US\$231.8 million for construction, improvements, repair or replacement of physical facilities. . NPS has over 13,000 full time employees, and nearly double this number, with part time employees and volunteers, during peak visitation periods. Regionally, the NPS is the largest protected areas land management agency with responsibility for nearly two-thirds of federal holdings.

The US Fish and Wildlife Service (USFWS), US Department of the Interior: 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.

Nationally 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 co-ordination areas. Regionally the FWS manages the over 50% of the regions protected areas, which cover nearly one-third of federal protected area lands.

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.. 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, fire fighting, 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. Regionally, the USFS has a reduced presence, managing 16 areas covering 63,000 ha.

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. Appropriations legislation for the fiscal year 1993 has designated some US\$1,539 million for the operations, research, and facilities for the 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 co-operatively with state agencies and with research institutions in the management of the national estuarine research reserve system. Regionally, NOAA is responsible for four marine sanctuaries and reserves, covering 44,000 ha.

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 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 indigenous citizens of the US it can administer reservation lands for nature conservation. BIA provides technical assistance to tribes, with a general mandate for multiple uses, and assists in protected area management upon application by a tribe.

The four services of the **Department of Defence** 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 co-ordination with federal, state and local agencies, and in December 1988 it entered into a co-operative agreement with The Nature Conservancy. 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. 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, with input from the EPA and the USFWS, and this form of strict control provides some form of protection for all major wetlands.

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". USNPS 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.

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 fund-raising 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). Twenty-one major issues stemming from the threats were identified. Representative of the threats facing the protected area estate as a whole included: 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

The situation described above for the national parks system is probably much worse for 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). The organisational fragmentation present at the federal level is characteristic of the state activities too (Myers and Green 1989). However, many state agencies do have co-operative agreements with such agencies as the BLM and the USFS.

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. Among these The Nature Conservancy (TNC) is 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 National Fish and Wildlife Foundation, a non-profit organisation established by Congress in 1984 to foster co-operation, 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 co-operation with the USFWS and other organisations. The National Parks Foundation is a similar body, established by the US government.

Biodiversity

The dominant land form in the Gulf State region is the Gulf Atlantic Plain, which broadens out from a narrow coastal plain along the east coast to a much wider zone through Florida, Alabama, Louisiana and Texas. Other landforms present include the Interior Plains in western Texas, and the southern extent of the Appalachian Highlands (maximum elevations of 300-600 m) in Alabama. The Mississippi river empties into the Gulf of Mexico in Louisiana, forming an extensive wetland system.

Average annual precipitation is highest (150-200 mm) in Southern Florida and along the Mississippi & Alabama coastlines, and steadily drops through Texas to the west (125 mm falling to 25-50 mm). Wetlands form major ecosystems in southern Florida along the coasts and in the Mississippi drainage.

With only minor altitudinal change, vegetation patterns are largely controlled by variations in rainfall and local drainage. Out of the 66 vegetation types identified by Kuchler for the US and Southern Canada (Goodes World Atlas, 17th edition, 1988), 18 are represented in the region. The most widespread include Broadleaf deciduous and needle leaf evergreen forests, Broadleaf and needle leaf deciduous forests, and mixed and open Oak-Hickory stands and grass dominated formations in most of Texas (see below).

VEGETATION TYPES OF THE GULF STATES REGION

Source: Goodes World Atlas, 17th edition, 1988

BROADLEAF EVERGREEN TREES: 1. Mangroves, 3. Greasewood

BROADLEAF EVERGREEN SHRUBS AND DWARF SHRUB FORMS: 7.
Lechuguilla-sotol, 9. Sandsage-sandgrass

BROADLEAF DECIDUOUS FOREST: 16. Oak-Ash-Maple,

BROADLEAF DECIDUOUS TREES, NEEDLE LEAF EVERGREENS: 22. Oak
Pine,

BROADLEAF DECIDUOUS TREES, MEDIUM HEIGHT GRASS IN PATCHES:
25. Oak hickory bluestem

BROADLEAF DECIDUOUS TREES, NEEDLE LEAF DECIDUOUS TREES: 26.
Bay trees, bald cypress, 27. Tupelo gum bald cypress

NEEDLE LEAF EVERGREEN TREES: 34. Pine, 35. Pine juniper

NEEDLE LEAF EVERGREEN TREES, NEEDLE LEAF DECIDUOUS TREES: 45.
Pine-Bald Cypress

GRASS, LOW: 54. Bluestem, 55. Broom grass - water grass, 56. Marsh grass

GRASS, LOW BROADLEAF DECIDUOUS, SHRUBFORM, IN PATCHES: 60.
Bunch grass

GRASS, MEDIUM HEIGHT: 61. Mesquite-grass mesquite

NEEDLE LEAF DECIDUOUS TREES: 65 Bald cypress

Management

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 establishment of Yellowstone 18 years later as a national park under the jurisdiction of federal rather than state authorities was an historic precedent. 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 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.

All of the federal agencies mentioned undertake some regular form of inventorying and monitoring of the land resources under their control. Most of the lands under NPS jurisdiction have some inventory and/or ongoing monitoring programmes, arranged on a site-by-site basis. 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 planning, 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).

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 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.

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.

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 eight national marine sanctuaries covering some 3.1 million ha, and 21 national estuarine research reserves.

The national wilderness preservation system consists of 492 wilderness areas (37.3 million ha of which over half is 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). By 1992 some 652,000 ha 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, given that it only covers sites managed by one agency, and in many states there are likely to be others, e.g. dealing specifically with forestry, or with fish and wildlife, which are not included.

Private protected areas include over 1,300 preserves covering 650,000 ha 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); Ducks Unlimited administers 161,780 ha of wetlands; the local land trusts across the continent represented in the Land Trust Alliance administer a total of 828,630 ha (McCloskey 1992).

The North American Waterfowl Management Plan (NAWMP) 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 co-operation in the protection of Neotropical migrants.

There are a number of trans-boundary protected areas. A management agreement was under discussion with Mexico 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.

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.

Other Relevant Information Recreation and tourism is a major element of the protected areas philosophy in the US. Visits to parks increased from six million in 1942 to 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 Gil 1992). Huge numbers of visitors in many parks are causing problems of erosion, waste and pollution and general overcrowding and disturbance.

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ANNEX I: LEGAL INSTRUMENTS

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 Co-operation Agreement Act (16 USC

Date: 25 August 1916 (National Park Service Act); 1946 (Co-operation 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 Co-operation 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 (2023.4 ha) 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 Programme: Marine Protection, Research and Sanctuaries Act of 1972 (PL 92-532), as amended, 16 USC 1431 et seq. (authorisation); 15 CFR 922 (programme 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. (authorisation); 15 CFR 921 (programme 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 characterises 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 co-operation, 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 co-ordinated 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 co-ordinate 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 Co-ordination 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 Co-ordination Act, 1934 (amended 1958) authorises 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 co-ordination areas under co-operative agreements with federal, state, local and private agencies and organisations.

Source: TNC (1975)

Title: Department of Defence, United States Code, Title 16

Date: 1966

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

Administrative authorities: Department of Defence

Designations:

Military Reservation Co-operative 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." Co-operative 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 Programme.

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 Programme

Date: No information

Brief description: An administrative rather than a legal designation, research natural areas are designated by any one of eight co-operating 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 Defence; 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)

ANNEX II: USA (Gulf Coast States) PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Alexander Springs (FL)	II	W		3,116	1984
Big Gum Swamp (FL)	II	W		5,504	1984
Billies Bay (FL)	II	W		1,263	1984
Bradwell Bay (FL)	II	W		9,477	1974
Breton (LA)	II			2,023	1975
Caprock Canyon (TX)	I			5,526	not avail.
Chassahowitza (FL)	I			9,543	1976

Cheaha (AL)	II	W		3,031	1983
Florida Keys (FL)	II		YES	2,508	1975
Galveston Island (TX)	I			786	not avail.
Hale Ranch (TX)	I			1,982	not avail.
Hill Country Natural Area Reserve (TX)	I			1,099	not avail.
JN Ding Darling (FL)	I			1,060	1976
Juniper Prairie (FL)	II	W		5,366	1984
Lacassine (LA)	I			1,354	1976
Little Lake George (FL)	II	W		1,012	1984
Mud Swamp/New River (FL)	II	W		3,157	1984
Sipsey (AL)	II	W		5,103	1974
St. Marks (FL)	I			7,021	1975
Subtotal	19		1	69,931	
Alexander Springs	II			3,116	1984
Big Bend (TX)	II	NP		286,572	1944
Big Cypress (FL)	II	PN	YES	21,198	1974
Big Gum Swamp	II			5,504	1984
Big Slough (TX)	II	W		1,450	1984
Billies Bay	II		YES	1,263	1984
Biscayne (FL)	II	NP	YES	41,967	1980
Black Creek (MISS)	II	W		2,028	1984
Bradwell Bay	II			9,956	1975
Everglades (FL)	II	NP	YES	592,920	1947
Guadalupe Mountains (TX)	II	NP		31,364	1972
Indian Mounds (TX)	II	W		4,418	1984
Juniper Prairie	II			5,366	1984
Kisatchie Hills (LA)	II	W		3,521	1980
Little Lake Creek (TX)	II	W		1,542	1984
Sipsey	II			10,484	1975
Turkey Hill (TX)	II	W		2,139	1984
Upland Island (TX)	II	W		5,027	1984
Subtotal	18		4	1,029,835	not avail.
Fort Jefferson (FL)	III	NM	YES	19,083	1935

Fort Matanzas National Monument	III			120	1924
Subtotal	2		1	19,203	not avail.
Grand Cote (LA)	IV			2,459	not avail.
Anahuac (TX)	IV	NWR		9,897	1963
Aransas (TX)	IV	NWR		42,407	1937
Arthur R. Mitchell Loxahatchee (FL)	IV	NWR		58,994	1951
Atchafalaya (LA)	IV	NWR		6,178	not avail.
Attwater's Prairie Chicken (TX)	IV	NWR		3,234	1972
Bayou Cocodrie (LA)	IV			1,996	not avail.
Big Boggy (TX)	IV	NWR	YES	1,770	not avail.
Bogue Chitto (LA)	IV	NWR		11,602	not avail.
Bogue Chitto (MISS)	IV	NWR		2,755	not avail.
Bon Secour (AL)	IV	NWR	YES	1,819	not avail.
Brazoria (TX)	IV	NWR	YES	4,941	not avail.
Breton (LA)	IV	NWR		3,661	1904
Buffalo Lake (TX)	IV	NWR		3,104	not avail.
Cameron Prairie	IV			3,893	not avail.
Cape Romano Aquatic Reserve (FL)	IV		YES	6,700	1991
Catahoula (LA)	IV	NWR		2,150	not avail.
Charlotte Harbor Preserve (FL)	IV		YES	22,918	1982
Chassahowitzka (FL)	IVN	WR	YES	12,317	not avail.
Chicot (LA)	IV			2,592	not avail.
Choctaw (AL)	IV	NWR		1,708	not avail.
Crocodile Lake (FL)	IV	NWR	YES	1,619	not avail.
D'Arbonne (LA)	IV	NWR		7,055	not avail.
Dahomey (TX)	IV			1,072	not avail.
Delta (LA)	IV	NWR		19,763	1935
Eufaula (AL)	IV	NWR		3,211	not avail.
Florida Panther (FL)	IV			9,461	not avail.
Fountainbleau (LA)	IV			1,093	not avail.
Great White Heron (FL)	IV	NWR	YES	2,998	1938

Hagerman (TX)	IV	NWR		4,585	1945
Hillside (MISS)	IV	NWR		6,239	1975
Indian River Area Aquatic Preserves (FL)	IV		YES	25,890	1986
J.N. "Ding" Darling (FL)	IV	NWR	YES	2,037	1945
Lacassine (LA)	IV	NWR		13,203	not avail.
Laguna Atascosa (TX)	IV	NWR	YES	18,301	not avail.
Lake Woodruff (FL)	IV	NWR		7,494	1964
Little Sandy	IV			1,539	not avail.
Lower Rio Grande Valley (TX)	IV	NWR		10,662	not avail.
Lower Suwannee (FL)	IV	NWR	YES	15,856	not avail.
McFaddin (TX)	IV	NWR		17,397	not avail.
Merritt Island (FL)	IV	NWR	YES	56,356	not avail.
Mississippi Sandhill Crane (MISS)	IV	NWR		7,692	1974
Moody (TX)	IV	NWR		1,424	not avail.
Morgan Brake (MISS)	IV	NWR		1,324	not avail.
Muleshoe (TX)	IV	NWR		2,352	not avail.
National Key Deer (FL)	IV	NWR	YES	3,068	not avail.
Noxubee (MISS)	IV	NWR		18,786	1940
Okefenokee (FL)	IV	NWR		1,490	1937
Panther Swamp (MISS)	IV	NWR		10,993	not avail.
Paynes Prairie State Reserve (FL)	IV			5,656	1961
Pelican Island (FL)	IV	NWR	YES	1,780	not avail.
Pine Island	IV			163	1908
Pinella	IV			159	1956
Pinellas Country Aquatic Preserve (FL)	IV		YES	1,926	1982
Rookery Bay (FL)	IV	NMS	YES	8,585	1991
Sabine (LA)	IV	NWR	YES	56,472	not avail.
San Bernard (TX)	IV	NWR	YES	9,904	1967
St. Catherines Creek	IV			5,275	not avail.
St. Johns (FL)	IV	NWR		2,533	not avail.
St. Mark's (FL)	IV	NWR	YES	26,399	1931

St. Martins Marsh Aquatic Preserve (FL)	IV			1,510	1984
St. Vincent (FL)	IV	NWR	YES	31,650	1968
Tallahatchie (AL)	IV			1,577	not avail.
Tensas River (LA)	IV	NWR		22,259	not avail.
Terra Ceia Aquatic Preserve (FL)	IV		YES	1,383	1982
Texas Point (TX)	IV	NWR	YES	3,626	not avail.
Upper Ouachita (LA)	IV	NWR		8,460	1978
Weeks Bay (AL)	IV	NERR	YES	1,483	1986
Wheeler (AL)	IV	NWR		13,839	not avail.
Yazoo (MISS)	IV	NWR		5,051	not avail.
Subtotal	70		24	689,745	
Amistad (TX)	V	NRA		26,260	1965
Bastrop (TX)	V			1,418	not avail.
Big Thicket (TX)	V	PN		34,712	1974
Caledesi Island (FL)	V		YES	116	1966
Canaveral National Seashore (FL)	V	NS	YES	23,321	1975
Chea State Park (AL)	V			1,133	1933
Collier-Seminole (FL)	V			1,472	1944
Cordell Banks	V		YES	128,777	1989
De Soto State Park (AL)	V			2,051	1935
Fakahatchee Strand State Preserve (FL)	V		YES	3,610	1974
Gulf (AL)	V	NS		2,428	1935
Gulf Islands (FL) NS	V	NS	YES	57,084	1971
Jean Lafitte (LA)	V	NHP		3,480	1978
Joe Wheeler (AL)	V	NWR		1,032	1949
John Pennekamp Coral Reef (FL)	V		YES	3,359	1959
Key Largo Coral Reef (FL)	V	NMS	YES	32,388	1975
Lake Guntersville (AL)	V	NS		2,391	1947
Lake Mineral Wells (TX)	V			1,155	not avail.
Long Key (FL)	V		YES	187	1961
Looe Key (FL)	V	NMS	YES	1,554	1981

Monahans Sand Hills (TX)	V			1,554	not avail.
Mustang Island (TX)	V			1,499	1964
Natchez State Park (MISS)	V			1,391	1979
Natchez Trace Parkway (AL)	VP			18,300	1938
Oak Mountain (AL)	VNS			4,023	1935
Oleta River (FL)	V			162	1980
Padre Island National Seashore (TX)	VNS	YES		54,196	1968
Palo Duro Canyon (TX)	V			6,638	not avail.
Paynes Prairie (FL)	V			7,041	not avail.
Pedernales Falls (TX)	V			1,967	not avail.
Rio Grande N. Scenic River (TX)	V	NSR		3,885	1978
Sanford (TX)	V	NRA		16,603	1965
Sea Rim (TX)	V			6,115	not avail.
Seminole Necklace (FL)	V			2,569	not avail.
Shadow Mountain (TX)	V	NRA		7,369	1952
South Llano River (TX)	V			1,065	not avail.
Trace (MISS)	V			1,030	1986
Subtotal	37		10	463,335	
RAMSAR SITES					
Everglades (FL)		RW	YES	566,143	1987
Pelican Island (FL)		RW	YES	1,908	1993
Cache-Lower White Rivers		RW		145690	1989
Subtotal	3		2	713,741	
WORLD HERITAGE SITES					
Everglades National Park (FL)	X	NP	YES	585,867	1979
Subtotal	1		1	585,867	
BIOSPHERE RESERVES					
Big Bend National Park (TX)	IX			283,247	1976
Big Thicket National Preserve (TX)	IX			34,217	1981

Central Gulf Coastal Plain	IX			72,964	1983
Everglades National Park (Ft. Jefferson) (FL)	IX		YES	585,867	1976
Subtotal	4		1	976,295	

RW Ramsar Site NS National Seashore

W Wilderness Area NWR National Wildlife Refuge

NP National Park NMS National Marine Sanctuaries

NRA National Recreation Area NERR National Estuarine Research Reserve

P Parkway PN National Preserve

NM National Monument NHP National Historic Park

NSR National Scenic River

** Wilderness areas (category I) have only been listed where 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.

VIRGIN ISLANDS (UNITED STATES OF AMERICA)

Area 341 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	1	1	5,308
Category III	1	1	356
Category IV	2	2	140
Category V	0	0	0
Categories VI-VIII	0	0	0
Biosphere Reserves	1	1	6,127
World Heritage Sites	0	0	0
Ramsar Sites	0	0	0
Total (1)	4	4	6,623

(1) Totals have been adjusted to avoid double counting areas that are classified in 2 or more categories.

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Policy and Legislation

The United States Virgin Islands is an un-incorporated territory of the United States. Much self government has been provided incrementally by the United States Congress. The Virgin Islands has elected its own Governor since 1970, and has been represented in Congress by a non-voting 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 Programme (CZM). The USVI 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 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.

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 natural 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. The sanctuary designation process was amended significantly in 1984 to increase the emphasis on sustainable multiple use and planning, and less on prohibitions. There are two USVI areas on the Site Evaluation List (1983), Southeast St. Thomas and East End St. Croix (Foster and Archer 1988).

The 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 establish the Salt River Bay Historical Site and Ecological Preserve in St. Croix.

International Participation

Conventions & Treaties

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA, 1990)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

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Administration

Both the National Park Service and the Fish and Wildlife Service are agencies within the United States Department of Interior (USDI). The Park Service 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 Co-operative (VIRMC).

Total budgets for these three sites in 1991 was US\$7.76 million, with a staff of seventy-three.

The Fish and Wildlife Service administers wildlife refuges. The Virgin Islands Coastal Zone Management Programme 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.

Biodiversity

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 south-west 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 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).

Management

The 6,623 ha of protected areas in the US Virgin Islands is equivalent to 19% of the Island's landmass. The area is included in the Virgin Islands National Park (5,308 ha) 3 smaller areas, and the Virgin Islands Biosphere Reserve which incorporates the individual areas.

The islands have also been the subject of a significant number of scientific studies. In recent years the Virgin Islands Resource Management Co-operative has worked to provide co-ordinated 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 1986-88. 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 (1988b).

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.

The Virgin Island National Park suffers from the overuse of 750,000 recreational visitors. As a result a natural resource protection programme that designates anchoring and mooring zones in the park has been implemented (Rogers 1988a). The co-operative development of the Salt River Bay Historic Park & Ecological Preserve has been limited by funding shortages, inter-institutional conflicts, and commercial development pressure (van't Hof 1993).

Posner et al (1981) evaluated the economic impact of park generated tourism in St. John and St. Thomas, without considering preservation of historical resources and natural habitat, recreational opportunities or other non-market parameters. On an annual basis, operating expenses (US\$2.1 million) represented less than 5% of direct and indirect benefits (US\$43.3 million). Upward growth in recreational use (450,000 visitor days in 1980, 750,000 visitor days in 1986) together with addition of unmeasured benefits would probably raise net economic impact significantly (Dixon *et al* 1993).

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, over-exploitation of marine resources, and maintenance of marine, near-shore water quality.

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ANNEX I: LEGAL INSTRUMENTS

Not specifically available. See United States of America (Gulf States and Florida).

ANNEX II: US VIRGIN ISLANDS PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Virgin Islands National Park	II	NP	YES	5,308	1956
Subtotal	1		1	5,308	
Buck Island Reef National Monument	III	NM	YES	356	1961
Subtotal	1		1	356	
Sandy Point Wildlife Refuge	IV	NWR	YES	134	1984
Green Cay NWF	IV	NWR	YES	6	1977
Subtotal	2		2	140	
Virgin Islands National Park	IX	BR	YES	6,127	1976
Subtotal	1		1	6,127	

BR = Biosphere Reserve

NP = National Park

NWR = National Wildlife Refuge

NM = National Monument

VENEZUELA

Area 916,445 sq. km.

Summary Table

IUCN MANAGEMENT CATEGORY	No. of Protected Areas (PAs)	PAs with Marine or Coastal Zones	Extension
Category I	0	0	0
Category II	39	10	12,633,912
Category III	10	3	1,120,328
Category IV	5	2	96,448
Category V	50	0	13,687,069
Categories VI-VIII	4	2	9,489,631
Biosphere Reserves	0	0	0
World Heritage Sites	0	0	0
Ramsar Sites	1	1	9,968
Total (1)	108	17	37,027,388

(1) Totals have been adjusted to avoid double counting of areas with multiple management categories.

Policy and Legislation

Implementing legislation for protected areas and wildlife was enacted in 1941 following the signature of the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Anon. 1987). Further responsibility for protecting natural resources is given in the 1961 Constitution. It establishes the state as the main manager of resources and allows 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 1970's, 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).

The Organic Law of Central Administration (Ley Orgánica de la Administración Central 1976) provides for the creation of the Ministry of the Environment and Renewable Natural Resources (Ministerio del Ambiente y de los Recursos Naturales Renovables, MARNR) responsible for all natural resources, and for implementing environmental policy. Management responsibilities were shifted to the new ministry 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 1991, MARNR and INPARQUES formulated a proposal for a comprehensive Protected Natural Areas Law (Ley de Areas Naturales Protegidas) which would supersede the ABRAE framework, replacing it with the Natural Protected Areas System (ANAPRO) focused more specifically on areas with less intervention (Gondelles 1992, Luy, pers. comm., 1992).

International Participation

Conventions & Treaties

Amazon Co-operation Treaty, (ATC, 1978)

Convention on Biological Diversity (CBD, 1992)

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971)

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention, 1940)

Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage, 1972)

Programmes & Associations

Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE, 1972)

Caribbean Conservation Association (CCA, 1967)

Caribbean Environment Programme (CEP, 1981) and its Specially Protected Areas & Wildlife Programme (SPA-W, 1990)

Latin American Network for Technical Co-operation in National Parks, Protected Areas & Wildlife (LAN-NPPAW)

UNESCO's Man and the Biosphere Programme (MAB, 1972)

Administration

At the national level, MARNR consists of General Sectoral Directorates (Direcciones Generales Sectoriales) operating through autonomous regional agencies in each of the 24 administrative areas. All national parks and natural monuments are managed by INPARQUES. The institutes responsible for managing other categories in the ABRAE system are selected by MARNR (Pardo, pers. comm., 1991).

The 1989 regulations require management plans 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 (Pardo, pers. comm., 1991).

INPARQUES has at its disposal two bodies for the protecting natural resources and upholding regulations pertaining to their use: 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, Rodríguez, pers. comm., 1992). The Environmental Guard is empowered by law to prevent and curtail activities detrimental to the environment within several categories of protected areas. Activities carried out by the armed forces include: border patrol; tourist information and education programmes; building and maintaining conservation centres and enforcing resource use regulations (Anon. 1987, IUCN 1986).

Several autonomous management bodies with responsibilities to manage forests, wildlife and the Amazon State 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 State (Servicio Autónomo para el Desarrollo Ambiental del Territorio Federal Amazonas) (SADA-AMAZONAS).

SEFORVEN is responsible for managing the country's forested land, and 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 co-ordinates and supervises activities in the implementation of the Planning of Amazon State (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 ABRAEs located in the Amazon State work closely with SADA-AMAZONAS to achieve the conservation objectives of the region. A Consultative Council (Consejo Consultivo) assesses the activities of SADA-AMAZONAS.

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 endangered species, has formulated national conservation strategies for these and other species, and helps to manage one protected area (Velásquez, pers. comm., 1994). 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 Center (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 Non-governmental Conservation Organisations (Red de Organizaciones Conservacionistas No Gubernamentales) to encourage an exchange of information and co-ordinate activities (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 zoning, 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 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 (Bevilacqua, pers. comm., 1991; Gabaldón and Bevilacqua, pers. comm., 1990).

Biodiversity

All the characteristic Neotropical biomes are represented in Venezuela: high mountains, coastal ranges, arid and semi-arid regions, mangroves and marine coastal wetlands and seasonally flooded plains. North of the Orinoco River, most of the tropical forest is highly impacted, but to the south it is relatively undisturbed (Anon. 1989). Biogeographic provinces (Udvardy 1976) include the Venezuelan Dry Forest, Venezuelan Deciduous Forest, Los Llanos, Campos Limpos, Colombian Coastal and Guayanan Provinces.

Internationally significant wetlands (IWRB 1991) include the Ciénagas de Juan Manuel, Aguas Blancas & Aguas Negras, Cuare Wildlife Refuge, Los Llanos, and the Orinoco Delta. Endemic Bird Areas (ICBP 1992) are located in Tepuis, Cordillera de Caípe & Paria, Northern Venezuelan Mountains, Venezuelan Llanos, Merida Mountains and Eastern Andes of Colombia.

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 capped peaks (up to 5,007 m); the cloud forests of the Coastal Cordillera; llanos, flat lands with savannah 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 Savanna, a grassland area on a 16,000 sq. km. plateau at 1,000 m elevation 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 State, itself comprising 20% of the total land area but containing only 0.5% of the population (AID/NPS 1981, Anon., n.d., 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.).

Management

Venezuela's 37 million ha of protected areas is equivalent to 42% of the national territory, which is second only to Colombia in terms of absolute coverage. Seventeen areas contain marine or coastal resources, including the Cuare Ramsar Site. IUCN categories II & III account for more than 13 million ha, 37% of Venezuela's landmass.

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 1994, the national system included 39 national parks, 10 natural monuments, 5 wildlife refuges, 50 Protection Zones, and 4 National Biosphere Reserves (Summary Table, Annex II).

Information on protected area coverage and the degree of protection 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, 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, PROFAUNA and other agencies.

Problems in the protected area system arise, in many cases, as a result of inadequate selection procedures and planning processes (IUCN 1986, Pardo, pers. comm., 1991). Twenty-five different management categories, many of which go beyond traditional conservation objectives, 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 supersede ABRAE but has not yet been approved (Luy, pers. comm., 1992).

Lack of funding for the protected area services reduces their 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, two for wildlife rangers, and numerous short courses for the national guard had taken place. Nation-wide, 187 park guards were spread out between 21 parks, 8 wildlife rangers were assigned to three refuges, leaving nine other parks and the rest of the protected areas unstaffed (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 clear, and continued occupation, new colonisation and conflict within protected areas is common (Anon. 1987). Non-controlled and anarchic tourism and tourist developments are a problem, especially in coastal and marine protected areas.

Efforts have been made to increase protection in the Amazon State, where most dense forest remains. In 1978, timber extraction in the region was limited by Decree No. 2552 (Luy, pers. comm., 1992). More than half of the territory is now protected under various management categories, including a biosphere reserve (Rodríguez, pers. comm., 1992). A research centre, the Alejandro de Humboldt Amazonian Environmental Investigation Center (Centro Amazónico de Investigación Ambiental Alejandro de Humboldt), has been established (FAO 1991).

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 (Sharpe, pers. comm., 1992).

Reviews of the national protected areas system have been carried out by: INPARQUES (1983), IUCN (1986), 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 I: LEGAL INSTRUMENTS

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

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 but is 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. Does not imply UNESCO-MAB approval as part of the international biosphere network.

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 authorization 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 authorization. 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

ANNEX II: VENEZUELA PROTECTED AREAS LIST

Name of area	IUCN & National Mgmt. Categories		Presence of Marine or Coastal Zones	Area ha	Year Established
Aguaro Guariquito	II	NP		585,750	1974
Archipiélago Los Roques	II	NP	YES	221,120	1972
Canaima	II	NP		3,000,000	1962
Cerro El Copey	II	NP	YES	7,130	1974
Cerro Saroche	II	NP		32,294	1989
Chorro El Indio	II	NP		10,800	1989
Ciénagas de Catatumbo	II	NP		250,000	1991
Cinaruco Capanaparo	II	NP		584,368	1988
Cueva de la Quebrada El Toro	II	NP		4,885	1969
Dinira	II	NP		42,000	1988
Duida Marahuaca	II	NP		210,000	1978
El Avila	II	NP		81,800	1958
El Guácharo	II	NP		62,700	1975
El Tamá	II	NP		139,000	1978
Guaramacal	II	NP		21,000	1988
Guatopo	II	NP		122,464	1958
Henri Pittier	II	NP	YES	107,000	1937
Jaua Sarisariñama	II	NP		330,000	1978
Laguna de Tacarigua	II	NP	YES	39,100	1974
Laguna de la Restinga	II	NP	YES	18,862	1974

Macarao	II	NP		15,000	1973
Mariusa	II	NP		331,000	1991
Médanos de Coro	II	NP	YES	91,280	1974
Mochima	II	NP	YES	94,935	1973
Morrocoy	II	NP	YES	32,090	1974
Páramos del Batallón y La Negra	II	NP		95,200	1989
Parima Tapirapecó	II	NP		3,420,000	1991
Península de Paria	II	NP	YES	37,500	1978
Perijá	II	NP		295,288	1978
San Esteban	II	NP	YES	43,500	1987
Serranía de la Neblina	II	NP		1,360,000	1978
Sierra Nevada	II	NP		276,446	1952
Sierra de San Luis	II	NP		20,000	1987
Sierra de la Culata	II	NP		200,400	1989
Terepaima	II	NP		18,650	1976
Turépano	II	NP		74,100	1991
Yacambú	II	NP		14,580	1962
Yapacana	II	NP		320,000	1978
Yurubí	II	NP		23,670	1960
Subtotal	39		10	12,633,912	
Cerro Platillón	III	NM		8,000	1987
Cerro Santa Ana	III	NM		1,900	1972
Cerros Matasiete y Guayamurí	III	NM	YES	1,672	1974
Formaciones de Tepuyes	III	NM		1,069,820	1990
Laguna de las Marites	III	NM	YES	3,674	1974
Las Tetras de María Guevara	III	NM	YES	1,670	1974
Lomas El León	III	NM		7,275	1989
María Lionza	III	NM		11,712	1960
Morros de San Juan	III	NM		2,755	1949
Pico Codazzi	III	NM		11,850	1991
Subtotal	10		3	1,120,328	
Caño Guaritico	IV	FR		9,300	1989

Cuare	IV	FR	YES	11,825	1972
De la Tortuga Arrau	IV	FR		17,431	1989
Estero de Chiriguare	IV	FR		32,169	1974
Ciénaga de los Olivos	IV	FR	YES	25,723	1986
Subtotal	5		2	96,448	
Area Metropolitana de Caracas	V	PZ		84,300	1972
Barquisimeto	V	PZ		46,273	1987
Cuenca Alta del Río Cojedes	V	PZ		276,000	1974
Cuenca Alta del Río Tocuyo	V	PZ		141,600	1974
Cuenca Altas y medias del Río Pao	V	PZ		68,000	1974
Cuenca del Río Guárico	V	PZ		40,207	1974
De la Ciudad de Coro	V	PZ		19,720	1987
El Cigarrón	V	PZ		45,230	1989
Escalante Onia Mucujepe	V	PZ		101,125	1975
La Marichí	V	PZ		2,000	1973
La Mariposa	V	PZ		2,810	1988
La Tortuga Arrau	V	PZ		9,856	1989
Laguna de la Danta	V	PZ		2,203	1974
Las González	V	PZ		11,220	1980
Litoral Central	V	PZ		35,723	1974
Macizo Montañoso del Turimiquire	V	PZ		540,000	1974
Maracaibo	V	PZ		20,800	1986
Margen Izquierdo del Río Masparro	V	PZ		5,000	1974
Mucujún	V	PZ		19,450	1985
Region Lago de Maracaibo	V	PZ		244,125	1974
Río Albarregas	V	PZ		11,233	1973
Río Capaz	V	PZ		45,700	1989
Río Chuspita	V	PZ		5,642	1976
Río Torbes y sus Alrededores	V	PZ		12,000	1974

Río Yacambú	V	PZ		46,900	1974
Rubio	V	PZ		23,760	1978
San Antonio Ureña	V	PZ		6,223	1982
San Cristóbal	V	PZ		10,000	1978
San Rafael de Guasare	V	PZ		302,000	1973
Serranía de San Luis	V	PZ		86,000	1987
Sierra Nirgua	V	PZ		146,590	1974
Sierra de Aroa	V	PZ		113,000	1991
Sierra de Bobare	V	PZ		140,000	1974
Sur del Edo Bolívar	V	PZ		7,262,358	1974
Burro Negro	V	HR		75,000	1974
Distrito Páez del Estado Apure	V	HR		66,100	1981
Piedemonte Andino	V	HR		491,280	1974
Region Valle de Quibor	V	HR		72,000	1974
Río Cupravera	V	HR		3,203	1978
Río Pedregal	V	HR		195,900	1976
Cabos, Puntas y Lagunas de Isla de Margarita	V	HR		1,549	1988
Cuenca Alta de los Ríos Maticora y Cocuiza	V	HR		241,500	1974
Cuenca Alta y Media del Río Machango	V	HR		113,000	1990
Piedemonte Norte de la Cordillera Andina	V	HR		431,727	1974
Ríos Guanare, Bocono, Tucupido, La Yuca y Masparro	V	HR		400,000	1991
Sureste del Lago de Maracaibo Sto. Domingo	V	HR		406,662	1974
Sureste del Lago de Maracaibo Uribante-Caparo	V	HR		446,000	1974
Distritos Maturín, Cedeño, Acosta, Piar	V	HR		190,000	1976
Río Sanchón	V	HR		8,100	1976
Zona Sur de Lago de Maracaibo	V	HR		618,000	1974

Subtotal	5		0	13,687,069	
Alto Orinoco Casiquiare	VII	BIO		8,400,000	1991
Delta del Orinoco	VII	BIO	YES	876,500	1991
Sabanas de Anaro	VIII	FR		16,331	1982
Ciénagas de Juan Manuel, Aguas Blancas y Negras	VIII	FR	YES	196,800	1975
Subtotal	4		2	9,489,631	
Cuare Ramsar Wetland		RW	YES	9,968	1988
Subtotal	1		1	9,968	

NP = NATIONAL PARK

NM = NATURAL MONUMENT

FR = FAUNAL REFUGES

PZ = PROTECTIVE ZONES

HR = HYDROLOGICAL RESERVES

NBR = NATIONAL BIOSPHERE RESERVE

RW = RAMSAR WETLAND

BIO= BIOSPHERE RESERVE